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Beyond Cost Reduction

Reinventing the Automotive OEM-Supplier Interface
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Reinventing the Automotive OEM-Supplier Interface

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A Word from the Authors

The ideas presented in these pages have grown out of The Boston Consulting Group’s extensive work with the world’s leading automotive OEMs and suppliers, as well as a detailed analysis of global purchasing practices in the automotive industry. This analysis was based on more than 80 interviews we conducted in 2003 with senior executives of over 50 European, Japanese, and North American OEMs and suppliers. The companies whose executives we interviewed included most of the world’s leading OEMs, as well as eight of the top ten automotive suppliers. To get a complete picture of the industry, we also included in our analysis smaller suppliers at the tier two and tier three levels.

We would like to thank all the people who have contributed to the realization of the report, especially

• The senior executives we spoke with at OEMs and suppliers, who generously shared with us their insights into the current state and future evolution of the OEM-supplier interface

• Our BCG sponsors and advisers, who made this report possible: Josef Rick, François Rouzaud, Georg Sticher, and Dave Young, as well as our officer colleagues in the Automotive practice

• The project team of consultants and researchers: Pascal Martin, Malte Müller, and Stefan Reiter

• The editorial team of Barry Adler, Kathleen Lancaster, and Sharon Slodki

In our view, collaboration between OEMs and suppliers is the only way the automotive industry can achieve product differentiation at competitive cost and thus lay the groundwork for sustainable, profitable growth. We hope that Beyond Cost Reduction, by describing ways that industry participants can overcome today’s differences, will contribute to that essential collaboration and help strengthen the industry for a bright and thriving future.

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Executive Summary

Around the world, automotive OEMs face a difficult balancing act: capturing innovation from their suppliers to ensure the product differentiation that is the lifeblood of the industry, while also keeping costs within reasonable margins. Many have erred on the side of cost containment. Over the past decade, they have put their tier-one suppliers under intense and relentless cost pressure, forcing annual price cuts that have averaged about 3 percent. As a result, suppliers have seen their financial performance erode—to the point where many have been pushed into consolidation and some to the brink of bankruptcy. This outcome is costly also for the OEMs, because suppliers have become the primary source of breakthrough innovation in the industry, and financially strapped companies don’t have the cash to create innovation.

If OEMs are to meet the challenge of producing distinctive, innovative cars at low cost, they must make certain that their supply base stays diverse and healthy. Toward that end, they must ensure that their purchasing departments are structured and managed to master the art of innovation capture. In other words, they must reinvent the structures and processes that directly affect the OEM-supplier interface.

Ten megatrends are affecting that interface.

- First is a massive wave of supplier consolidation, which shows no signs of abating. The number of tier one and tier two suppliers worldwide is likely to shrink by decade’s end from between 1,500 and 2,000 today to between 500 and 700, of which only some 100 will be system integrators that deal directly with the OEMs.
- The increasing role of suppliers as system integrators presents a challenge to OEM purchasing departments, because systems are much harder to price and evaluate than simple parts. OEMs will need to include engineers on purchasing staffs, and suppliers will have to orchestrate an increasingly complex supply chain.
- The role of suppliers as drivers of innovation means that OEMs will become increasingly dependent on suppliers and therefore will need to develop far more sophisticated strategies for capturing innovation from them.
- Various forms of partnership programs, designed in principle to lock suppliers into mutually advantageous relationships with OEMs, too often fail to create the value they promise.
- Controversial new business models, including build-operate-transfer (BOT) models (also known as pay-on-production models) and supplier parks, offer both advantages and risks for OEMs and suppliers alike, and require new sets of competencies.
- The slower-than-anticipated adoption of e-procurement has surprised many observers; in fact, only a relatively small share of parts can be sourced easily through online bidding, and even for these the process is far from smooth.
- Shortening innovation cycles are driving the need for ever closer cooperation between OEMs and suppliers, which now get involved in each other’s design and development processes much earlier than before. One way they do this is by placing resident engineers in each other’s facilities.
- Meanwhile, OEMs and suppliers alike face increasing challenges on quality, with the number of costly recall actions rising—and damaging OEMs’ brands as well as suppliers’ finances.
- Increasing product differentiation, reflected in the proliferation of vehicle types, means that purchasing organizations must buy smaller lots of components, making it harder to keep costs down.
- Finally, global sourcing presents challenges for OEMs and suppliers alike, ranging from local supplier development to quality control and logistics.

Against the backdrop of these trends, OEMs must manage to balance innovation against cost. Analysis
of our worldwide survey of automotive suppliers revealed that most OEMs fall into two groups in terms of their purchasing philosophies. The first group—the volume OEMs Ford, General Motors, and Volkswagen—tend to bargain with their suppliers primarily by using their market power to exert unilateral price pressure. The second group—German premium OEMs and Japanese OEMs such as BMW, Honda, Porsche, and Toyota—focus much more on using technology-based negotiation and process analysis to improve their price positions. Other OEMs—including DaimlerChrysler, PSA Peugeot Citroën, and Renault—use a mix of the two approaches. Regardless of their current approach, OEMs can create an innovation-fostering environment, leverage their suppliers’ expertise, and align their organizations for more effective interaction by deploying six levers:

- Stabilization of the innovation-purchasing process
- Differentiated remuneration of suppliers’ R&D expenses
- Construction of innovation platforms
- Early involvement of suppliers in the innovation process
- Cooperation between and collocation of internal R&D and purchasing
- Trend and supplier scouting

Many OEMs need to reorganize their purchasing functions in order to capture the best possible innovations while keeping costs within reasonable margins. The ideal structure depends on the OEM’s brand positioning and size. Purchasing functions must master three key objectives: innovation capture, supplier management, and cost optimization. Toward that end, purchasing can be an independent, top-level function reporting to the CEO, in which case it tends to focus more on cost reduction; or it can be largely or entirely combined with R&D, to generate stronger cooperation between buyers and engineers, as well as more effective technical collaboration with suppliers. In either case, the purchasing department must fulfill four core functions: systems purchasing, components purchasing, nonproduction purchasing, and strategic supplier management. Differentiating between systems purchasing and components purchasing represents a significant and healthy departure from traditional practice, and allows a truly differentiated approach. Each kind of purchasing has particular requirements in terms of sourcing processes and staff profiles.

For OEMs to have a healthy, diversified, and innovative supply base—not only now but for the next couple of decades and beyond—they will need to implement strategic supplier management. This consists of five functions:

- Trend and supplier scouting, which very few OEMs currently have in their purchasing departments
- Supplier development, which aims at shaping the supplier landscape by promoting innovation networks, structuring mergers and acquisitions in the supply base, and organizing the OEM’s financial participation in selected suppliers
- Cost engineering, which oversees target costing, process redesign, and product redesign
- Multidimensional quality management along the entire supply chain
- Partnership programs that integrate the various initiatives at the OEM-supplier interface into a comprehensive framework for collaboration

In terms of structure, whether or not the purchasing function is integrated with R&D, the function must have a strong matrix organization to cut across traditional departments and commodity groups. Four basic organizational models can be effective; which one is most appropriate is determined by whether the OEM is a volume manufacturer or a premium manufacturer and whether it produces a single brand of automobile or multiple brands. Regardless of the structure an OEM adopts, it must ensure a smooth innovation-capture process. Key elements in such a process are a strong project structure that links R&D and purchasing throughout the process, as well as a clear joint deci-
sion-making process within the purchasing function, involving both the people in charge of purchasing by system or component groups and those in charge of sourcing for individual platforms or models. Finally, OEMs need to develop their purchasing personnel and related policies along five dimensions: cross-functional experience, technical background, equitable remuneration, differentiated incentive systems, and training in technology and supplier management.

On the other side of the OEM-supplier interface, tier one suppliers face the dual challenge of working more closely than ever before with the OEMs, which push them on cost while pressing for innovation, and with their tier-two and tier-three suppliers, which are generally not well integrated into effective supply-chain structures. Tier one suppliers should pay particular attention to four areas. In R&D, they have to understand the OEMs’ innovation strategies early on in order to meet their needs. In procurement, they need to implement strategic subsupplier management in order to develop their own supply base and manage both quality and costs. In production, they need to acquire the project-management and risk-management skills that are critical for the new business models. And in sales, the goal is to structure a customer- and product-driven organization that permits effective communication with the increasingly global OEMs through strong key-account management and cross-functional sales teams.

Three principles should stand as guideposts for OEMs and suppliers alike:

- Stable development and purchasing processes are essential to the effective exchange of innovation
- Virtual and physical innovation platforms must play a critical role in capturing innovation inside and outside the traditional automotive supply base
- Intracompany cooperation models are indispensable—especially between each OEM’s purchasing and R&D departments

None of this will be easy, and it won’t happen fast. But the industry must move in this direction. The only way for industry leaders to ensure product differentiation at competitive cost is by putting OEM-supplier relationships on a new basis—in short, by reinventing the OEM-supplier interface.
Why Look Beyond Cost Reduction?

Over the last decade, the relationship between most automotive OEMs and their suppliers has centered on a relentless drive for lower prices. A global analysis of OEMs’ negotiations with their tier-one suppliers shows that since the mid-1990s, annual price reductions in the industry have averaged around 3 percent. (See Exhibit 1.) Moreover, many OEMs are engaging in price discussions not once but two or three times a year, often requesting cuts of 5 to 10 percent, and this trend shows no signs of abating.

As a result, suppliers are under intense and constant cost pressure that has severely eroded their financial performance, in terms of both return on sales (ROS, defined as EBIT/sales) and asset productivity (sales/net assets). From 1997 to 2002, the average ROS of the leading suppliers we analyzed decreased from 5.3 percent to 3.8 percent, while their average asset productivity fell from 2.3 percent to 1.9 percent. (See Exhibit 2, page 10.)

Notably, this trend afflicts major suppliers across all regions—from the United States, where suppliers have grown accustomed to the tough negotiation styles of the Big Three, to Japan, where the leading players are still involved to some degree in traditional keiretsu structures. It is not surprising, therefore, that suppliers around the globe have been forced into consolidation—and some have even been pushed to the brink of bankruptcy.

Clearly, having many of their tier-one suppliers in perilous financial condition—with some close to going out of business—is not in the OEMs’ best interest. Fewer suppliers means less choice and less competition; weaker suppliers means less investment in innovation. Because tier one and tier two suppliers are increasingly the primary generators of breakthrough innovations, OEMs need to take special care to ensure that their supply base remains diverse and healthy.

Furthermore, OEMs need to maintain good relationships with those suppliers. Our research has shown that the quality of the OEM-supplier relationship is strongly related to customers’ perception of both product quality and innovativeness. OEMs that have good relationships with their suppliers also tend to have higher customer-satisfaction ratings on the quality and the innovation content of their vehicles. Conversely, OEMs that have lower supplier-satisfaction ratings also have lower customer satisfaction in terms of both quality and innovation. (See Exhibit 3, page 11.)

In an industry in which product differentiation at competitive cost is a key prerequisite for sustainable growth, OEMs must maintain a difficult balancing act: capturing innovation from their suppliers while keeping costs within reasonable margins. Although most OEMs have extensive experience in the area of cost reduction, they have not yet fully mastered the art of innovation capture. Their purchasing departments in particular often impede, rather than actively support, the effective acquisition of innovation.
An effective innovation-capture process comprises both product-development and purchasing activities. Ideally, these two functions should be closely coordinated throughout the entire innovation process—from advanced development and concept competition to series development and ramp-up. In practice, however, many OEMs suffer from a lack of coordination among the principal parties involved. All too often, the innovation process is riddled with dysfunctional organizational structures, processes, and relationships, which can cause costly iterations. Frequently, suppliers spend months and even years developing new systems and components, working in close cooperation with an OEM’s R&D department but without any real involvement of the purchasing department. Predictably, this approach triggers major process instabilities and setbacks when the time comes for concept competition, bidding, and contracting—with dire consequences for the quality and innovativeness of the OEM’s products.

So, for many OEMs, the main questions are: How can we break out of the vicious cycle of uncoordinated development and purchasing processes, low supplier satisfaction, limited innovation exchange, and insufficient product differentiation at the point of sale? How can we ensure that we capture—at reasonable cost—the innovations that will strengthen our brand in the eyes of customers?

