

***GOVERNING AUTOMOTIVE SUPPLIER PARKS: LEVERAGING THE BENEFITS OF  
OUTSOURCING AND CO-LOCATION? †***

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Comments welcome.

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## ABSTRACT

Outsourcing of modules and systems has become a key feature of the global automobile industry in recent years. At the same time, suppliers are co-locating inside, or adjacent to, the automakers' assembly plants, in order to assemble large chunks of the car. This paper draws on evidence from Europe and Brazil to analyze the causes and consequences of outsourcing and co-location for the governance of the firm, industry dynamics, and employment.

The paper finds that modular product architecture is indeed associated with more outsourcing, but the outsourcing of production tasks is not necessarily associated with the disintegration of asset ownership. If anything, task outsourcing goes hand-in-hand with integrated asset ownership in modular consortia. Moreover, the paper presents evidence that relational contracts may co-exist with integrated and non-integrated asset ownership patterns. This diversity in configuring supplier parks is explained as much by social norms and local institutions (e.g. in the labour market) as by management policy.

## *Introduction*

An automotive supplier park is a network form of organization, that is neither market nor hierarchy (Powell 1990; Sako 1990). Various labels such as industrial park, supplier campus, or modular consortium, clusters of suppliers located adjacent to, or inside, automakers' final assembly plants emerged in the 1990s. Such supplier park became a template for organizing production for some automakers as they outsourced more and more tasks, increasingly parcelled out in big chunks called modules. But what has been the impact of increased outsourcing on the nature of network organization? Outsourcing can represent a double-edged sword. On the one hand, it may reveal a move towards draconian cost-cutting and sweating labour; on the other, it is a step toward relational contracting in which trust and joint problem-solving are key (Powell 2001). Which way has it gone in supplier parks managed by different global automotive manufacturers? And what are the implications of emergent governance modes for industry dynamics? This paper seeks to address these questions.

The automotive supplier park phenomenon presents a puzzle for academics and practitioners. Since the 1980s, North American and European automakers have de-merged their component divisions and increasingly bought in components and materials, in part in response to the Japanese example of lean production and supply (Womack 1990). In this process of de-verticalization, supply chains became geographically dispersed, and multinational suppliers came to take greater responsibility for modules and systems (Sako 2003). As though as a counter-trend to this development of global supply chains, supplier parks – in which suppliers co-locate with automakers -- started appearing in the 1990s. But why should modularity go hand-in-hand with supplier co-location? In theory, modular product architecture should enable

the supply chain also to be modular and hence geographically dispersed (Fine 1998), as in the case of electronic contract assembly (Sturgeon 2002). This paper attempts to resolve this puzzle.

In practice, supplier parks are, for some, mainly about new experiments in integrated manufacturing strategy and logistics management. For others, they are a reversion back to Henry Ford's Rouge model of a highly vertically integrated factory, except that ownership is fragmented (*Automotive News*, 9 April 2001). For yet some others, these parks are part and parcel of a series of measures (e.g. outsourcing of production and services, build-to-order, just-in-sequence delivery, etc.) applied by automakers to increase flexibility and reduce costs. Whilst the number of sites with some features of the supplier park is increasingly, the jury is still out on whether it will become the model of the future, or consigned to history as a failed experiment.

The remainder of this paper is structured as follows. First, I will review the main approaches to analyzing outsourcing currently available in the literature. Second, I will apply the relevant approaches in an eclectic manner to analyse automotive supplier parks that are configured in different ways. Third, I present some comparisons of the ways in which employment and labour are regulated on supplier parks, as an example of governance mechanisms. The paper concludes by extrapolating from the case studies, and considering some general lessons for configuring supplier parks. It is argued that there is no one best way of organizing a supplier park. Different modes of governing supplier parks exist due to a mix of economic incentives predicated on corporate strategy and institutions embedded in the locality.

## 1. Outsourcing Theories and Relational Contracts

Outsourcing is about the redrawing of the boundary of the firm. It involves the reallocation of responsibility for carrying out tasks from within an organisation unit to another unit, normally separated by ownership. Theories that address the boundary of the firm must have a theory about the governance of firms and markets. I will therefore start this section with an economic model of relational contracts within and between firms, following Baker, Gibbons and Murphy (2002); here, asset ownership is central to the definition of the boundary of the firm. I will then turn to the management and engineering literature, in which the notion of outsourcing of tasks does not correspond to the economic theory notion of outsourcing as defined by asset ownership. Finally, I invoke the sociological idea of embeddedness to redefine ‘relational contracts’ that are predicated on factors outside a specific transaction. The aim here is to be selective, rather than comprehensive, in the review of literature, with a view to arriving at an eclectic framework that would help explain the supplier park phenomenon.

### **Relational Theory of the Firm**

Sociologists have long known that informal agreements and unwritten codes of conduct powerfully condition not only the behaviour of individuals within firms, but also relations between firms. In this wisdom, however, this discipline relied on non-economic notions of affiliation, identity, status and power to explain why organizational boundaries might change over time. Economists ever since Coase, by contrast, have been concerned with the reason for the creation of firms in a sea of markets (Coase 1937). In so doing, they saw a sharp boundary between markets that relied on formal contracts (enforceable by a court), and firms that relied

on authority and other informal agreements to overcome some of the difficulties with incomplete formal contracts. It therefore took innovative thinking by Baker, Gibbons and Murphy (2002) to formalize the sociological notion that ‘relational contracts’ (i.e. informal agreements not adjudicated by courts) exist both within and between firms, and that the firm’s integration decision can be made to best service those relational contracts.

Consider a supply transaction involving an upstream party (supplier), a downstream party (automaker), and an asset (production equipment). The upstream party uses the asset to produce a good (e.g. an engine) that can be used in the automaker’s production process. The value of this good to the automaker is  $Q$ , but the good also has an alternative use with value  $P$ , which is assumed to be always lower than  $Q$ . If the upstream party owns the asset, the transaction is non-integrated, and the upstream party is an independent contractor, i.e. someone who works with his own tools. If the downstream party owns the asset, the transaction is integrated, and the upstream party is called an employee (or a division), working with an asset owned by the downstream organization.