In this report we address these two questions in detail. We begin by outlining ten basic trends that affect the OEM-supplier interface. Then we identify
We hope this report will contribute to deeper understanding and more fruitful collaboration between OEMs and suppliers. In our view, collaboration is the only way the industry can achieve product differentiation at competitive cost, thus laying the groundwork for sustainable, profitable growth.

six principal levers that OEMs can wield to optimize that interface—highlighting best practices around the world. Next we discuss how an OEM can structure a supplier- and technology-oriented purchasing organization that allows product differentiation at competitive cost. We pay particular attention to the art of strategic supplier management, detailing the five critical functions to be included in such an approach. Finally, we offer our thoughts on an agenda for tier one suppliers, which face many of these issues from both sides of the bargaining table: as sellers to the OEMs and also as buyers from their own subsuppliers.

**EXHIBIT 3**
SUPPLIERS’ SATISFACTION WITH OEMs CORRELATES WITH CUSTOMERS’ PERCEPTION OF QUALITY AND INNOVATIVENESS

<table>
<thead>
<tr>
<th>Supplier satisfaction index (SSI)</th>
<th>Customer satisfaction index (CSI)/quality</th>
<th>Supplier satisfaction index (SSI)</th>
<th>Customer satisfaction index (CSI)/innovation</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>OEM A</td>
<td>R² = 0.75</td>
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<td>OEM F</td>
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**Sources:** Supplier Satisfaction Index, 2003 (Bamberg University); The Best Cars 2003; BCG analysis.
**Note:** Sample sizes were 1,185 suppliers for the supplier satisfaction index and 109,789 customers for the customer satisfaction index.
Ten Megatrends That Affect the OEM-Supplier Interface

In the course of our analysis of the automotive industry, we have identified ten megatrends that are directly affecting the way OEMs and suppliers are currently cooperating—or failing to cooperate—across the industry. (See Exhibit 4.) The supplier community is particularly affected by three of those trends: the consolidation of their ranks into a smaller number of larger suppliers, their increasing role as system integrators, and their new responsibility as innovation drivers. Three trends specifically affect the interface between suppliers and OEMs: the development of partnership programs, the movement toward new business models such as BOT (build-operate-transfer) models and supplier parks, and the slower-than-anticipated adoption of e-procurement. OEMs, for their part, feel the primary brunt of four additional trends: the shortening of innovation cycles, the dramatic increase in the number of quality problems and recall actions, the clear push toward product differentiation and customization, and the movement toward global sourcing and production. While some of these trends primarily affect suppliers and others primarily affect OEMs, all ten indicate that the OEM-supplier interface needs to be reinvented if the industry is to pursue sustainable growth.

**Trend 1: Supplier Consolidation**

Since the mid-1990s, automotive suppliers have undergone a massive wave of mergers and acquisitions, whereby many formerly healthy large and midsize suppliers have coalesced into fewer mega-suppliers. Examples include Canadian Magna...
International Group’s takeovers of Steyr-Daimler-Puch and Donnelly Corporation, Visteon’s acquisition of LTD Parts, and ZF Friedrichshafen’s takeover of Mannesmann Sachs. Moreover, this trend shows no signs of abating. It is likely that the number of tier one and tier two suppliers worldwide will decrease from between 1,500 and 2,000 today to between 500 and 700 in 2010. At that point, only some 100 of the remaining suppliers will be actual system integrators dealing directly with OEMs. This consolidation will dramatically reduce the OEMs’ choice of suppliers, especially in the leading-edge areas of electronics and mechatronics.

The consolidation of the supply base makes it critically important for OEMs to develop strong relationships with their suppliers. Remaining the “customer of choice” of the innovation drivers at the tier-one and tier-two supplier levels is key to producing innovative and high-quality cars. Therefore, OEMs should engage in exclusive R&D partnerships with their most innovative suppliers to ensure an adequate level of product differentiation. Moreover, to avoid overdependence on a few traditional suppliers, the OEMs’ purchasing organizations will have to scout trends and suppliers more proactively in order to identify and develop alternative sources—both within and beyond their traditional automotive supply base.

**Trend 2: Suppliers as System Integrators**

Increasingly, suppliers provide not merely small parts but completely assembled and tested systems, including exhaust systems, cockpits, front ends, and integrated seats. In the future, as the modularization of vehicles continues, OEMs will expect suppliers to deliver entire roof systems, integrated interiors, complete doors, and trunk lids. However, such integrated systems are much harder for OEMs’ purchasing departments to price and evaluate than simple parts. So the OEMs’ purchasing functions will increasingly need to include engineers who are qualified to assess such complex systems.

For suppliers, in turn, the role of system integrator generates considerable challenges. Suppliers need to be able to identify subsuppliers and integrate them seamlessly into their production schedules, logistics streams, and IT platforms, ensuring that their assembly of parts into systems and modules is competitive on cost with the OEMs’ traditional assembly.

Overall, the trend toward system integration requires a totally new set of competencies on both sides of the interface. While OEMs need a much more technology-driven purchasing function, tier one suppliers have to become orchestrators of an increasingly complex supply chain.

**Trend 3: Suppliers as Drivers of Innovation**

The outsourcing trend of the past few decades has considerably increased the share of external value creation in the automotive industry. Today most OEMs create only some 30 to 35 percent of value internally and delegate the rest to their suppliers. Moreover, although the industry’s externalization of core processes appears to have slowed or even stopped, the fact is that major portions of automotive production happen at the supplier level. So it is no wonder that suppliers also play an increasing role as innovators. Their contributions in this area are reflected in the dramatic increase in patents registered by European and U.S. suppliers over the past decade: in some product categories, the number of patents registered by suppliers has increased more than three times faster than the number of patents registered by OEMs. Our research suggests that, especially in the area of electronics and mechatronics, suppliers will become the primary drivers of innovation in the industry.

As OEMs depend increasingly on suppliers’ capacity for innovation, they will need to develop far more sophisticated strategies for managing suppliers. For example, as noted above, they will have to establish a formal supplier-scouting function within their purchasing departments to identify and develop the relevant technology leaders and include them in their supply base. In addition, OEMs will need to provide a stable and coordinated innovation process, as well as virtual and physical innovation platforms, to ensure the optimal integration of the suppliers’ market-related and prod-
uct-related know-how. Tier one suppliers, for their part, will need to build up their engineering competence, either through organic growth or through the acquisition of engineering firms. They will also need to form innovation networks with their sub-suppliers to leverage the full potential of their supply chains.

**Trend 4: Partnership Programs**

The industry has been experimenting with a number of partnership programs between OEMs and suppliers. Prominent examples include Daimler-Chrysler’s Extended Enterprise and Ford’s Team Value Management. Most of these programs are designed to raise quality, strengthen innovation, and lower costs. Typically, they focus on a set of suppliers that—theoretically, at least—are rewarded for taking part in the program. While such programs could be an effective platform for innovation exchange, our research has shown that in reality many suppliers are quite skeptical of them, describing them as public relations or marketing ploys that do not give participating suppliers real advantages, such as a genuine preferred-supplier status.

If OEMs really want to increase the impact of their partnership programs, they will need to link them more closely to their purchasing practices. This means that OEMs should offer their preferred suppliers truly preferential treatment when the time comes for negotiations and development opportunities. Engaging preferred suppliers in cooperative arrangements such as R&D partnerships, production-cycle supply contracts, and volume-sensitive pricing would demonstrate the value of such partnership programs.

**OEMs should offer preferred suppliers truly preferential treatment in negotiations and development opportunities.**

**Trend 5: New Business Models**

A new operational dimension of OEM-supplier partnerships is exemplified by two approaches: BOT models (also known as pay-on-production models) and supplier parks. In BOT models, the supplier takes over parts of the production process, bearing considerable operational and market risk. In supplier parks, suppliers move their production close to the OEM’s factory, thus improving their logistical connection to the plant but also reducing their economies of scale and undertaking substantial investments.

BOT models are the subject of much controversy in the industry. Clearly, there are both pros and cons for OEMs and suppliers alike. For OEMs, BOT models have the advantages of requiring no initial investment, improving their balance sheets, increasing efficiency, sidestepping budget constraints, and sharing operational and market risk. But BOT models can also have disadvantages for OEMs, such as further loss of operations competence, increased unit prices, and tensions with the unions. Moreover, because most suppliers have less attractive financing conditions than OEMs have, such models can turn out to be costlier and riskier than traditional models of ownership and operations.

On the supplier side, positive aspects of BOT models include chances to expand the range of services that suppliers can offer the OEMs; opportunities to gain a better understanding of the production process itself, which in turn can enhance product development; and possibly higher margins. However, suppliers clearly incur higher risk, including both operational and market risk. They must also bear the financing costs of such models, which can threaten their financial viability.

Today OEMs are pushing strongly for BOT models when it comes to sourcing large production equipment, such as complete paint shops and final assembly lines. Suppliers of such production equipment will very likely find themselves involved in BOT models—as, for example, are the paint system supplier Dürr and the assembly automation specialist Eisenmann. Suppliers should continually assess the risks related to this type of engagement.
The concept of supplier parks had strong initial support from volume OEMs, including Ford and Volkswagen. Their primary goal in promoting the parks was to ensure just-in-time and just-in-sequence delivery of parts and systems to their larger production facilities. Subsequently, premium OEMs such as BMW and DaimlerChrysler have followed their example, although the premium OEMs’ parks tend to be smaller in volume and narrower in scope. Interestingly, Japanese OEMs have established very few supplier parks, either in Japan or overseas. That is because in Japan there is no real need for such parks, since most suppliers are traditionally located relatively close to the OEMs’ production facilities. Toyota’s strong supply base in Nagoya, close to Toyota City, is a good example of such a production hub.

The increased use of BOT models and supplier parks has had a dramatic impact on relationships between OEMs and suppliers. For OEMs, these models require much tighter management and stronger support of suppliers, which are now collocated with the OEMs, either in the OEM factory or close to it. Such management is especially important because, in this setup, OEMs become even more dependent on the suppliers’ overall performance: if large parts of the core production process are transferred to key suppliers, it is essential to ensure their economic viability as well as their operations expertise. Even very small deficiencies in these areas could have drastic consequences for the OEMs’ production flow. The impact on suppliers is even more dramatic, as they must engage in totally new ways of operating. Often they must develop new competencies, such as risk management for new business models, project management to set up new facilities on the OEM’s premises, and operations expertise to handle parts of the OEM’s production process.

**Trend 6: Slower-Than-Anticipated Adoption of E-Procurement**

Whereas for some product categories and production processes, suppliers and OEMs are coming together physically in BOT models and supplier parks, online procurement represents an alternative, virtual way of sourcing. A few years ago, many managers in the automotive industry saw e-procurement as the solution for the industry’s cumbersome and complex purchasing processes. Public marketplaces such as Covisint and SupplyOn, as well as OEM-specific marketplaces such as Toyota’s WARP and VW Group’s Supply.com, were created in the anticipation that a high percentage of the industry’s purchasing—especially of commodities—would flow through such channels. However, the industry has adopted e-procurement at a far slower pace than was projected. The main reason for this slow and partial adoption is that many supplied systems and components are not optimally suited for online bidding. In fact, the only parts that can be sourced easily through online bidding are those that can be clearly defined in drawings and specifications, requiring little or no interaction between engineers from the supplier and the OEM. In addition, the limited compatibility of the IT systems currently used for purchasing with online marketplaces represents a considerable hindrance to the adoption of e-procurement.

Even for parts that are suited for e-procurement, most online-bidding processes today are far from smooth. Incomplete documentation, the cartelization of suppliers, and a general lack of expertise with online bidding often make the process ineffective and the results disappointing in terms of price or product quality. So it is not surprising that leading marketplaces are critically reviewing their online-auctioning functions with regard to their future scope and relevance.