In a well-known ‘make-or-buy’ framework, the decision to integrate is taken with a view to eliminating the hold-up problem. In non-integration, it is the supplier who is tempted to hold-up the buyer by refusing to deliver unless the agreed price is renegotiated. Williamson (1975) argues that the buyer can integrate (i.e. own the asset) to eliminate the supplier hold-up possibility. However, making one party the owner may stop hold-ups by the non-owner, but it may also create hold-up opportunities by the owner. The integrated owner can now take delivery and refuse to pay. As Gibbons (1999) asks rhetorically, why should firms be oblivious to conditions that wreck markets? This conundrum can be solved only with recourse to the use

of informal agreements (i.e. relational contracts) in tandem with formal instruments (such as formal contracts and asset ownership).

One way of typologizing this joint use of informal and formal agreements is to unpack the market vs hierarchy continuum into a two-dimensional matrix (see Figure 1). Following convention in economics, the non-integrated case is referred to as ‘outsourcing’, and the integrated case as ‘employment’. Here, the relational vs spot governance contrast is distinct from asset ownership patterns. In transaction cost economics, it is typically assumed that an integration decision is a move from spot outsourcing to relational employment. However, in Figure 1, relational contracts exist both between, as well as within, firms.

#### **Outsourcing of Tasks is not the same as Dis-integration of Asset Ownership**

So far, it has been assumed that the dis-integration of asset ownership is equivalent to outsourcing. This is not an unreasonable simplification, as the classical make-or-buy framework reduces the outsourcing decision to a decision affecting a single process or a single bundle of processes. However, to make the above framework of use to analyse supplier parks, we need to separate the notion of the outsourcing of tasks from outsourcing defined purely by asset ownership patterns. Here, the engineering and management mode of thinking is useful (Baldwin and Clark 2000; Baldwin and Clark 2003).

In any production system, a whole series of tasks are carried out, from design and development, parts fabrication, supply chain management, assembly, and testing. These tasks are structured in time and space, depending on the product architecture. So for instance, two

sets of tasks can be carried out independently of each other, and therefore in parallel, if each concerns the development of a distinct module with well-defined interfaces. Independence of a set of tasks from other tasks, in this way, is the basis for theorizing about the effect of product architecture on the boundary of the firm.

However, even for one distinct module (a physical chunk of a complex product), a series of tasks may be distributed in the supply chain, rather than carried out within a single firm. Figure 2 illustrates different ways in which tasks may be outsourced to suppliers. An automaker may decide to outsource the assembly of modules only in the first instance, before it gives greater responsibility to the supplier in the form of quality control, purchasing (i.e. selection of second-tier suppliers), and eventually engineering and development. The gradual increase in the scope of tasks to be outsourced may be considered beneficial to build confidence and trust in the supply relationship over time.

However, it is quite possible for automakers to intend that outsourcing would stop at a very limited extent of assembly and logistics for some modules, and never progress to other tasks. This is consistent with the notion of capacity (rather than knowledge) outsourcing (Fine 1998; Brusoni 2001). It is also logically possible for automakers to outsource the design and development tasks only, whilst undertaking the production and assembly tasks in-house. The nature of relational contract is different between supplier relationships that involve design only, those that involve assembly only, and those that involve both design and production.

Much more can be reviewed here, on the importance of core competence, knowledge, and non-patentable know-how in strategic decisions about 'make-or-buy' for the long term. However, the point here is that in studying supplier parks, we will only get to identify those

suppliers with some production and assembly tasks. Therefore, their 'local' relationship with the automaker on the supplier park has to be understood in the context of the larger picture. Some suppliers come to locate on the park after a close participation in the development process; others come with a much shorter history, having won a bid for an assembly-only contract.

### **Relational Contracts and Embeddedness**

The other contextual factor that should be brought to the fore is the concrete patterns of social relations in which economic transactions are embedded. In his seminal article, Granovetter makes the point that a systematic attention to actual patterns of personal relations by which economic transactions are carried out 'threads its way between the oversocialized approach of generalized morality and the undersocialized one of impersonal, institutional arrangements' (Granovetter 1985).

In this view, relational contracts have two bases in why trust is generated and malfeasance discouraged. One is the desire to safeguard future transactions, and the other the expectation of good behaviour that inheres in a personal relationship (Granovetter 1999). The former is nothing more than repeated games that enhance the shadow of the future and tipping actors to cooperate rather than to defect (Axelrod 1984). The latter is difficult to theorize using a repeated game theory framework. We therefore need to invoke larger historical, political, and social institutions in which transactions are embedded. For example, institutions that regulate the labour market, government policies and industry associations condition not only personal relations at the workplace but also 'social relations between firms'. The term 'relational

contract' is used in the remainder of this paper in this broad sense, not in the narrow sense of a repeated game based on reputation.

### **The Argument in Summary**

The economic theories of the firm define outsourcing to be equivalent to the disintegration of asset ownership. This notion is conceptually distinct from outsourcing of tasks, which according to the engineering and management literature is facilitated by modularity in product architecture.

In order to analyze how the double-edged sword problem in outsourcing – leading either to cost-focused spot contracting or trust-based relational contracting – is being addressed within supplier parks, we first need to find out the ways in which product architecture enabled certain tasks to be outsourced from the automaker to suppliers. At the same time, asset ownership matters to the extent that it gives rise to specific incentives for owners and non-owners. Thus, by design, asset ownership and product architecture can influence the nature of relations between firms on supplier parks. At the same time, it is argued here, following Granovetter, that the same asset ownership pattern and product architecture may still lead to a different governance mode in one location from another, because of a difference in the nature of social norms and local institutions that have influenced the social relations between firms.

## 2. Towards a Typology of Supplier Parks

Many things have been written to date about supplier parks, but none systematically compares the degree of task outsourcing, asset ownership pattern, and governance modes. I attempt to make such a systematic comparison based on fieldwork mainly in Europe (Germany, France and Spain) and Brazil. In total, I visited 14 supplier parks between March 2002 and December 2004 (see the Appendix). Each visit lasted at least half a day, and in some cases two whole days. Interviews were with plant managers and various functions of the automakers, such as purchasing, logistics, quality control, human resources, and finance. Wherever possible, key suppliers on site were also interviewed, as were labour representatives.

The 14 supplier parks vary considerably in their planned capacity, the number of employees on site, the number of suppliers, and what suppliers make. Diversity in the arrangements is striking. First, the number of suppliers on site varies from as few as five (at Renault Douai and Palencia) up to 21 (at Ford Camaçari) (see Table 1). Second, in some cases, suppliers are evenly distributed in the types of components they assemble, whilst in other cases, they are concentrated in specific areas such as interiors.

In order to make some sense out of this diversity, this section presents three configurations that exist in the field. First, VW Resende, Smart Hambach, and Ford Camaçari are described as cases of integrated ownership and relational governance. Second, GM Gravatai is put forward as a case of non-integrated ownership and relational governance. Third, Renault (at their sister plants Douai and Palencia) is described as a case of non-integrated asset ownership and spot governance (Figure 3 summarizes this typology). In each case, the supplier park is analysed with respect to (a) the extent of task outsourcing that is taking place, (b) asset

ownership pattern (who owns land, buildings, equipment and machinery?), and (c) the nature of relational contracts that are underpinned by specific social norms and local institutions.

### **Integrated Ownership – Relational Governance**

#### **Volkswagen Resende**

Set in the hills of Paraíba Valley in the state of Rio de Janeiro in Brazil, the VW Resende truck plant is a modular consortium in its pure form. It opened with much fanfare and publicity on a greenfield site in 1996, well before many of the new assembly plants outside the traditionally industrial ABC region started their operation.<sup>1</sup> VW Resende therefore represented the earliest implementation of an experimental production system that had existed only as an idea. As with most early experiments, however, the formal production arrangements may be evident to all participants, but the mode of cooperation and social norms – i.e. the relational contracts – required within the consortium emerged only through a process of trial and error. Whilst much has been written about this model factory (Lung 1999; Abreu 2000; Salerno 2001; Ramalho 2002), our discussion will focus on the following three aspects: (a) the modular consortium concept in its essence, (b) the underlying asset ownership pattern, and (c) the emergent relational contracts within the consortium.

The modular consortium concept at Volkswagen is attributed in part to Ignacio Lopez, who moved from GM to Volkswagen to find a receptive home for his ideas, and in part to the failure of Autolatina, a joint venture with Ford, which left VW with no expertise in designing

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<sup>1</sup> The ABC region is an industrial region south of the City of São Paulo where the largest auto plants are concentrated. It is made up of Santo André (A), São Bernardo (B), and São Caetano (C).

the entire truck or bus in-house. Volkswagen was to focus on strategic functions such as the overall vehicle architectural design and customer satisfaction, whilst asking suppliers not only to manufacture components but also to participate in final assembly of the trucks. The modular consortium at Resende is therefore unusual in the vehicle manufacturing industry for its practice of totally outsourcing final assembly.

Seven 'partner' supplier entities are involved in the production process. First, Delga welds body panels, which are then passed onto Carese (owned by Eisenmann) for painting. Separate buildings exist for the body shop and the paint shop, but all other partner suppliers are under one roof in the final assembly area. The final assembly line starts with Maxion assembling the chassis. Remon (a consortium of Pirelli, Bridgestone and Michelin) fixes the assembled tires and wheels onto the chassis. Powertrain (a consortium of Cummins and MWM) operates a sub-assembly area for engines and transmissions, but also delivers and fixes them at the final assembly line. Lastly, Siemens/VDO installs seats and cockpits inside the cabin, before Volkswagen conducts final inspection of the completed truck.

On the surface, the above production arrangement might appear to resemble that of a 'manufacturer without factories' such as Nike, whose main asset is the product brand in a buyer-driven global commodity chain (Gereffi and Korzeniewicz 1994). However, a closer examination of the asset ownership pattern at Resende defies this logic. Volkswagen is said to have made an initial investment of \$250 million in 1996, in order to construct the modular consortium on a one million square meter land that used to be a sugar cane field. Much of the funds went to construct the 90,000 square meter buildings and shared facilities, and to purchase machinery and equipment. Consequently, Volkswagen owns and controls more or less every factor of production, except labour. Specifically:-

- (a) The land is owned by VW, and partner suppliers pay no rent.
  
- (b) The buildings are also all owned by VW, and suppliers pay no rent.
  
- (c) Machinery and equipment, including those in the paint shop and the body shop, are designed by, paid for, and therefore, owned by, VW.
  
- (d) Condominium facilities are owned by VW, and suppliers pay for the use of the canteen, medical care facilities, etc. However, suppliers are not charged for the use of energy and water.
  
- (e) Inventories of materials and components on site are also all owned by VW. Typically, an external logistics company (Binotto) delivers parts to a consolidation centre, and another logistics company (Union Manten) records the delivery on behalf of VW and delivers parts to the lineside. Since the partner suppliers use only materials and components ‘on consignment’, they are not paid for the material inputs they work on, and therefore have no scope for earning profit on their price. Also, since the inventories are owned by VW, the suppliers would not have an incentive to lower the cost of holding inventories.

In all, the suppliers’ hands are tied, as VW owns every input except labour. This ownership structure gives suppliers limited incentives beyond the management of labour. Based on the asset ownership pattern, therefore, VW Resende is an integrated firm that has outsourced the management of labour. It does not engage in production activities but has retained full ownership of the physical assets of production.