To tap the real potential of online procurement, suppliers and OEMs will have to determine the product categories that are truly suitable for this medium and train their sales and purchasing personnel to handle the online-bidding process effectively. At the same time, the industry would benefit by focusing on an additional key application of online platforms: their use as cooperative development tools. Online platforms have considerable potential as a base for improving both information exchange and co-engineering between OEMs and their suppliers.
**Trend 7: Shortening Innovation Cycles**

The need for close cooperation between OEMs and suppliers—through partnership programs, BOT models, or online platforms—is driven in part by the dramatic shortening of innovation cycles. Over the past ten years, the average life span of a car model in the developed countries has shrunk by almost half—from about eight years to about four. Over roughly the same period, the average development time, from design freeze to start of production, has decreased from about 48 months to about 30; by the end of this decade, it is likely to fall to 18. Because of the dramatic acceleration of development and the shrinking of production cycles, OEMs and suppliers are getting involved in each other’s design and development processes much earlier than before, blurring the traditional handoff points between advanced development, concept definition and competition, series development, and ramp-up.

This trend suggests that OEMs need to structure their development processes so that the R&D and purchasing departments work together early on to define key parameters, ensure product differentiation at competitive cost, and involve suppliers as early as possible to leverage their market and product expertise. Thus, in the future, the OEMs’ purchasing function will have to play an orchestrating role at the OEM-supplier interface.

For suppliers, in turn, it is critically important to stay close to the OEMs to capture essential information on new development projects. Japanese suppliers, in particular, have shown how resident engineers can be used to better understand the OEM’s development plans and to influence them to the supplier’s strategic advantage.

**Trend 8: Increasing Challenges on Quality**

Ever shorter development cycles, combined with the OEMs’ insistence on ever lower prices, are contributing to rising numbers of quality problems. Our research has shown that in some of the world’s core automotive markets, the number of recall actions has more than doubled over the last ten years—growing far faster than the number of cars or the number of models produced. In general, most recall actions can be traced back to deficiencies in suppliers’ parts. For example, of the top ten recall actions worldwide in 2002, nine were related to deficiencies in suppliers’ parts, such as short circuits in ignition locks, problems with automatic transmissions, and deficiencies in brake lights, warning lights, airbags, batteries, and brake pedals. Naturally, these recall actions have damaging effects on OEMs’ brands, on the particular models involved, and on suppliers’ finances, since suppliers frequently must bear the costs of recalls.

To ensure better management of quality along the supply chain, OEMs must integrate adequate expertise into their purchasing organizations. Toyota, for example, has installed quality-oriented supplier production management in its purchasing department. Other OEMs need to go beyond their traditional quality auditing to implement more proactive approaches. Dispatching quality- and process-improvement teams to supplier locations—as well as setting up quality circles among suppliers, based on the Japanese concept of kyoukohai (OEM-orchestrated supplier associations)—would be effective ways to improve quality along the supply chain.

**Trend 9: Increasing Product Differentiation**

Consumers’ desire for cars that reflect their individual lifestyles, together with the industry’s push for variety in design and technology, have dramatically increased the number of vehicle models over the last ten years. From 1996 to 2002, while the number of brands remained almost constant, worldwide sales in the niche vehicle segments—car-derived vans, off-road vehicles, and multipurpose vehicles—grew by 80 percent, 60 percent, and 14 percent, respectively. This increasing variety of vehicle types presents a challenge for the OEMs’ purchasing organizations, since they must focus on buying smaller lots of components that are specific to individual niche models, rather than sourcing large volumes of identical components.

Some OEMs are responding to this trend by outsourcing the production of their niche vehicles to
tier 0.5 suppliers; for example, Porsche does so with Valmet and BMW with Magna Steyr. However, OEMs must also redefine their purchasing strategies to cope with the increasing product differentiation. Rather than negotiating model by model, as they commonly do today, OEMs should further develop their common-part strategies in order to be able to bundle their supply streams in so-called cross-model agreements. On the supplier side, it becomes increasingly important to design systems and components for complete product families—that is, parts that fit flexibly into all possible variations of a particular base model.

**Trend 10: Global Sourcing**

Over the past five years, sourcing of automotive components from low-cost countries in Asia, Eastern Europe, and Latin America has risen dramatically. China, in particular, has become a major source of automotive components for European, Japanese, and U.S. OEMs. From the mid-1990s to 2002, the value of automotive components exported by China increased more than fourfold—from about $350 million to almost $1.5 billion. So it is not surprising that most OEMs have already set up local sourcing organizations in China. In parallel, most leading European, Japanese, and North American suppliers have set up joint ventures in China—and also in low-cost countries in Eastern Europe and Latin America. The drivers of this globalization of the OEM-supplier interface are both the advantage of low-cost local production and the need to be close to the OEMs’ own production facilities in these developing regions.

Of course, global sourcing involves a number of challenges for both sides. For OEMs, they include identifying and developing a new set of local suppliers, contracting in a sometimes unstable legal environment, and ensuring quality as well as logistics far from the OEMs’ traditional production hubs. Similarly, suppliers establishing production facilities in low-cost countries need the financial power, the project management experience, and the logistical capabilities to replicate their operations far from home—a task that is especially difficult for smaller tier-two and tier-three suppliers.

* * *

The ten trends described in this section show that the OEM-supplier relationship is becoming increasingly complex in terms of the interrelationships of all participants, the content and timing of the innovation process, and the geographic range of activity. Both sides must now move from sometimes antagonistic relationships to more cooperative ones in order to achieve product differentiation at competitive cost.

The next section describes six levers that OEMs can use to help bring about economically sustainable, innovation-oriented cooperation with their suppliers.
Six Levers for Optimizing the OEM-Supplier Interface

In today’s automotive markets, in which product differentiation at competitive cost is essential to sustainable growth, OEMs must strike a difficult balance between capturing the best possible innovation from their suppliers and keeping costs within reasonable margins. They approach this challenge in various ways, as their purchasing negotiations reveal. Our recent analysis of OEM-supplier relationships around the world uncovered a range of purchasing philosophies.

Each OEM’s philosophy could be positioned along two major dimensions: bargaining through market power and bargaining through technology and process analysis. OEMs whose purchasing functions bargain through market power use their sourcing volume to exert unilateral price pressure. Those that bargain through technology and process analysis, in contrast, engage in detailed technical discussions with suppliers, analyzing product contents and production processes in order to jointly identify opportunities to reduce costs. Needless to say, the latter approach fosters a more stable climate for cooperation—and has a positive impact on innovation capture.

At our request, the suppliers we interviewed in the course of this study positioned their OEM clients in a matrix that combines the two basic dimensions. The result provides a clear picture of the OEMs’ differing purchasing philosophies. (See Exhibit 5.)

The first group of OEMs contains the volume players Ford, GM, and Volkswagen, which generally rank high on the dimension bargaining through mar-
ket power and considerably lower on bargaining through technology and process analysis; they also tend to have limited personnel stability in their purchasing functions. It is worth noting that although the interviewed suppliers take a rather critical view of the purchasing practices of these volume OEMs, the latter are currently implementing several cooperative product- and process-redesign initiatives with their key suppliers. Ford, for example, has TVM (Team Value Management), and Volkswagen has PPO (Partnerschaftliche Prozessoptimierung, or Partner Process Optimization). Moreover, despite these volume OEMs’ tough stance in sourcing negotiations, they remain important customers for automotive suppliers, since they bring the volume necessary to make supply production profitable.

Suppliers identified a second group of OEMs—typified by BMW, Honda, Porsche, and Toyota—that focus strongly on technology-based negotiation and process analysis as ways to improve price positions in their sourcing negotiations. Whereas for BMW and Porsche this approach is driven primarily by their limited volume leverage and strong engineering focus, Honda and Toyota have been practicing this cooperative negotiation style for decades as part of the Japanese keiretsu system.

A third group, which includes OEMs such as DaimlerChrysler, PSA Peugeot Citroën, and Renault, adopts both philosophies. These OEMs engage in a differentiated sourcing approach, practicing a cooperative negotiation style for critical, brand-differentiating systems and components, and using a more cost-driven approach for standard parts. As our analysis suggests, many OEMs have extensive experience in the area of cost reduction. However, our research revealed that few of their purchasing departments have really mastered the vitally important art of innovation capture. What can OEMs do to redress that imbalance?

Drawing on our analysis of purchasing practices across the automotive industry, as well as our work with leading OEMs and suppliers worldwide, we have identified six levers that OEMs can use to create an innovation-fostering environment, leverage suppliers’ expertise, and align their organizations for more effective interaction. (See Exhibit 6, page 20.) Together, these levers can affect the course of the entire development and purchasing process, from advanced development through ramp-up:

- Stabilization of the innovation-purchasing process
- Differentiated remuneration of suppliers’ R&D expenses
- Construction of innovation platforms
- Early involvement of suppliers in the innovation process
- Cooperation between and collocation of internal R&D and purchasing
- Trend and supplier scouting

In this section we describe each of the six levers and offer examples of best practices. We also enumerate the positive effects these levers can have on the bottom line—when applied in the right way.

**Lever 1: Stabilization of the Innovation-Purchasing Process**

In their innovation-purchasing philosophies, most automotive OEMs fall into two main camps. (See Exhibit 7, page 21.) Premium OEMs, which seek differentiating systems and components, have a long-term orientation that emphasizes process stability and sustained cooperation with a small number of suppliers. Following this philosophy, each OEM works closely with a particular supplier during advanced development and concept definition. Then, at the concept competition stage, the OEM brings in a second supplier to ensure some level of financial and conceptual benchmarking. Most often, however, the OEM chooses to continue working with the original supplier for series development, ramp-up, and series production. Needless to say, this approach fosters a strong relationship of trust between the OEM and the supplier, allowing a full exchange of innovations.

In contrast, the custom of many volume players, especially in the United States, has been to involve
suppliers at a later stage in the process—at concept competition—and in much larger numbers, to generate a maximum level of price pressure. Even later, after the bidding, these OEMs often keep two suppliers in the race for some time to provide dual development. In some cases, shortly before ramp-up, the OEM replaces the selected supplier with a low-cost supplier that takes over the development results and brings the project into series production. Of course, this approach—which involves ferocious competition and much uncertainty for suppliers—precludes any possibility of continuing, collaborative, trust-based relationships between OEMs and suppliers. It also raises difficulties in the areas of intellectual property and the remuneration of suppliers’ investments in R&D.

Nonetheless, both philosophies have their advantages and disadvantages. The premium OEMs’ approach generates increased supplier loyalty, higher innovation drive, and lower cost increases between bidding and the start of production. On the other hand, the exclusiveness of this approach also means less competition and therefore, in some cases, higher initial costs, as well as a substantial risk of missing new ideas and opportunities because of the narrower supplier base. In contrast, the volume players’ approach, with its intense competition, does achieve low costs. But the short-term perspective underlying this approach can hinder the exchange of leading-edge technology and thus can limit opportunities for product differentiation.

It is important that OEMs clearly differentiate their purchasing processes according to their brand positioning and the types of systems and components they are sourcing. Ideally, all OEMs, regardless of size or market position, should use the collaborative approach for sourcing brand-differentiating systems and components. For standard components, such as batteries and tires, the volume approach is more appropriate because it allows price optimization without compromising the end product’s image.
Lever 2: Differentiated Remuneration of Suppliers’ R&D Expenses

A clear set of guidelines regarding intellectual property and R&D remuneration is essential to sustainable cooperation between OEMs and suppliers. As tier one suppliers continue to perform more system development and integration, their R&D budgets are bound to grow considerably. At the same time, their long-term supply contracts for particular components are at greater risk, because OEMs now tend to switch suppliers even during a model’s production cycle. Therefore, suppliers that traditionally allocated their R&D costs to the relevant product’s unit price for the vehicle’s whole production cycle—generally five to seven years—must now find new ways to fund their development efforts.

In their collaboration with OEMs, suppliers currently promote three remuneration models: R&D contracts, R&D partnerships, and production-cycle supply contracts.

R&D Contracts. This model lays the groundwork for tightly defined cooperation between a supplier and an OEM: the supplier carries out a specific development task, with no automatic link to subsequent series production. Under this kind of arrangement, detailed remuneration schemes and procedures for the transfer of know-how ensure that the supplier receives adequate compensation for its R&D efforts. For example, Faurecia, a French automotive-equipment supplier with global operations, developed seats for a Japanese OEM’s small-car model and also did the European market research that led to their development. In this case, the OEM remunerated the supplier for the whole activity under a development contract, with no binding element regarding series production.