It is possible that VW's ownership of physical assets came out of necessity rather than choice. In theory, the modular consortium idea seems to have involved suppliers as partners in the financing of the factory as much as in the production and assembly on site (Abreu et al 2000, p.267). In reality, VW did not find many suppliers with financial resources to invest in machinery and equipment. With relatively low labour costs, the Resende plant ended up being much less automated than their counterparts in Europe, with welding and painting operations being nearly 100 per cent manual. However, by late 2004, at the time of my field visit, VW had a plan to adopt a new supplier who will pay for the construction of a new body shop with welding robots.

The labour-intensive nature of the operations thus far suggests that the management of labour is central to the success of the Resende plant. But in contrast to the attention that was given to the innovative nature of the supply chain – with suppliers brought inside the factory as assemblers – there is little that is innovative about the management of labour. With the benefit of hindsight, VW wanted to outsource the management of labour, but ended up taking an informal leadership role in insisting on certain norms in labour management to be followed by all suppliers.

First, there is a common wage and benefits agreement with the union (Força Sindical), to pre-empt any dispute that might arise out of pay differentials between suppliers. Workers all came from the same labour pool trained by SENAI; once hired to work inside the Resende plant, shopfloor supervisors – leaders in each assembly area – were given a general orientation about the VW vision, its culture and common values. It is therefore not surprising that workers have developed an identity that they were *de facto* employees of the German multinational (Abreu 2000, pp.276-7).

Second, VW employs no direct workers, but has 477 indirect staff out of a total of 2118 employees on the Resende site. These VW staff work in indirect functions including product development, purchasing, and process engineering. In particular, VW tightly controls process engineering, having designed its body shop, paint shop, and the final assembly processes themselves.

In the end, if the wage is the same whether workers are employed by suppliers or directly by VW, and since there is so much coordination associated with working with partner suppliers, why doesn't VW do its own final assembly? An HR manager's response was:

The new concept was for VW to do the start and the finish of the assembly line. This was partly for cost reasons and there was also an advantage to not getting involved in managing labour. VW's main interest is to focus on product design and on marketing and managing client relations. We are not all that interested in managing the assembly process itself nor in managing labour.

To summarize, VW Resende is an extreme ('pure') case of a modular consortium, in which even the final assembly is outsourced to the 'partner' suppliers on site. However, all productive assets are owned by VW, giving these suppliers a very narrow scope for discretionary action, even in matters of inventory control. The key area in which suppliers could have exercised discretion is the management of labour. But even here, VW ended up taking an informal leadership role in imposing uniform employment governance, and pay and conditions are identical for all workers at VW and 'partner' suppliers.

### **Smart Hambach**

Smart Hambach, in the north east of France, is also a modular consortium with an integrated asset ownership structure. The key difference with VW Resende is, however, that Smart employees do the final assembly. Whilst supplier autonomy is respected in formal terms, there are strong relational contracts that render the site a tightly coordinated social system.

The idea of a two-seater electric city car was conceived by Nicolas Hayek, the founder of Swatch, to offer consumers the same sort of variety, quality and affordability in cars as for the watches. A joint venture between Hayek's SMH and Mercedes-Benz, called Micro Compact Car (MCC), was formed in 1994. The project did not go as planned, as the idea of an electric car was superseded by the conventional gasoline-powered car, and the car had to be re-engineered at a late stage to avoid the same sort of instability problem that Mercedes was facing for its A Class cars. Consequently, the product launch was delayed, and when cars finally started rolling out in 1998, Hayek pulled out leaving all of MCC to Mercedes.

Despite these problems, the Smart project retained a key feature of the initial concept, which was to open a new market segment by building a sales distribution network of its own, capable of offering consumers a choice in differentiated options. The design principle that made this possible was the modular product architecture, with suppliers developing major chunks of the car on an entirely new platform. Mercedes traditionally has had a culture of doing everything in-house, so this heavy reliance on suppliers for design and development was totally novel. However, Mercedes stuck to the notion that its core competence lay in 'retaining responsibility for the total car'; hence the retention of final assembly in-house.

At the time of my visit, there were seven ‘system partners’ on the Hambach site.<sup>2</sup> Magna assembles body-in-white; Surtema Eisenmann paints the bodies, whilst Cubic Europe does three-dimensional transfer printing for some bodies. Dynamit Nobel provides customized plastic body panels. The final assembly line starts within the area managed by Siemens-VDO, which assembles the cockpit and fixes it onto the body frame. Thereafter, the final assembly line is managed by Smart, which takes delivery of doors assembled by Magna and drive train made by ThyssenKrupp. The physical layout of the Hambach site is more dispersed than at Resende, as suppliers are not under one roof. Separate buildings or walls demarcate one supplier from another. Thus, whilst the final assembly area is in the shape of a cross with offices and a common canteen overlooking the repair area in the centre of the cross, such high visibility does not extend to the suppliers’ operations.

Land, buildings and equipment are owned and managed by Smart. Suppliers pay no rent for land and building, but they pay a rental charge for equipment. Smart’s policy is to invoice suppliers on things of which they can influence the usage. A leasing company was created to raise the initial investment fund of around 800 million Euros from three sources: equity finance from French banks, loans from German banks, and subsidies from the French local government.

The French authorities apparently wanted one legal entity for Smartville. But it ended up with each company as an autonomous entity. Consequently, the site has seven system partners and three logistics suppliers, apart from Smart itself. Of the total 2250 employees on

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<sup>2</sup> In 2001, front end module assembly carried out by Bosch was brought back in-house. There are also two system partners off site, but in the immediate vicinity, namely Faurecia (seats) and Continental (wheels).

site, 900 are employed by Smart. As the Smart HR manager explained, the Smart plant manager does not have real authority over suppliers, and each company manages its own social policy. But the salary conditions must be comparable (if not identical) from supplier to supplier in order to sustain Smartville as an eco-system. To facilitate this coordination, the HR managers from the eleven companies on site gather for meetings, in which the Smart HR manager takes a moderating role. For example, some suppliers have a thirteenth month pay and others do not; in this case the latter are asked to provide other benefits to make up the difference so that the total package would be of similar value.