This model does not imply that suppliers’ strategy in working with OEMs should be limited to development. Naturally, suppliers should continue to aim for series production as well. But, in an increasingly uncertain business environment, R&D con-
tracts are an effective tool for ensuring full remuneration of costs incurred in the development phase.

**R&D Partnerships.** In this model, the supplier and the OEM share personnel and equipment for particular development tasks. The supplier invests less money in advanced development than it would under the traditional arrangement, in which the supplier bears all the risk. In addition, as a benefit of participation in the partnership, the supplier is accorded “preferred supplier” status when the project goes into series production. For example, Arcelor, a European steel company, develops new steel-coating processes together with its OEM clients, using teams of Arcelor resident engineers who work in the OEMs’ press shops. This approach allows the suppliers to reduce their investments in equipment. It also creates a basis for the effective transfer of know-how and increases the likelihood that the supplier will play a role in eventual production.

**Production-Cycle Supply Contracts.** In this model, the OEM guarantees single sourcing to one supplier throughout the entire production cycle of a car model. This approach allows the supplier to allocate its R&D costs to the unit price without the risk of losing money, because the OEM is bound to honor the supply contract until it discontinues production of the specified model. The production-cycle supply contract is especially appropriate when the OEM wants to ensure the exclusivity of the supplier relationship, as well as exclusive access to the generated innovation. This is frequently the case with small, highly innovative suppliers of information technology and electronics.

**Lever 3: Construction of Innovation Platforms**

Innovation platforms are institutionalized opportunities for the exchange of information in particular areas of innovation. The objective of these platforms is to provide a physical or virtual infrastructure for information exchange, as well as a regulatory framework that defines supplier remuneration, rules regarding intellectual property, and potential codevelopment arrangements. Innovation platforms take a number of distinct forms, including technology conferences, collocation of development engineers, and open Web portals for innovation exchange.

*Technology conferences* are a traditional tool of information exchange between OEMs and their suppliers. In general, OEMs organize topic-related events at their headquarters or development centers, where suppliers are asked to present their leading-edge technologies and their perspectives on future developments. For example, Toyota holds regular technology conferences in Toyota City, organizing them around topics such as interiors, braking systems, and air-conditioning systems. These meetings allow broader discussion of technology trends than typically takes place in the course of normal project work. They also generate long-term perspectives, identifying innovation trends that might be relevant in five to ten years.

A second kind of innovation platform is the *collocation of suppliers’ development engineers* with elements of an OEM’s R&D department, often in so-called simultaneous-engineering parks. Several European premium OEMs collocate their suppliers’ specialists with their own R&D engineers to work on high-profile innovation projects. Here, physical proximity and cross-fertilization between engineering teams generate much more effective innovation processes than are possible when engineers work in separate facilities.

A third and the most revolutionary approach among innovation platforms is *open Web portals for innovation exchange*. BMW has pioneered this area with its Virtual Innovation Agency. (See Exhibit 8.) The VIA is an open Web portal that supports active trend and supplier scouting by allowing any interested person—whether an individual researcher or a skilled engineer at an automotive or a nonautomotive supplier—to submit his or her innovation ideas over the Internet. The ideas are forwarded to a panel of development specialists in innovation councils who review and filter them, seeking a few critical ideas that may lead to breakthrough innovations. Once the breakthrough innovations have been identified, BMW orchestrates the industrial
production of the resulting system or component. The author of the idea either is engaged in the development and production process or receives remuneration for the idea. Thus the VIA allows an effective capture of innovative ideas, ensuring that they do not get lost in the OEM organization and that the best concepts are selected in a structured manner.

**Lever 4: Early Involvement of Suppliers in the Innovation Process**

Involving suppliers at an early stage is vitally important because it allows the OEM to tap into their know-how—regarding both technologies and consumer behavior—in their particular areas of expertise. Because increasing numbers of innovations include new, nontraditional technologies, early supplier involvement is an important prerequisite to a successful joint-development process. So it is not surprising that some OEMs are involving their suppliers long before the concept competition stage; in fact, with increasing frequency, suppliers are being asked to participate in concept definition and even in advanced development.

For example, Johnson Controls has been cooperating closely with Opel in Germany to codevelop the pioneering flexible and integrated interiors of two Opel models, the Zafira and the Meriva. Using teams of resident engineers—who were involved very early in the process, at the concept definition stage—Johnson Controls has contributed significantly to shaping one of the key differentiating features of this new generation of vehicles. In this case, the supplier brought in not only its technological expertise but also a deep understanding of the end customer’s needs.
Another example of early supplier involvement is the close cooperation of the German roof-system supplier Edscha with DaimlerChrysler. In fact, shortly after DaimlerChrysler decided to build a cabriolet version of the PT Cruiser, it moved to involve Edscha in the development process. Cooperating with Edscha at this relatively early stage allowed DaimlerChrysler to tap the supplier’s product and market expertise regarding roof systems, to the benefit of the final car design.

Even earlier in the process, at the advanced development stage, suppliers are driving an impressive amount of innovation. For example, PSA Peugeot Citroën and Faurecia are linked in a long-term cooperative approach to do R&D for new seating concepts. In another example, Toyota outsourced large parts of its R&D activities on brake, fuel, and radiator hoses to Toyoda Gosei, which now plays a key role in the development of these components. In these two cases, the family and keiretsu ties linking these suppliers to their respective OEMs certainly facilitated the comprehensive transfer of R&D competencies. We believe, however, that this trend is bound to continue even in less closely knit communities.

These examples, drawn from many more, illustrate how important it is to involve suppliers at an early stage in order to tap the full potential of their technological and market-related expertise. Of course, this kind of long-term collaboration between suppliers and OEMs cannot flourish under OEMs’ traditional one-sided, cost-oriented approach to purchasing.

**Lever 5: Cooperation Between and Collocation of Internal R&D and Purchasing**

Today the innovation process that links suppliers and OEMs is likely to break down at one major juncture: the handoff of the project from engineering to purchasing. Normally, a supplier works with the OEM’s R&D department for one, two, or even three years to define and develop a new system or component. During this early part of the process, most OEMs use forward sourcing to implement purchasing policies and target costing to control costs. Frequently, however, the rotation of purchasing staff and a certain technological isolationism on the part of R&D engineers prevent the purchasing function from being effectively involved at this stage. Little wonder, then, that the handoff of project leadership from R&D to purchasing often triggers an extreme push for cost reduction, calling into question everything the OEM-supplier team has developed to that point and generating numerous—and costly—iterations.

To avoid such expensive disruptions to the process, it is important to promote close cooperation between R&D and purchasing. The objective is to install a fast, effective, and binding decision-making process across the OEM’s departments, ensuring consistent communication with the supplier and preventing major breaks in the innovation process. (See Exhibit 9.)

Concretely, this means that at the advanced development stage, while R&D is researching a particular leading-edge technology—either on its own or with a traditional supplier—the purchasing function should be actively combing the market for sourcing options for that technology and also determining first financial benchmarks. At the concept definition stage, the system-development and system-sourcing functions should work together closely to ensure that concepts are defined precisely by both internal parties and that technical and financial requirements are clearly understood. In general, close cooperation of this kind requires either the collocation of these functions or a permanent committee structure.

Finally, at the series development stage, it is important to ensure that the relevant representatives of purchasing and R&D are cooperating as members of a platform team, model team, or vehicle-line team. Although the names of these teams may vary, they share a common logic: it is important to coun-
terbalance traditional thinking along department and commodity group lines with thinking that cuts across those lines and focuses on projects. Whether the latter has as its immediate subject a platform, a model, or a vehicle line, the close cooperation of R&D and purchasing is critical to ensuring a stable innovation process.

Examples of successful collocation include the module and simultaneous-engineering teams at BMW’s research and innovation center in Munich. These teams, organized around individual components or systems, include representatives from the R&D and purchasing departments, as well as from such functions as quality assurance, marketing, and production. All the technicians working with these teams are located in adjacent buildings, thus allowing the immediate testing and implementation of new ideas. By having these teams physically collocated and working together, BMW ensures efficient processes, internal coordination, and consistency in the way its functions interact with its suppliers.

**Lever 6: Trend and Supplier Scouting**

Most OEMs’ purchasing functions are missing key aspects of trend and supplier scouting. Ideally, trend and supplier scouting should take place even before forward sourcing and should focus on three tasks: working closely with the trend-scouting functions in R&D and marketing to identify innovations that will have real impact on cars in the medium to long term; identifying and allocating the right suppliers to these innovative ideas; and ensuring that the suppliers’ know-how becomes available to the OEM. The two most advanced practitioners in this area seem to be BMW and PSA Peugeot Citroën.

To ensure a continuous supply of innovations, BMW actively searches for suppliers that are not part of its traditional supply base. In addition to deploying its VIA open Web portal for innovation exchange, described in our discussion of Lever 3, BMW’s purchasing department looks for nonautomotive suppliers with unique competencies. For example, to develop its iDrive “infotainment” sys-
tem, BMW identified Immersion, a U.S. company specializing in haptic technologies for computer electronics. By collaborating with both Immersion and Alps, a Japanese supplier of automotive electronics, BMW was able to develop a touch-enabled driver interface, which clearly differentiated the BMW 7 Series from its competitors.

PSA Peugeot Citroën has recently set up a new department—innovation purchasing—within its purchasing function. The department’s charter is to identify and assess trends, preselect suppliers, and maintain supplier contacts, even if there are no concrete plans for a project-related contract in the immediate future. In short, this scouting group concentrates on suppliers that might become important a few years down the road. With the acceleration of globalization and the increasing participation of nonautomotive suppliers in innovation, trend and supplier scouting will play a critical role in the years ahead.

The Six Levers and the Bottom Line

These six levers have considerable impact on the relationships between suppliers and OEMs, not only qualitatively but also financially. Although one might expect that using these levers could increase overall costs, in most cases the reverse seems to be true. By ensuring a stable innovation process, renumerating suppliers adequately, and especially involving them early on, OEMs can substantially reduce the modification costs that typically represent a big portion of the final unit price. Moreover, by simplifying the process of negotiation and optimizing internal communication between purchasing and R&D, OEMs can significantly reduce purchasing process costs. And, finally, by scouting trends and suppliers, OEMs can lay the groundwork for focusing their R&D activities effectively, thus managing R&D expenditures much more prudently.

While the advantages of these six levers seem obvious, their implementation requires a careful redesign of OEMs’ purchasing organizations in terms of structures, interfaces, processes, and staffing requirements. To balance innovation capture and cost optimization, OEMs must ensure that their purchasing organizations are supplier and technology oriented. This new organizational concept is the subject of the next section.
Structuring a Supplier- and Technology-Oriented Purchasing Organization

To capture the best possible innovation from their suppliers while keeping costs within reasonable margins, many OEMs are now rethinking the organization of their purchasing functions. Recognizing that the traditional organization into commodity-based groups can impede innovation, they are engaged in restructuring and reorienting their purchasing functions in various ways. In our view, a number of organizational models can be effective. The ideal design for a given OEM depends on its brand positioning and size. In this section, we discuss several options for organizational design, together with their implications for processes and personnel. But first let’s take a look at the overall goals of the purchasing function.

The Strategic Objectives of the Purchasing Function

To implement innovation-fostering and cost-effective relationships between OEMs and suppliers, each OEM’s purchasing function needs to focus on three objectives: innovation capture, supplier management, and cost optimization.

Innovation Capture. Purchasing should drive an effective innovation-capture process. This means forging and maintaining close links—in the form of project teams or committee structures—especially with R&D but also with other OEM functions, such as production and marketing. In addition, the purchasing function needs to orchestrate an innovation process whereby it identifies innovation drivers early on, through trend and supplier scouting, and integrates them effectively into the overall development process.

Supplier Management. Supplier management must include strategies for long-term cooperation, as well as tactics for operational improvements in the supply base. This means that OEMs need to engage in supplier development—either by promoting flexible supplier networks or by structuring mergers and acquisitions in their supply bases. In addition, the purchasing function should ensure that cost engineering optimizes product contents and process structures at the supplier level. Finally, the supplier management function should coordinate quality management along the entire supply chain.