The purpose of such relational governance is clearly stated by MCC Smart CEO Andreas Renschler: 'it's crucial to connect everyone (i.e. systems partner suppliers) into the same social system, to create a sense of community and shared purpose. That's where management comes in. At Hambach, we have 12 companies involved in building cars. Smart owns only the property, yet everyone involved identifies themselves as Smart' (*Automotive News*, March 10, 2003).

### **Ford Camaçari**

Ford Industrial Complex at Camaçari, in the state of Bahia in Brazil, is a condominium with suppliers, some of which are under a single roof with Ford. Like VW Resende and Smart Hambach, the land and buildings are owned by the automaker. Like VW Resende, all

employees on the Camaçari site are on an identical human resource system. But like Smart, and unlike VW Resende, Ford controls final assembly.<sup>3</sup>

The so-called Amazon project involved the development of an economical B-platform car using Ford's product architecture with 19 modules. The New Fiesta started its production at Camaçari in 2002, and the EcoSport was subsequently launched in 2003. From the start, the Amazon project idea was to push outsourcing to its limit, and to economize on overhead and fixed costs by sharing them with suppliers. Therefore, the target agreement signed by suppliers at the time of Program Approval (when design was frozen) included a requirement that they locate on Ford's site.

Whilst Ford retains control over the final assembly process, 21 component suppliers and 4 service providers (in maintenance, logistics, and product development) are located on the site. Eight further component suppliers are located outside, but close to, the site. Of the 21 component suppliers, 11 are in the final assembly area 'under one roof'. They are Faurecia (door module), Visteon (cockpit), Pelzer (soft trim), Interfrim (headliner), Lear (seats), Mapri- Textron (fasteners), Valeo (front end module), Benteler (suspension), ArvinMeritor (exhaust), Cooper (fluid tube), and Pirelli (tire assembly). Other significant suppliers include Forrrolene and Sodecia in the stamping shop, DDOC undertaking body painting, Dow and Autometal doing plastics injection, ABB in maintenance, and Exel providing logistics service. Thus, compared to VW Resende and Smart Hambach, Ford Camaçari is a much bigger site in which significant value-adding manufacturing processes other than assembly are carried out.

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<sup>3</sup> This was despite sensational media reporting that Ford would outsource key parts of its final assembly operations, which 'could signal the company's gradual withdrawal from final assembly as a core activity

All the suppliers for the Amazon project were fixed by the time the site was originally chosen at Guaíba in Rio Grande do Sul. All, but one, of the suppliers followed Ford when it chose to relocate to Bahia, after discovering that the new RS governor was not going to honour all aspects of the agreement signed with the previous state government. Both federal and state incentives made the Camaçari location attractive, and the package included improving the road infrastructure and the promise to build a new port nearby. Within the Ford Industrial Complex, land and buildings are owned by Ford, whilst the machinery and equipment that suppliers use are owned by suppliers themselves. This means that for suppliers, ‘Bahianization’ – bringing value-adding manufacturing activities to Bahia – involves a calculation of trading off high transportation costs if sourced from the industrial south and upfront new investment costs if sourced from within Bahia. On the one hand, the distance between the traditional industrial region in the south and Bahia is equivalent to 3 days in transit, 50 hours of which is on the road. On the other hand, since Bahia has no history of industrial production, local suppliers are not up to required standards, forcing most Ford suppliers to consider making rather than buying components locally.

With the launch of the Ecosport and the hiring of 2100 new employees in August 2004 to cope with the expansion, the Camaçari site employs 7753, of whom 3372 are on Ford’s payroll. Ford is very much in charge, to create a uniform human resource system that applies to all employees on the Camaçari site regardless of their employer. New recruits are trained by SENAI, which provides 900 hours of training over 6 months, 450 hours before hiring and 450 hours after hiring. A labour pool created via SENAI is sub-divided and allocated to Ford and suppliers, who conduct their own selection process based on interviews. Once selected, all

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– transforming Ford from a carmaker into a global consumer products and services group’ (*Financial Times*, 4 August 1999).

workers are put through an identical training programme, using Ford's on-site Technical Centre which houses a mock paint shop, body shop, and final assembly line; 'no short cuts for suppliers', says Ford's HR manager.

Apart from recruitment and training, there is a comprehensive list of facilities which are shared amongst Ford and its suppliers, including the restaurant, medical services, banking, maintenance and logistics, health and safety procedures, plant security, fire protection, and cleaning services. The Camaçari site also has a common wage structure for operators (but not for managers and engineers) that apply to Ford and its suppliers on site. A Human Resource Management Committee exists in order to develop and monitor such a common system so as to avoid labour conflict. The idea is to create a consensus, even if it means forcing a common solution through the committee structure. G7 consists of seven key companies (Ford, Benteler, Visteon, ABB, Lear, Exel, Faurecia) that each represents other suppliers. Every Thursday, the G7 plant managers and HR managers meet to discuss various issues. On the process of arriving at a consensus, Ford's HR manager reflected: 'It's a challenge, but after three years, we're aligned with our partners to do this. Sometimes, one supplier wants to do things differently – e.g. pay their workers more – but we lean on the supplier to stick to the common rule.'

#### **Non-integrated Ownership – Relational Governance: GM Gravatai**

VW Resende, Smart Hambach and Ford Camaçari all have an integrated asset ownership structure and highly developed relational contracts as reflected in their enforcing a uniform human resource system on the site. General Motors' supplier park in Gravatai, in the state of Rio Grande do Sul, has a similarly uniform HR system, but asset ownership is not

integrated. That is, suppliers purchased their own piece of land and constructed their own factory building.

The Blue Macaw project started in 1996, in order to develop a small subcompact car, with a modular product architecture based on the Corsa platform. Its vision also included (a) full participation of suppliers who would co-design, co-validate and co-locate, (b) the implementation of lean manufacturing concepts, and (c) a high degree of de-proliferation (i.e. a base car for which only a small option variety is offered).

The production of a Corsa derivative, called Celta, started in 2000 with 16 *sistemistas*, as the suppliers are known, which came to locate on the Gravatai site (see Table 1). The whole site was initially bought by the state government, which in turn sold allotment by allotment at a subsidized rate to GM and the suppliers. Thereafter, each company erected its own factory building, and purchased their own the machinery and equipment. The only exception is Polyprom, which does small stampings within GM's stamping shop. There are no other suppliers inside the stamping shop, body shop, paint shop, or the final assembly area. Suppliers' ownership of assets was considered unproblematic by GM, whose manager expected suppliers to stay around for a long time, like the Blue Macaw birds which, once mated, stay together for ever. This expectation is enforced by the fact that model cycle tends to be rather long in Brazil, lessening the chance of supplier turnover. At the same time, there is a formal contractual safeguard, prohibiting suppliers from supplying to other automakers from the Gravatai site.

Whilst respecting supplier autonomy in matters of asset ownership, General Motors at Gravatai takes a lead in instituting a uniform human resource system in a manner similar to

Ford's at Camaçari. At the time of my visit in November 2004, the Gravatai site employed a total of 2441 workers, of whom a majority – 1699 – were on GM's payroll. The Personnel Policy Committee (PPC), consisting of HR managers from GM and the 16 suppliers, meets once a month to discuss matters concerning personnel services, labour relations, and the human resource system. Each of these three areas has a sub-committee that meets more frequently. First, personnel services consist of transport, cafeteria, site protection, and medical centre, and are all outsourced to one single company. Second, labour relations on site is governed by a five-year collective works contract, signed between the Força Sindical union and the Gravatai Industrial Complex (i.e. GM and supplier managements all put together), to implement a common system of flexible work hours, disciplinary steps, and conflict resolution procedure. Lastly, there is a common wage scale that applies to all companies on the site.

The common way of doing things can emerge only over time, even if 'the intention is to commonize everything', according to GM's HR manager. 'The challenge is to work with 16 different ways of working and of managing people. This has been a problem with us at the beginning.' Compromises had to be made in some cases. For example, unlike at Ford Camaçari, GM wanted the sistemistas to use the same recruitment and selection process (involving tests, assessment centre, and interviews), but acquiesced to suppliers using their different ways when they claimed that the GM way was too expensive. Similarly, initial training at GM consists of a 5 day 'lean orientation week' to learn and practise the lean production principles. Every new recruit at GM gets this training, but suppliers thus far have argued, despite numerous attempts by GM, that they cannot afford to let their workers go for a week-long training.

### **Non-integrated Ownership – Spot Governance: Renault Douai and Palencia**

As the last category of supplier parks to be examined, the configuration of non-integrated asset ownership combined with spot governance (i.e. relative absence of relational contracts) is common in many brownfield sites in Europe. This arrangement strongly reflects the cost-cutting motivation for outsourcing, enabling automakers to economize on initial capital investment cost and on labour costs. It is generally understood that supplier wages are lower than automaker wages.

As an example, Renault's parks at Douai in France and Palencia in Spain, sister locations that make the New Megane, are similarly configured with five suppliers housed in separate warehouse-like buildings on site: Benteler makes cross car beams, Siemens assembles wiring harnesses, VPO (a joint venture between Valeo and Plastic Omnium) assembles the front end module, SAS assembles the cockpit, and Grupo Antolin assembles the door inner. It is evident that the park is for suppliers that deliver in sequence bulky and difficult-to-transport products that face high variety (for example, the cockpit has a theoretical variant of 1 million, a world of difference from the Corsa derivative in Brazil).

The proximity necessitated by the combination of high variety and bulkiness of the products has had undesirable effects, however, such as a convergence of pay scales (logistics manager at Douai, quoted in *Automotive News*, July 28 2003, p.30D). In fact, at Douai and Palencia, a Renault logistics manager is assigned to look after each supplier on site, but there is little lateral communication that brings together all five suppliers on the site. Each supplier negotiates a rent for the use of the building, and bargains over who pays for the specific investment on site, in the absence of knowledge about settlements by other suppliers. If

suppliers are made to pay, say, for the U-shaped assembly line, then they would wish to make the investment as general as possible, and easy to dismantle (thus standing the transaction cost economics logic on its head). Moreover, each supplier is left to determine its own human resource policy, so on the same site, some suppliers rely more on temporary workers than others. Suppliers also negotiate with unions on pay, flexibility, and work hours separately, with little lateral communication amongst suppliers.

### 3. Employment Network on the Supplier Park

The previous section demonstrated that on supplier parks, both integrated and non-integrated asset ownership patterns co-exist with relational governance mode. This section delves deeper into the nature of employment networks as a mode of governance on supplier parks. In particular, the case of the three parks in Brazil – VW Resende, Ford Camaçari, and GM Gravataí – is contrasted to the Mercedes' industrial park in Rastatt, Germany. In Brazil, both management's and labour's constrained preferences coincided to result in a uniform employment governance on each supplier park. By contrast, in Germany, labour's preference, as expressed through the presence of multiple unions and works councils on site, led to a more variegated regulation of the employment network.

Outsourcing has always been associated with the automaker's motive to access low-cost labour in emerging markets or in non-unionized workplaces. The location choice for many of the greenfield supplier parks reflects this motive. For example, in Brazil, automakers have chosen locations away from the traditionally industrialized ABC region in the south with the presence of strong metalworking unions, to justify paying lower wages. In 2001, the average

monthly wage at newer auto plants was US\$477, just over half the average of US\$907 prevailing in the traditional auto plants. (Anner 2003). Thus, management is less concerned with creating lower pay scales for suppliers than for the automaker within supplier parks.<sup>4</sup>

In the three supplier parks in Brazil studied here, there is a single union that has signed a framework agreement on a common wage system for all workers at the automaker and partner suppliers. The corporatist legacy in the Brazilian labour law dictates that one union is to be recognized for a specific industrial sector in a given geographical region. At the time of my visits, this meant that the VW and GM managements dealt with the more conservative Força Sindical (FS) metalworkers' union, whereas the Ford management dealt with the metal union affiliated to the more left-oriented Central Unica dos Trabalhadores (CUT). However, there was a varying degree of contest between FS and CUT, with the CUT union taking recognition cases to the labour courts and simultaneously attempting to win grass roots support from workers through the creation of factory commissions (non-mandated works council-like bodies) within supplier parks. For management, there is a trade-off in dealing with a moderate FS union that has a weak presence in the workplace and negotiating with CUT with tougher stance, for example, against flexible hours. 'CUT is tough but will implement an agreement. By contrast, FS often agrees to something but doesn't have the power to implement it', according to the Ford HR manager. Either way, the key issue for the Brazilian unions is not the closing of wage gaps between automakers and suppliers, but differentials between the industrial south and the new greenfield locations.