Cost Optimization. Purchasing must continue to keep a strong focus on cost optimization by generating synergies—while also ensuring increased product differentiation. This implies that buyers in both traditional commodity groups and project teams need to explore all opportunities for cross-model and intraplatform synergies. To balance those synergies with product differentiation, teams aligned along both dimensions—that is, commodity groups and project teams—must work together in a clearly structured joint decision-making process.

With those objectives in mind, OEMs should begin redesigning their purchasing organizations by exploring three broad questions:

• First, how should we position the purchasing organization vis-à-vis R&D and production? Should it be an independent, top-level function reporting to the CEO, or should it be integrated with R&D?

• Second, how should we organize the purchasing department itself to best maintain the balance between cost reduction and innovation capture?

• And third, how should we set up each function within the department?

How to Position the Purchasing Function?

There are two schools of thought among OEMs as to how purchasing should fit into the overall structure of the company. (See Exhibit 10, page 28.) Most OEMs position purchasing as an independent, top-level function that reports directly to the CEO.
This positioning allows purchasing to bundle sourcing volume—across multiple brands if necessary—in order to push for companywide synergies. On the other hand, this positioning tends to impede cooperation between purchasing and R&D. Also, departments positioned in this way typically focus more on cost reduction than on innovation.

The alternative structure, used by some innovation-focused OEMs such as BMW and PSA Peugeot Citroën, combines most of the purchasing function with R&D; in some cases, parts of operational purchasing activities, such as logistics and supplier quality management, are integrated into production. This positioning, in which purchasing is not represented at the board level but instead is combined with R&D, generates much stronger cooperation between buyers and engineers. It also contributes to more effective technical collaboration with suppliers, in part because of the absence of departmental conflict on the OEM side, and in part because the purchasing staff in this setup tends to have more sophisticated technical understanding. Naturally, when purchasing is integrated with R&D, there is a tendency to focus more on technical achievement and less on cost reduction.

So, overall, while the integrated model is more conducive to innovation, the segregated model permits a clearer emphasis on cost reduction. Companies need to think carefully about their strategic priorities and brand positioning before choosing the structure that will work best for them.

Regardless of its positioning within the organization, however, the purchasing department must perform four core functions.

**The Four Core Functions of the Purchasing Department**

Drawing on our global benchmarking of OEM purchasing organizations, as well as the analysis of strategic objectives described above, we have identi-
fied four core functions that every OEM purchasing organization needs to fulfill: systems purchasing, components purchasing, nonproduction purchasing, and strategic supplier management. (See Exhibit 11.) The core of this organizational concept is the differentiation between systems purchasing and components purchasing. Complex systems and modules, such as integrated interiors and roof systems, for which there are typically only a few suppliers and which require intensive cooperation during the development phase, should fall under the sourcing responsibility of systems purchasing. Components that are largely standardized, such as batteries and tires, for which there are more potential suppliers and which can also be purchased through online procurement, should be allocated to components purchasing.

Separating systems purchasing from components purchasing is crucial to taking a truly differentiated approach to automotive sourcing. This approach constitutes a significant departure from current organizational models, in which complex systems and standardized components are frequently sourced by the same entities. Ideally, the two types of purchasing should be reflected in different sourcing processes and staff profiles.

*Systems purchasing* should be staffed with buyers who have both strong technological backgrounds and excellent relationship-building skills, in order to support a technology-driven and supplier-oriented innovation process. These buyers should also be willing to remain in their area of specialization for three to five years so that they can develop effective relationships with suppliers, as well as expertise in the relevant systems. Because most systems are developed for a particular car model, and smooth cooperation with the supplier is of utmost importance, there should be a horizontal dimension—focused on brands, platforms, or models—that cuts across the vertical dimension of system groups. The resulting matrix ensures a balance between an effective innovation process in brand-, platform-, or model-specific teams and a stringent quest for companywide synergies within the system groups. By emphasizing the horizontal dimension of project-related teams—at the level of brands, platforms, or

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**EXHIBIT 11**

**A BEST-PRACTICE STRUCTURE FOR AN OEM PURCHASING ORGANIZATION INCLUDES STRATEGIC SUPPLIER MANAGEMENT**

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<th>Currently in place at most OEMs</th>
<th>Partially in place</th>
<th>Absent from most OEMs</th>
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<td>Systems purchasing</td>
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<td>Nonproduction purchasing</td>
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<td>Strategic supplier management</td>
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<td>Production facilities</td>
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<td>New business models</td>
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<td>Trend and supplier scouting</td>
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<td>Quality management</td>
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<td>Partnership programs</td>
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**Sources:** BCG interviews; BCG analysis.

1. Complex systems and modules are provided by a few suppliers—relationship management is needed (for example, integrated interiors).
2. Components are provided by a large number of suppliers—sourcing takes place through standardized processes and business-to-business platforms (for example, tires and batteries).
3. This department handles BOT (build-operate-transfer) models and supplier parks.
models—the new organization also lays the groundwork for an effective interface with the R&D department, which is generally structured along specific development projects.

Components purchasing should be staffed with buyers who are more cost-oriented than their colleagues in systems purchasing. These buyers should also have good negotiating skills, both in face-to-face meetings and in virtual procurement settings.

In addition, components purchasing should be organized differently from systems purchasing. Whereas the vertical dimension should follow the traditional setup by component groups—as currently practiced by commodity groups—the horizontal dimension should be regional. This is because it is generally more effective to use a regional sourcing infrastructure in buying standardized and relatively low-cost parts, although the OEM defines its overall purchasing strategy, standards, and volumes on an aggregated level for each component group. In fact, many OEMs have set up purchasing offices in low-cost countries to gain better access to local suppliers, ensure effective quality control, and manage the supply chain locally.

So, while the horizontal, project-oriented dimension in systems purchasing aims at optimizing the innovation process, the horizontal regional dimension in components purchasing supports a cost-optimizing approach to global sourcing.

Nonproduction purchasing focuses on sourcing items not used in actual vehicles, such as production equipment and general supplies. While this function will not change dramatically in its core activities, OEMs will need to enlarge its competence base to ensure the effective establishment and management of BOT models and supplier parks. In fact, the new-business-models department—which should reside within nonproduction purchasing—will have to support much of the logistical coordination associated with BOT models and supplier parks. Moreover, this function will have to handle the complex financing schemes and the project management entailed in setting up suppliers’ production facilities close to or even within the OEMs’ factories. As OEMs push for closer physical integration with their suppliers, this interface must be carefully managed—from the contractual, financial, and operational points of view.

Strategic supplier management is the last of the four core functions that constitute a best-practice purchasing organization in an automotive OEM. Essentially, strategic supplier management works to optimize the supplier landscape—from innovation capture to cost reduction and quality assurance—both today and well into the future. Because strategic supplier management plays such a critical role in an OEM’s ability to wield the six innovation-fostering levers described in the previous section, and because most OEMs do not currently have the full range of relevant functions in place, we devote a special section to describing how strategic supplier management should work.

Implementing Strategic Supplier Management

In our view, strategic supplier management is key to ensuring that OEMs have a healthy, diversified, and innovative supply base—not only in the near term but 5, 10, or even 20 years from now. Strategic supplier management consists of five functions: trend and supplier scouting, supplier development, cost engineering, quality management, and partnership programs.

Trend and Supplier Scouting. This function draws on deep knowledge of trends in markets and technologies, as well as on familiarity with suppliers and their plans, to identify and prescreen suppliers for strategically important leading-edge technologies. Many years before a particular technology—such as a fuel cell engine—goes into series production, trend and supplier scouting should be identifying competent suppliers, initiating first contacts with them, benchmarking the technology’s price spot,
and managing the OEM’s panel of future key suppliers. Toward this end, the function works closely with R&D, systems and components purchasing, and marketing, since it needs their input for its core activity. While many OEMs currently seek input from their established suppliers in formulating their innovation strategies, trend and supplier scouting should enable them to pursue a more proactive and independent quest for innovative ideas, including at nonautomotive suppliers. (See Exhibit 12.)

At present, very few OEMs have a function dedicated to trend and supplier scouting in their purchasing organizations. While traditional commodity-group buyers sometimes take on responsibility for portions of this activity, they rarely can devote enough time to the effort to make it successful. As described above, PSA Peugeot Citroën is one of the few OEMs that have implemented formal trend and supplier scouting. Its recently established innovation-purchasing department, which reports to the head of purchasing, is in charge of identifying and assessing technology trends (together with R&D), prescreening qualified suppliers, and managing a pool of potential innovation drivers—even if there are no concrete plans for sourcing from that pool in the immediate future. In essence, this scouting group concentrates on suppliers that might become important a few years down the road. The group then keeps close contact with the suppliers by involving them in joint research projects, partnership programs, and the like.

With the acceleration of globalization and the increasing participation of nonautomotive suppliers in innovation, trend and supplier scouting will play a critical role in the years ahead. Implementing it as a function in its own right in the OEM’s purchasing organization is therefore of great importance.

**EXHIBIT 12**

**TREND AND SUPPLIER SCOUTING BEGINS WELL AHEAD OF THE PRODUCTION CYCLE**

<table>
<thead>
<tr>
<th>Trend sources</th>
<th>Trend identification</th>
<th>Supplier prescreening</th>
<th>Supplier monitoring</th>
<th>Technology matching</th>
</tr>
</thead>
<tbody>
<tr>
<td>Market research</td>
<td>Identify new, relevant technologies</td>
<td>... assess corresponding suppliers and include them in an “observatory panel”...</td>
<td></td>
<td>... and choose the best to include in new projects</td>
</tr>
<tr>
<td>Strategic supplier management</td>
<td>Supplier trends</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Advanced R&amp;D</td>
<td>Technology trends</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Advanced Development Stage**

- Find appropriate suppliers for identified trends
- Initiate first contacts
- Assess new suppliers
- Determine prices for new technologies

**Concept Definition Stage**

- Ensure ongoing supplier benchmarking
- Maintain regular contacts
- Check financial evolution of suppliers
- Adjust prices for technologies

**Vehicle Project Start**

**Platform engineering**

**Project sourcing**

**Handoff**

*About ten years before the start of production*

*Four to five years before the start of production*

*Source: BCG analysis.*
Supplier Development. This function of strategic supplier management aims at shaping the supplier landscape by promoting innovation networks, structuring mergers and acquisitions in the supply base, and organizing the OEM’s financial participation in selected suppliers. The overall objective of this activity is threefold: to enhance innovation potential by linking suppliers together; to ensure the viability of economically weakened suppliers by arranging financial and nonfinancial integration at the supplier level; and to implement control rights for the OEM, through either contractual means or financial participation schemes. To ensure effective supplier development, OEMs should staff this function not only with experienced buyers but also with finance and M&A specialists who have experience with corporate financial analysis at the supplier level, as well as a solid understanding of deal structuring and network management.

A good example of advanced supplier development is BMW’s approach to building flexible supplier networks. (See Exhibit 13.) Anticipating that it will increasingly be using nonautomotive suppliers as sources of breakthrough innovation, BMW has set up a series of supplier networks that link nonautomotive suppliers to traditional suppliers—thus combining innovation power with industrial scale. For example, BMW developed both the ITS (inflatable tubular structure) airbag system and the iDrive “infotainment” system by creating flexible supplier networks of this kind.

In the case of the ITS airbag system, BMW first identified the defense industry supplier Simula, which produces crash safety equipment and inflatable restraint systems for military vehicles and aircraft. BMW then brought Simula together with Autoliv, a traditional automotive supplier that had the overall competence in development and assembly to incorporate Simula’s specific know-how into the production of BMW’s airbag system. In this case, there was a clear triangular relationship among the three players: BMW as the OEM and coordinator; Simula, which provided the differentiating expertise and know-how; and Autoliv, which contributed the overall development and assembly competence.

As noted in the previous section, BMW created a similar triangular relationship with Immersion and Alps to develop its touch-enabled driver interface for iDrive.

Another outstanding example of supplier development is Toyota’s new form of Japanese keiretsu, in which the OEM brings together different suppliers from the same area of specialization into a new joint-venture entity, with Toyota taking a minority stake in the venture. Following this pattern, Toyota has created three companies in recent years. (See Exhibit 14.)

Advics, which develops innovative brake systems, consists of Sumitomo, with its electric-wiring technology; Denso, with its competence in leading-edge electronic controls; and Aisin Seiki, with its expertise in traditional brake systems. FTS, which develops and produces resin fuel tanks, brought together
Toyoda Gosei, which has strong expertise in resin, and Horie Metal, a world-class manufacturer of fuel tanks. Favess, which develops and assembles electronic power-steering systems, brought together Koyo Seiko, Toyoda Machine Works, and Denso.

In all three ventures, Toyota’s objective has been to integrate the suppliers’ complementary engineering competencies in order to create new, highly innovative companies. Such companies not only ensure an adequate innovation pipeline for the OEM but also assure the participating suppliers of better positioning in global automotive markets. By combining their R&D capacities as well as their development and production infrastructures, the suppliers boost their innovation potential and considerably improve their cost structures. So this new type of keiretsu is beneficial for both sides: while the OEM secures its innovation pipeline, the suppliers profit from enhanced engineering competence and improved cost positions.

In the future, as automotive manufacturers continue to extend their supply chains around the globe, supplier development will become increasingly important. It will play a key role in maintaining a healthy and diversified supply base and in integrating new, nonautomotive innovation drivers into traditional sourcing structures.

**Cost Engineering.** With a shorter-term focus than other strategic-supplier-management functions, cost engineering manages suppliers’ costs from the development stage to series production. This function consists of three elements: target costing, process redesign, and product redesign.

*Target costing* aims to define a cost range for each development project, from small parts to complex systems. In general, the cost guideline is driven by the overall business case for the vehicle, as well as benchmarking of global production costs and detailed product analysis. In our view, target costing should be included in strategic supplier management, where it is relatively independent of R&D, production, and the traditional purchasing organization.

*Process redesign*, the second element in cost engineering, analyzes suppliers’ production processes with a view to finding effective ways to reduce cost structures in the production of particular systems or components. While this kind of analysis has been well established in the Japanese automotive industry for decades, European and U.S. OEMs have only recently initiated a similarly cooperative and process-oriented approach to cost reduction. Volkswagen’s PPO initiative is a recent example of this trend.
OEMs undertake \textit{product redesign} to reduce the cost of planned and current systems and components, reviewing each part for possible overengineering and for performance that exceeds customers’ requirements. Naturally, the most effective time to assess and simplify systems and components is during a model’s design and development stage. But it can also be worthwhile to undertake “de-contenting” initiatives—efforts to reduce the cost of specific components either by changing their materials or structure or by removing them completely—even when the relevant car model is already in production. Needless to say, making such changes after the car is completely designed and in production is not the most effective way to go about cost reduction. Nonetheless, in view of the high cost pressure in this industry, the practice will no doubt persist.

One manufacturer that practices extensive cost engineering is Ford. In recent years, Ford has launched a series of cost optimization initiatives. In the late 1990s the company declared that its supply base was an extension of its own operations and that it wanted to manage and control that base more closely in terms of cost and quality. Under a broad initiative it dubbed Total Cost Management (TCM), Ford organized lean-manufacturing workshops with its key suppliers. Ford engineers in the company’s value-analysis center in Livonia, Michigan, tried to educate these suppliers in cost reduction by means of value engineering and value-chain analysis. In 2001 the company enriched the educational character of TCM by adding a financial incentive. The North American Design Cost Sharing (DCS) program promised suppliers participation in all cost savings achieved by joint engineering teams. Thirty-five percent of the first year’s savings were paid to the suppliers. Ford assigned a great number of engineers to work with suppliers to find ways to use cheaper materials and reduce waste, with the objective of saving $3 billion by 2005.

In Europe, meanwhile, Ford has pursued a different approach to cost engineering. Rather than sharing cost savings with suppliers, it has set up interdisciplinary teams that include representatives from the purchasing, engineering, manufacturing, and finance departments to work with suppliers to develop cost-saving ideas. The participants in the TVM (Team Value Management) initiative focus on process and product analysis in certain commodities. Over the past two years, Ford has set up as many as 65 commodity teams in Europe, with the goal of taking out 15 percent of materials costs.

By establishing stringent cost engineering—including target costing, process redesign, and product redesign—OEMs can go far toward ensuring product differentiation at competitive cost. This kind of cost engineering should be part of a structured and transparent approach to cost management, which OEMs should undertake jointly with suppliers.

\section*{Quality Management}

A primary function of strategic supplier management is quality management along the entire supply chain. In fact, with more than two-thirds of production activities currently being outsourced to suppliers, OEMs need to provide multidimensional quality support. Taking as a reference the Japanese OEMs’ approach to quality management, we differentiate among three forms of OEM-driven quality support: traditional quality auditing, quality teams, and quality associations.

\textit{Quality auditing} consists of a detailed review of the supplier’s production process during the ramp-up phase, as well as the ongoing measurement of product and process quality. While all OEMs conduct detailed quality auditing at the tier-one supplier level, many would do well to conduct quality auditing selectively also at the tier two and tier three levels, because some tier-one suppliers do not have the resources or the expertise to do so.

\textit{Quality teams}, which OEMs dispatch to suppliers for defined periods, can help suppliers not only by addressing acute quality problems but also by training them in quality management techniques. Their
goal is to strengthen quality management at all supplier levels.

Finally, the Japanese concept of *quality associations*, known as *kyohokai*, refers to groups of suppliers that come together under an OEM’s leadership to focus on developing and improving quality standards. U.S. and European OEMs should consider involving their key suppliers in quality associations of some kind in order to improve quality standards along the supply chain. Because the quality of products and processes is a principal element in the supplier’s relationship with the OEM, we suggest that supplier-oriented quality management be clearly positioned within strategic supplier management, as exemplified by Toyota.

Long a pioneer of quality-management techniques, Toyota includes a substantial quality-management dimension in its purchasing organization. In addition to applying traditional quality control to purchased parts and materials, Toyota disseminates its quality-management techniques through a second department, called Supplier Production Management. SPM not only gives Toyota’s suppliers quality support during the ramp-up phase but also sends task forces of several engineers to key suppliers for periods ranging from a few weeks to many months, with the goal of transferring Toyota Production System (TPS) principles to them. In this way, Toyota ensures adherence to its quality standards as well as to its overall production philosophy. This approach not only cuts costs and boosts quality but also smooths the interface between Toyota and its suppliers. Today Toyota is experimenting with *kyohokai*-style quality associations outside Japan. The idea is both to share knowledge through the exchange of best-practice ideas among suppliers and to provide intensive quality training. Among the OEMs reviewed for this study, Toyota has the most elaborate and complete supplier-oriented quality management.

Given the considerable distribution of production tasks along the automotive supply chain, OEMs can ensure quality only by installing multidimensional quality support that goes well beyond traditional quality auditing. Quality management should therefore be a critical element of strategic supplier management.

**Partnership Programs.** This function serves to integrate the various initiatives at the OEM-supplier interface into a comprehensive framework for collaboration. Supplier development, cost engineering, and quality management should take place not in isolation but as key elements within an OEM’s carefully structured partnership program. The role of this function is to define such dimensions as cost reduction, quality management, innovation exchange, network building, and supply chain management; to integrate the relevant strategic-supplier-management functions; and to ensure the relevance of preferred-supplier status in sourcing strategies and negotiations. Compared with the other four functions of strategic supplier management, this one is more a support function, acting as a marketing and communication department toward suppliers.

In addition to ensuring the significance of preferred-supplier status in OEMs’ purchasing strategies and negotiation procedures, partnership programs serve to integrate all the other dimensions of strategic supplier management: trend and supplier scouting, supplier development, cost engineering, and quality management. They form a solid platform for effective supplier management.

One caveat: if an OEM treats its “preferred suppliers” exactly as it treats new suppliers, its partnership program will be seen as merely a marketing gimmick. To be effective, partnership programs must give participating suppliers preferred positioning vis-à-vis nonparticipants.

**Four Organizational Models for Purchasing**

At the beginning of this section, we outlined the merits of integration versus separation of the purchasing and R&D functions, as well as the need for a strong matrix organization to cut across traditional departments and commodity groups. Following the logic set forth in that discussion, we have defined four organizational models for purchasing departments. (See Exhibit 15, page 36.) The deci-
sion as to which model to use depends primarily on whether the OEM is a volume manufacturer or a premium manufacturer, and on whether it produces one brand of vehicles or multiple brands.

The Single-Brand, Volume-Oriented Purchasing Organization. This is the traditional structure, in which purchasing is a centralized function that reports directly to the CEO. Locating all purchasing activities within this department generates clear cost synergies for the OEM. The horizontal platform or model dimension is less important because systems and components are sourced in common or in similar ways across all models. This centralization of purchasing activities ensures an optimal bundling of purchasing volumes across platforms and models, thus contributing to superior cost performance. On the other hand, the same strong standardization across models that reduces materials costs also has the effect of reducing end-product differentiation. In addition, the separation of purchasing from R&D can hamper innovation capture.

The Single-Brand, Premium-Oriented Purchasing Organization. Here purchasing is combined with R&D, and the company practices strict collocation
of purchasing and R&D personnel. A stronger emphasis on the horizontal (platform or model) dimension promotes better cooperation between purchasing and R&D, which is a prerequisite for an effective innovation-capture process. In addition, this kind of organization fosters technical competence among purchasing personnel. This approach also permits clear product differentiation, which is essential if the company is to meet demanding customer requirements in the premium segment. However, this type of organization carries the risk that R&D’s considerable influence on the sourcing process could curtail the overall push for cost reduction at the OEM-supplier interface.

The Multiple-Brand, Volume-Oriented Purchasing Organization. For volume OEMs that handle several brands, it makes sense to keep purchasing as an independent, top-level function that reports directly to the CEO. In addition, purchasing should be organized in a matrix with a strong horizontal platform dimension in which each platform team covers all relevant models of the different brands. The combination of a centralized purchasing department with a number of platform managers and their platform teams creates a strong focus on cost synergies, because while purchasing is in charge of pushing for cross-platform cost synergies, platform managers also have a clear mandate to look for intraplatform synergies. As a result, the whole matrix is focused on cost, and the OEM can become very cost-effective. The negative aspect of this approach is that innovation capture is likely to have a lower priority than cost cutting. Also, because platform managers are looking for intraplatform synergies, there can be some blurring of brand differentiation.

The Multiple-Brand, Premium-Oriented Purchasing Organization. Here, too, purchasing is combined with R&D, and there is meticulous collocation of purchasing and R&D personnel, as well as a strong project orientation for sourcing activities. The horizontal dimension of the matrix is dominated by brands, which coordinate development and sourcing activities for their models. This approach ensures the clear brand differentiation that is essential to premium OEMs. At the same time, cross-brand committees focus on obtaining platform synergies. The overall advantages of this model are that by integrating R&D and purchasing, it promotes the capture of differentiating supplier innovation, and that the strong brand dimension tends to prevent cannibalization among several premium brands. On the other hand, this type of organization is likely to achieve only limited cost reduction, especially when cross-brand platform committees are not equipped with adequate decision-making power.

The four models described here reflect different perspectives on how an OEM’s purchasing organization might be structured. They should be seen not as definitive organization charts but rather as conceptual structures that highlight the major decisions to be made in designing an organization that will promote the best possible balance between product differentiation and cost optimization.

Ensuring a Smooth Innovation-Capture Process

While the structure of the purchasing department and its linkage to other OEM functions are critically important, another essential consideration is the set of decision-making rules that defines the development and purchasing process. Here, as most OEMs and suppliers are well aware, purchasing and R&D have not always cooperated effectively.

Normally, a supplier works with the OEM’s R&D department for one to three years to define and develop a new system or component. Although most OEMs’ purchasing departments try to manage the process through forward sourcing and target costing at this early stage, this involvement of purchasing is often not very effective, in part because staff rotations impair continuity and in part because of the tendency of many R&D engineers toward technological isolationism. All too often, therefore, the handoff of project leadership from R&D to purchasing triggers an extreme push for cost reduction—calling into question everything the OEM-supplier team has developed to date and generating numerous costly iterations. To ensure smoother cooperation, it is essential to install a strong project structure that links R&D and purchasing throughout the process.
Also, OEMs must ensure that there is a clear joint decision-making process within purchasing, involving the people in charge of purchasing by product groups—the systems and components purchasers—and those in charge of sourcing for individual platforms or models. As the development and purchasing process moves forward, the decision-making power shifts and roles must be redefined.