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<sup>4</sup> Similarly at Smart Hambach, it mattered that the prevailing pay in northeast France is lower than across the border in Germany, but the automaker – supplier pay differentials mattered less.

This Brazilian situation is in contrast to the complexity of labour networks in German supplier parks. As an example, the industrial park at Rastatt was created by Mercedes to launch the A-Class in 1997. By 2004, there were ten suppliers (see Table 1 for what they make), housed in a building adjacent to the final assembly area, and connected to the final assembly line by conveyor belts. Mercedes owns the land and buildings, and suppliers pay rent. A total of 2800 are employed in production, of whom 700 are with the suppliers on the site.

Each company on site has its own human resource system, based on its own philosophy, but it is generally understood that wages at supplier companies are lower than the pay level at Mercedes. It is as much the policy of the main union on site, IG Metall (IGM), as of management to maintain a clear boundary between the Mercedes workers and supplier workers. The Mercedes works council (guided by IGM) has an agreement with the Daimler-Chrysler management that no suppliers would carry out work inside the Daimler-Chrysler plant. The ultimate line of defence by Mercedes workers is to prevent suppliers from doing work on the final assembly line.<sup>5</sup> Thus, the physical boundary of the firm at Mercedes is dictated by this social norm backed up by a collective agreement.

The diversity and complexity of employment relations on the park are summarized in Table 2. Even the IG Metall union is a source of diversity, offering different tariff agreements for specific industrial sectors. Until recently, multiple industrial unions were present, notably the wood and plastics union and the textile union both with wage agreements that were inferior to the IGM agreement. IG Metall took over these unions, but continue to negotiate separate

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<sup>5</sup> In reality, supplier employees are present inside the final assembly plant, to check quality at the point of fit, when Mercedes workers install, say, seats and cockpits. This is not supposed to happen according to the formal agreement, and is a case of a relational contract to realize close coordination in production tasks between Mercedes and its suppliers.

sectoral agreements. Thus, it is ironically the works council that has tried to narrow pay differentials between suppliers on the site. For instance, the works council at the seat maker, JCI, negotiated a top-up above the textile sector wage rates in the form of premia linked to quality and attendance. Moreover, the seven works councils at suppliers have come together with the Mercedes works council to form a location works council (*Standort betriebsrat*), an informal body known to Daimler-Chrysler management but with no formal status for consultation nor negotiation. They meet once a month to discuss issues of common interest, and to exert collective pressure on specific supplier management by heightening awareness of areas of dissatisfaction amongst employees.

Despite such informal coordination, works councils are a decentralizing force in German industrial relations. The principle that different employment conditions apply to companies with separate ownership, therefore, is not easily thwarted via works council coordination. One way in which pay levels are being undercut substantially is by employing temporary workers. At Opel Russelsheim, for example, Vectra and Signum are assembled by 1600 production workers, but from 2002, a further 400 workers are employed on the site in a Supplier Mall, a warehouse with sub-assembly and sequencing activities. A separate company, SCR, manages the mall, which in turn justifies the employment of a high proportion of contingent workers supplied by Randstad, the labour placement agency.

To summarize, geography and ownership are two, often competing, bases for defining the dominant boundary for labour market segmentation. In Brazil, geography dominates in part due to the prevailing labour law, so employment networks become uniformly governed, as though for a single firm, for each supplier park, location by location. In Germany, by contrast, ownership dominates, and the idea of industrial boundaries for unions persists, so that

employment networks involving suppliers that draw from different industries (ranging from metal, electronics, plastics, textiles) remain variegated.

## Conclusions

This paper developed a framework for analyzing supplier parks, which represent a template for organizing in the auto industry since the 1990s. The template combines outsourcing and co-location. The framework focuses on examining three dimensions of organizing, namely asset ownership patterns, the degree of task outsourcing, and the nature of relational governance. The paper arrived at three theoretical and empirical results.

First, in examining the notion of outsourcing, we made a distinction between the economists' definition based on asset ownership and the engineering and management definition based on tasks structured by the underlying product architecture. Although the sample is small, the case studies indicate that modular product architecture is indeed associated with greater outsourcing of tasks, but task outsourcing is not necessarily associated with the disintegration of asset ownership. If anything, a high degree of task outsourcing goes hand-in-hand with integrated asset ownership in modular consortia.

Second, we re-iterated the sociological insight that relational contracts exist to a varying degree both between and within firms. We find empirical evidence for this through our case studies. Relational governance exists both in cases of integrated and non-integrated asset ownership in supplier parks. Integrated ownership coincided with uniform employment governance at VW Resende; non-integrated ownership coincided with diverse employment

governance at Renault Douai and Palencia. However, ‘off-diagonal’ arrangements also exist, namely GM Gravatai with non-integrated ownership but uniform employment governance.

Third, this diversity of configuration has been created by the specific automaker’s strategy in finance, procurement, and manufacturing, but also by the social norms and local institutions, the most significant of which are those in the labour market. As we saw in the case of Mercedes Rastatt, the way unions and works councils were structured were as important as management policies in arriving at diverse employment governance on the supplier park.

In relation to the double-edged sword of outsourcing, with a path towards cost-cutting arms-length capacity sub-contracting vs a path towards trust-based relational contracting, this paper provided some evidence that one path might dominate the other at different supplier parks. However, we also hint at the possibility that both paths might co-exist on the same park, with the presence of labour placement agencies and logistics suppliers on the park representing the cost-cutting face of the blade.

**Figure 1: Typology of the Firm according to Baker, Gibbons, and Murphy (2002)**

		Asset Ownership Pattern	
		Integrated	Not integrated
Governance  Mode	Relational	Relational Employment	Relational Outsourcing
	Spot	Spot Employment	Spot Outsourcing

**Figure 3: Typology of Supplier Parks**

		Asset Ownership Pattern	
		Integrated	Not integrated
Governance  Mode	Relational	VW Resende  Smart Hambach  Ford Camacari	GM Gravatai
	Spot	(Use of agency labour)	Renault Douai and Palencia

**Table 1: Suppliers on Supplier Parks**

Automaker	VW Resende	Smart Hambach	Ford Camaçari	GM Gravatai	Mercedes Rastatt
<b>Models</b>	Versao, Titan	Fortwo, Roadster	Fiesta, Ecosport	Corsa	A-Class
<b>Start of production</b>	1996	1998	2002	2000	1997
<b>Employment (automaker / total)</b>	477/ 2118	900/ 2250	3372/ 7753	1699/ 2441	2100/ 2800
<b>Number of suppliers on site</b>	7	7	21	16	10
<b>Chassis</b>	Maxion (chassis) Remon (tire, wheel) ArvinMeritor (suspension, axles)		Benteler (suspension) Pirelli (tire)	Goodyear (tire, wheel) Delphi (suspension, axle)	Radsystem (wheels)
<b>Drivetrain/electrical</b>	Powertrain (powertrain)	ThyssenKrupp (drivetrain)	ArvinMeritor (exhaust) Cooper Standard (fluid tubes) Kautex (fuel tank)	Valeo (cooling) ArvinMeritor (exhaust) Arteb (lighting) TI Bundy (fuel line) IPA Soplast (fuel tank)	Faurecia (muffler)
<b>Exterior</b>	Delga (body shop) Carese (paint)	Magna Steyr (body frame) Magna (doors) Dynamit Nobel (plastic body parts) Surtema (paint) Cubid Europe (surface decorating)	DDOC (paint) Ferrolene (blanks for stamping) Colauto/Powercoat (painting) Pilkington (glass) DuPont (paint) Faurecia (door module) Sodecia (stamping) Valeo (front end module)	Santa Marina (glass) Polyprom (stampings)	JCI (door panel) Decoma (front end)
<b>Interior</b>	Siemens VDO (seat, cockpit)	Siemens VDO (cockpit)	Autometal (plastic injection) DOW (plastic injection, painting) Intertrim (headliner) Lear (seat) Mapri-Textron (fastner) Pelzer (soft trim) SaarGummi (rubber parts) Visteon (cockpit)	Lear (seats, headliner) Siemens VDO (cockpit) Borsal-Gerobras (tool kit) Pelzer (plastic parts) Inylbra (carpet) Sogefi (air filter) FSM-Fanaupe (fastner)	Brose (door inner) JCI (seats) JCI (IP) Leoni (wiring) Intier (carpets) WOCO (pedal)

Source: Author's site visits and interviews.

**Table 2: Labour-Management Relations at Mercedes Rastatt Industrial Park**

Company Name	Employees	Works council	Unions	Collective Agreement	Pay differential
Algroup alusuisse (Alcan)	4	Part of the works council at Singen plant	IG Metall organized all 4 employees.	Covered by IG Metall agreement, as at Singen plant.	90-95% of DC pay.
Bundy (TI)	9	No works council	No union	Possibly IG Metall.	n.a.
Delphi	85	Yes	IG Metall with history of past conflict between IGM and another union	Electronic section of IG Metall	70-80%
Elgira	17	No works council	No union		n.a.
Intier Eybl (door inner)	74	Yes.	IG Metall now (past history of representation by the chemical union)	IG Metall gave this agreement a special status, in-between the plastics and electronics agreements.	70%
Intier Naher	49	Yes, but only since 2003. None until then.	IG Metall, but no details given because it is recent. No union until 2003.	(History: Magna tried to dismiss activists at both Hambach and Rastatt)	n.a.
Johnson Controls	250 At start, JCI policy to have 80% of employees as contingent workers	Yes, works council in the seat department fought against the 80% temporaries policy in 1999. DC plant manager intervened, pressurized JCI to change this HR policy, as problems with quality and delivery became serious. In 2001, seats and IP departments merged; elected a works council for this joint unit.	IG Metall	Textile agreement with premia.	80-85%
Radsystem/Eurofit	38	Yes	Not IG Metall; probably the chemical union.		60%
WOCO	50	No works council	No union		n.a.
WIG (Thyssen Krupp): a logistics and repair services provider	50-60 (earlier history of hire and fire; now stable)	Yes	IG Metall		60%
EUREST (catering supplier)	80-84	Yes	NGG (union for catering), changed to IG Metall from July 2004, joining forces with the canteen provider to DC's Gaggenau plant.	IG Metall	60-65% with the new arrangement (was 45%)

Source: IGM at Rastatt

## Appendix: List of Interviews for Data Collection

### **Supplier Parks Visited (date of visit)**

BMW Leipzig, Germany, May 2004  
BMW Spartanburg, USA, April 2004  
BMW Wackersdorf, Germany, May 2004  
Ford Camacari, Brazil, December 2004  
Ford Chicago, USA, September 2004  
Ford Genk, Belgium, 2002  
Ford Saarlouis, Germany, 2001  
GM Gravatai, Brazil, November 2004  
Mercedes Rastatt, Germany, March 2004  
Opel Russelsheim, Germany, June 2004  
Renault Douai, France, March 2002  
Renault Palencia, Spain, January 2003  
Smart France S.A.S. Hambach, France, May 2004  
VW Resende, Brazil, December 2004

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**Figure 2: Sequencing of Tasks for Outsourcing to Module Suppliers**