- At the advanced development stage, systems purchasers need to interact with their suppliers and with R&D to identify and promote differentiating innovations.

- At the stage of concept definition and competition, the project dimension—whether platform or model—becomes predominant. Project-specific sourcing managers need to decide which systems and components to incorporate into their respective platforms or models, while systems and components purchasers should provide them with general sourcing guidelines and useful input based on their particular supply-market expertise.

- During the final negotiation and subsequent series-development stages, there must be—and this is particularly important—a joint decision-making structure between systems and components purchasers on one side and project managers on the other. This is essential to ensure the stability of the innovation process.

In summary, over the course of the development process, decision-making power shifts from the vertical to the horizontal perspective, ending up with a clearly defined joint decision-making approach. Only by defining decision-making rules that reflect this shift—and ensuring that they are honored throughout the organization—can OEMs guarantee both innovation capture and cost containment.

**The Human Dimension**

To meet the broad array of challenges related to balancing an effective process for capturing innovation with a cost-effective sourcing strategy, OEMs need to develop their purchasing personnel and related policies along five dimensions: cross-functional experience, technical background, equitable remuneration, differentiated incentive systems, and training in technology and supplier management.

**Cross-Functional Experience.** While traditionally most members of the purchasing staff have had a strong departmental focus, we encourage OEMs to institute job rotation at both junior and senior levels among purchasing, R&D, production, marketing, and sales. This program may take the form of structured short-term exchanges or long-term personnel transfer. Companies that offer such cross-functional career paths report that their purchasing staff members are more motivated, acquire more interest in technology, and display a stronger end-customer orientation.

**Technical Background.** Educational profiles in many OEM purchasing departments tend to feature strong economic backgrounds. In fact, with the exception of two companies, all the OEMs we reviewed for this study had purchasing personnel who held degrees primarily in business administration, accounting, or economics. For the purchasing staff to play a more active role in the innovation process, OEMs must strengthen their technical competence. In our view, OEMs would benefit from adding more engineers to their purchasing departments—either through focused recruiting efforts at technical universities or through intracompany transfers from R&D or production.

**Equitable Remuneration.** Within most OEMs, there is still a considerable gap between the wages paid to purchasing staff and the wages paid to their counterparts in other departments, particularly R&D. To attract more technically sophisticated personnel, OEMs will have to provide equally interesting opportunities across departments, in terms of both wage structures and career options.
**Differentiated Incentive Systems.** Traditionally, the primary measures on which OEMs have assessed the performance of their purchasing staffs have been purchasing price levels and cost-reduction achievements. To promote sourcing that focuses more on innovation, OEMs need to rework their incentive systems to include new dimensions such as innovation capture rates, supplier quality improvement, supplier productivity improvement, and implementation of supply-chain-management tools.

**Training in Technology and Supplier Management.** Currently, OEMs offer their purchasing personnel only limited training in either new technologies or strategic purchasing techniques. However, to source complex systems effectively, purchasing staff members need to have a good understanding of relevant technologies. Moreover, to implement strategic supplier management, they should also be trained in areas such as supplier development, cost engineering, and quality management. Therefore, in addition to creating cross-functional career paths, OEMs should take a diversified approach to training, ensuring that it covers not only traditional purchasing skills but also strategic supplier management and relevant technical know-how.

Only by dramatically enhancing the competence of their purchasing personnel can OEMs achieve truly effective cooperation with their suppliers. Such cooperation goes well beyond annual price-reduction rounds to focus on fostering joint innovation processes—which in turn are critical to ensuring product differentiation at competitive cost.

* * *

In this section we have described how OEMs can better wield the six levers of a joint innovation process by setting up a supplier- and technology-oriented purchasing organization. In the next section we take a close look at the other side of the OEM-supplier interface—focusing on those areas where tier one suppliers need to take action in order to remain the OEMs’ partners of choice in an industry that is increasingly driven by innovation.
An Agenda for Tier One Suppliers

On the other side of the OEM-supplier interface, tier one suppliers are facing stiff challenges of their own. They have to work more closely than ever before, both with their OEM clients, which ask them for valuable innovations but also pressure them on cost, and with a multitude of tier two and tier three suppliers, which generally are not well integrated into effective supply-chain structures. Unlike tier two and tier three suppliers, tier one suppliers need to manage their own networks of subsuppliers in order to generate innovation and control materials costs. Moreover, they need to define structures capable of supporting their heavy involvement in OEM product-development and assembly processes.

In our analysis of OEM-supplier relationships around the world, we identified four areas that tier one suppliers need to address within their own organizations:

- In R&D, it is critical that tier one suppliers understand the OEMs’ innovation strategies early on, so that they can build an adequate engineering base and develop flexible innovation networks with subsuppliers.

- In procurement, tier one suppliers should implement strategic subsupplier management, similar to the OEMs’ strategic supplier management, in order to ensure the proactive development of their own supply base, manage costs at the tier two and tier three levels, and ensure quality along the whole supply chain.

- In production, tier one suppliers need to acquire the project-management and risk-management skills that are critical for the new business models that are likely to become increasingly important in the industry: BOT models and supplier parks.

- In sales, the main challenge is to build a customer- and product-driven sales organization that supports effective communication with the increasingly global OEMs through strong key-account management and cross-functional sales teams.

The R&D Challenge: Leveraging the Innovation Potential

To fulfill their new role as innovation drivers and orchestrators, tier one suppliers must both strengthen their own engineering capacity and leverage their subsuppliers’ technical expertise. Moreover, to do this effectively, tier one suppliers need to understand their clients’ innovation focus early on. In this area, Japanese suppliers offer best-practice models. Most Japanese suppliers have substantial numbers of resident engineers at OEM sites. Among the Japanese suppliers that participated in this study, the number of such engineers at OEMs ranged from 15 to 200. (See Exhibit 16.) Of course, these large numbers of resident engineers...
emanate from the traditional keiretsu structures and are typically distributed among many projects.

Resident engineers represent a significant investment in personnel. So it is critical that they generate substantial advantages in the advanced-development, concept-definition, concept-competition, series-development, ramp-up, and production stages. Toward this end, resident engineers use the advanced development period strategically to analyze the OEM’s innovation strategy, help focus the OEM’s development of new technologies, and proactively position the supplier’s innovations with the OEM’s R&D engineers. In addition, resident engineers are important sources of information on competitive activities during concept definition and concept competition. Later in the process, they can contribute to a smooth interaction between supplier and OEM, as their presence “on the ground” helps to minimize any risk of process instability. Especially during ramp-up, resident engineers can play an important quality-fostering role by ensuring that the supplier’s systems and components are optimally integrated into the overall vehicle.

In addition to placing resident engineers at the OEM, each supplier needs to develop a strong proprietary engineering base. The growth of tier one suppliers’ proprietary R&D capacity is reflected in their increasing R&D investments; many leading suppliers are allocating as much as 7 percent of their earnings to this activity. Suppliers can strengthen their innovation capacity in two ways: by growing organically or by acquiring engineering firms. For example, the acquisition of IVM Automotive by Edscha, the German roof-system supplier, was an important cornerstone in making Edscha a full-service provider—as shown by the substantial role it played in the design and development of the cabriolet version of DaimlerChrysler’s PT Cruiser.

Clearly, tier one suppliers must invest considerable time and money in pursuing R&D strategies that will complement the R&D strategies of their OEM clients. To ensure that they build the necessary engineering capabilities and deploy them effectively, tier one suppliers must implement stringent R&D management based on a detailed innovation road map for each OEM client. Identifying and assessing internal and external client opportunities for growth are another important function of R&D management.

In addition to developing their own innovation base through organic growth and acquisitions, tier one suppliers should work with tier two and tier three suppliers to develop flexible innovation networks. Like the OEMs, tier one suppliers are looking for innovation partners both inside and outside the traditional automotive supply base. For example, Valeo, a French supplier of automotive equipment, initiated an innovation partnership with Raytheon, the U.S. aerospace and defense company, to promote its development of parking assistance systems. Delphi, the world’s largest automotive supplier, established an innovation network with Ericsson, the telecom equipment manufacturer, for its telematics solutions; it also cooperated with Palm, a producer of personal digital assistants, to enlarge the voice recognition functionality of its car-related “infotainment” systems.

To set up and manage effective flexible-innovation networks at the subsupplier level, tier one suppliers need to act like OEMs, continually monitoring and benchmarking the innovation potential of their current suppliers as well as new suppliers with unique, complementary expertise. They should also develop alternative network scenarios with both automotive and nonautomotive suppliers, carefully assessing the subsuppliers’ potential for cooperation. Finally, they need to do the necessary managerial groundwork, setting up cooperation structures for the innovation networks, such as R&D platforms or joint R&D road maps, and managing them throughout the process.

The Procurement Challenge: Implementing Strategic Subsupplier Management

Although some tier-one suppliers have grown so large that they are now comparable to small OEMs, a number of them still have traditional, operations-oriented purchasing functions. In particular, the strategic-subsupplier-management function is not well developed in tier one suppliers’ purchasing
departments. For tier one suppliers to fulfill their role as innovation drivers and system integrators, they must aim to manage their subsuppliers along the same five dimensions that we have identified for OEMs: trend and subsupplier scouting, subsupplier development, cost engineering, quality management, and partnership programs. While establishing a full-fledged strategic-subsupplier-management function may not be necessary for all tier-one suppliers, most such suppliers could benefit from implementing some of the following functions, depending on their level of innovation and their process role in the supply chain.

**Trend and Subsupplier Scouting.** This function’s goal is to identify, at an early stage, subsuppliers that can handle the leading-edge technologies that will contribute to product differentiation in five to ten years. As described in the previous section, this function regularly monitors the supply base, initiates contacts with innovation drivers, benchmarks each relevant technology’s price spot, and manages the company’s panel of future key subsuppliers. For example, Behr, a supplier of vehicle air-conditioning and engine-cooling systems based in Germany, has set up an “innovation purchasing” function. This effort is dedicated to prescreening new subsuppliers and conducting worldwide benchmarking of breakthrough technologies for air conditioning and engine cooling. Only by practicing such proactive searches for new suppliers of leading-edge technologies can tier one suppliers ensure a steady stream of differentiating innovations for their OEM clients.

**Subsupplier Development.** This is a critical function for tier one suppliers, because it allows them to energize competition at the subsupplier level, to tap subsuppliers’ full innovation potential, and to prepare for international business expansion. In general, tier one suppliers that practice strategic subsupplier development apply it in three ways. First, they develop alternative sources for raw materials and production technologies as a safeguard against monopolistic or oligopolistic market situations. Second, they play a key role in instigating joint R&D structures or financial participation schemes to stimulate the exchange of know-how and innovation. Third, they structure mergers and acquisitions with local players to support expansion into new regions. Confronted with a business environment that is increasingly complex—both technologically and geographically—tier one suppliers need to shape their supply bases strategically in order to ensure access to differentiating innovations and to the markets of the future.

**Cost Engineering.** This function focuses on managing subsuppliers’ costs, using approaches such as target costing, process redesign, and product redesign. Especially for large tier-one suppliers that provide integrated solutions to their OEM clients, stringent cost management is essential to meet the OEM’s price expectations. It is not surprising that Delphi has been one of the first suppliers to set up such a cost-engineering function. Teams of Delphi engineers carry out detailed process analyses at their suppliers’ production sites. They also conduct lean-manufacturing workshops, in which Delphi and its suppliers jointly generate concrete measures to meet Delphi’s annual price reduction goal of 3 percent.

Learning from the OEMs, tier one suppliers should set up their own cost-engineering functions to drive down—in a cooperative way—materials and production costs at the tier two and tier three supplier levels. For tier one suppliers, cost engineering is the critical tool they need in order to avoid being caught in a profitability trap between the strong price pressure of the OEMs, on the one side, and their subsuppliers’ less stringently controlled cost structures, on the other.

**Quality Management.** This function is especially important for tier one suppliers, which face quality challenges from both directions: their subsuppliers and their OEM clients. To improve quality management among tier two and tier three suppliers, tier one suppliers need to send quality teams to provide
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on-site support, as well as to hold quality workshops with key personnel. At the same time, they should also send their own quality-management staff to their OEM clients to ensure an optimal integration of their systems and components—especially during the ramp-up phase and around the start of production.

To carry out these diverse quality-management tasks along the whole supply chain, most of the large tier-one suppliers analyzed for this study have several dozen quality specialists dedicated to supporting their subsuppliers and OEM clients during critical stages. As tier one suppliers increasingly assume the integrator role in the industry, it is essential that they take over a larger share of overall quality management along the entire supply chain. Of course, these activities need to be closely coordinated with those of the OEMs.

**Partnership Programs.** These used to be the sole prerogative of OEMs, which wanted to integrate their supplier-development, cost-engineering, and quality-management initiatives under an overall partnership concept. Recently, however, large tier-one suppliers have started to set up similar programs. Visteon, for example, has created a program called SAVE (Suppliers and Visteon Excel), which is geared toward cost management and supplier cooperation. SAVE aims to support participants in jointly identifying opportunities for cost savings in product design, materials, and manufacturing processes. The program also encourages communication and interaction among subsuppliers about technology development and production optimization. While the jury is still out regarding the success of SAVE, it clearly shows how large tier-one suppliers are replicating the strategic-supplier-management practices of OEMs.

Of course, partnership programs may not make sense for all tier-one suppliers. Each supplier should evaluate the potential for such a program, given the scale and nature of its subsupplier base. As with OEM-sponsored programs, the success of suppliers’ partnership programs will depend on whether they genuinely benefit the participating subsuppliers, either by giving them real support on innovation, processes, and quality or by ensuring that they receive preferential treatment in sourcing negotiations.

Not all tier-one suppliers have the scale or resources to implement full-fledged strategic-subsupplier management. However, depending on their innovation capacity and their role in the supply chain, all suppliers should think about instituting at least some of the functions described above, as they are critical to ensuring a healthy, diverse, and competitive supply base in the future.

**The Production Challenge: Preparing for New Business Models**

In the production area, the key challenges for tier one suppliers are not so much technical as operational. Here their task is to make the new cooperation structures—the build-operate-transfer (BOT) models and supplier parks—work without pushing themselves over the financial edge. Traditionally, suppliers used to produce systems and components at production sites of their own choosing. With increasing globalization, they have been moving their production facilities to other countries and continents to be closer to their OEM clients and to reduce costs. The increasing number of BOT models and supplier parks has taken the trend toward ever closer involvement in the OEMs’ production processes to an entirely new level.

**BOT Models.** BOT models represent the tightest form of OEM-supplier cooperation. As described above, in this model the supplier takes over parts of the OEM’s production process, owning the production equipment and sometimes managing the painting or final assembly process itself. By performing the OEM’s traditional manufacturing role in the OEM’s factory, the supplier increases its business scope; but it also takes on the full burden of market and operational risks that were formerly borne by the OEM.

BOT models are based on a quite complex network of relationships. (See Exhibit 17, page 44.) Traditionally, a tier one supplier used to sell, for instance, a complete paint-shop system to an OEM.
and receive payment for that system. In BOT models, this simple transaction is replaced by a complex interaction among the supplier, a specially created operating company, the OEM, and the financing bank. The supplier owns the operating company, which in turn owns the asset—the paint shop system—which is financed by the bank. The main difference between the traditional arrangement and the new one is that rather than paying the supplier for a paint shop system, the OEM now compensates the supplier, through its operating company, on a per-painted-vehicle basis. So the supplier takes over a large part of the entrepreneurial risk if, for example, a particular model fails to meet planned sales targets or if there are production disruptions in the factory.

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As discussed in earlier sections, BOT models are the subject of much controversy. Clearly, they hold both advantages and drawbacks for all players. For OEMs, the new business models have the advantages of requiring no initial investment, improving their balance sheets, increasing efficiency, sidestepping budget constraints, and sharing risk. But, of course, these models can also have disadvantages for the OEMs, such as further loss of operations competence, increased unit prices, and tensions with unions—as well as the risks entailed in supplier-related financing, which is likely to be less advantageous than traditional OEM-related financing.

For suppliers, BOT models allow them to expand the range of services they can offer the OEMs, thus differentiating themselves from the competition; to gain a better understanding of the production process itself, which in turn can enhance product development; and possibly to earn higher margins. However, suppliers clearly incur higher risk, including both operational and market risk. And they must bear the financing costs of BOT models, which can easily exceed their financial resources.

**Supplier Parks.** These represent a less extreme but still significant change in the traditional OEM-supplier relationship. Initially, the concept of supplier parks was strongly promoted by volume OEMs, including Ford and Volkswagen—mainly to ensure just-in-time and just-in-sequence delivery of parts and systems to their larger production facilities. Premium OEMs such as BMW and DaimlerChrysler have followed this example, although their parks tend to be limited to a smaller number of suppliers because scale effects are lower in the premium segment. Today there are dozens of supplier parks across Europe and the United States, ensuring better information exchange, smoother logistics, and shorter reaction cycles between suppliers and OEMs.

While the closer interaction generated by these parks has positive effects on product development and series production, there are drawbacks as well. When a supplier moves close to several OEMs, its formerly centralized production structure becomes fragmented, eroding economies of scale. Moreover, in producing literally at the doors of the OEM’s factory, the supplier becomes far more dependent on the success of the OEM’s local production than was the case under the traditional centralized location.

To function successfully in these new business models, suppliers must master the disciplines of model assessment and risk management.

**Model Assessment.** When asked to participate in a BOT model or a supplier park, suppliers need to carefully assess these arrangements in terms of the

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**EXHIBIT 17 BUILD-OPERATE-TRANSFER (BOT) MODELS INVOLVE COMPLEX RELATIONSHIPS**

![Diagram of BOT models](attachment://bot_diagram.png)

Sources: BCG interviews; BCG analysis.
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OEMs involved, the underlying business logic, and the local production structures. For example, participating in one OEM’s supplier park that serves a single-model factory is far riskier than participating in a supplier park that supplies several multimodel factories belonging to various OEMs, such as the Rosslyn supplier park in South Africa. In making these assessments, suppliers also need to develop a clear understanding of the cost structures in the relevant countries, including potential expatriate-remuneration packages, local trade-union requirements, and their own supply logistics. When engaging in this type of cooperation, it is essential that the OEM, the participating suppliers, and the financing banks work together closely and ensure maximum transparency.

Risk Management. In addition to performing this overall assessment of new business models, suppliers should carefully limit their risk exposure by crafting meticulously detailed contracts with OEMs and subsuppliers. Toward this end, they need to develop proprietary legal resources with the skill and experience to handle the risks involved. Each supplier’s legal team should secure the supplier’s position through contractual clauses covering such issues as minimum sales volumes, production cycle contingencies, preferred-supplier status for next-generation vehicles, and volume-sensitive pricing schemes. In addition, each supplier should be sure to establish flexible contracts with its own subsuppliers. The purpose of such contractual safeguards is to guarantee the supplier a minimal return on its investment and to share with subsuppliers some of the uncertainty inherent in these models.

These new business models represent a serious challenge to suppliers’ economic viability. As OEMs are increasingly pushing for these models, suppliers must protect their own interests by performing the detailed assessment described above, as well as engaging in proactive risk management.

The Sales Challenge: Structuring a Customer- and Product-Driven Organization

In our discussions with suppliers and OEMs, it has become clear that many suppliers’ sales organizations are not structured to support effective interaction with OEMs. Suppliers can address this issue by redesigning their sales organizations. (See Exhibit 18, page 46.) The redesign should follow three key principles:

1. Bundling key-account-management activities at the executive level

2. Ensuring strong linkages between key-account management and engineering

3. Mirroring the OEMs’ purchasing organizations in their own sales organizations

Bundling Key-Account-Management Activities at the Executive Level. While divisional key-account management will remain the backbone of ongoing sales activities, large suppliers should also have one point in the organization that oversees all negotiations and all contracting for a given OEM. Establishing executive-level key-account management allows the supplier to present a single, unified face to the OEM customer. It also provides centralized decision-making authority, making it possible for the supplier to respond quickly to OEMs’ requests for cross-divisional bids—for example, in e-procurement processes.

Some large suppliers with numerous divisions have implemented the concept of a cross-divisional “Mr. Ford,” “Mr. Volkswagen,” or “Mr. Toyota,” who oversees all sales activities with these OEMs. Others, however, still fragment their decision-making authority—a practice that allows them to apply different pricing models in different regions and different product categories. But in view of the globalization under way among OEMs, it will be increasingly important to give one person—it could be a board member or even the CEO—clear oversight of all the company’s activities with the most important clients.

Smaller suppliers with fewer divisions may not feel the need for executive-level key-account management at the board level. Instead, they may prefer to implement this function within a particular division. For example, the key-account manager of the division that does the most business with a given
OEM could also be the executive-level key-account manager for that OEM, thus filling a double role.

The ideal design for a key-account-management organization will of course depend on the size of the organization and the number of divisions it has. Suppliers with many business units generally need executive-level key-account management that transcends the divisions; those with one or two business units should integrate executive-level key-account management within the divisional structure.

**Ensuring Strong Linkages Between Key-Account Management and Engineering.** Suppliers’ sales teams will increasingly need technical sophistication and competence, especially if the products they are selling are relatively complex and require intense interaction with the OEM’s R&D department. So suppliers need to create, within each division, a sales team structure that links engineering with divisional key-account management by putting engineers with relevant technical expertise on each sales team. In this way, each team will have both in-depth technical expertise and a detailed understanding of the client’s purchasing organization and sourcing strategy. Of course, suppliers that sell relatively simple, standardized products may not need to incorporate engineers in their sales teams but can continue to sell through key-account management alone, thus integrating product and client know-how in one person.

**Mirroring the OEMs’ Purchasing Organizations in Their Own Sales Organizations.** To create an effective interface with their OEM clients, best-practice suppliers have organized their key-account management to mirror the OEMs’ purchasing organizations. This implies that, for example, if an OEM sources by commodity groups, the supplier’s sales organization should be organized by commodity groups, whereas if an OEM buys principally on the basis of platforms or models, the supplier’s key-account management should be structured accordingly. This approach can trigger different key-account-management structures within one supplier—each mirroring the specific setup of the respective OEM client. Although such a setup may increase the organizational complexity of the
supplier’s sales organization, it contributes to far better communication and smoother cooperation at the OEM-supplier interface. In general, it will become increasingly important for suppliers to adapt their sales organizations to the dynamics of the OEMs’ purchasing functions.

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As indicated by the four types of challenges described in this section, tier one suppliers around the world face a broad array of issues that require skillful management. Urgent tasks include leveraging subsuppliers’ innovation potential, designing a strategic-subsupplier-management function, preparing for new business models, and setting up effective sales interfaces with OEMs. In short, to fulfill their daunting new charter as system integrators and innovation drivers—and thus become the engines of the automotive industry’s growth—tier one suppliers will need to rethink their roles.
Reinventing the OEM-Supplier Interface

Throughout this report, we have argued that the future of the automotive industry depends on relationships between OEMs and their suppliers that are stable, innovation oriented, and cost-effective. Although those relationships have recently been marked by a relentless, unilateral drive for lower prices, it is our deep conviction that the industry now needs to move beyond cost reduction if it wants to achieve product differentiation at competitive cost. Toward that end, we have identified three principles that should stand as guideposts to OEMs and suppliers alike.

1. **Stable development and purchasing processes are essential to the effective exchange of innovation.** Such processes foster trust and promote cross-fertilization. Only by ensuring a certain level of process stability—free of negotiating ploys and self-serving business tactics—can OEMs manage to capture innovations that will allow them to differentiate their products in the eyes of consumers.

2. **Virtual and physical innovation platforms must play a critically important role.** Innovation platforms enable OEMs to identify new suppliers—especially in nonautomotive areas—and to set up early, effective interactions with innovation drivers. Whether these platforms take the form of open Web portals for innovation exchange, specialized R&D partnerships, or joint development teams, they all contribute to the development of new, brand-differentiating systems and components.

Only by providing such an innovation-fostering environment can OEMs truly leverage the product and market expertise of their suppliers—an essential undertaking, given the high level of specialization and outsourcing in the industry.

3. **Intracompany cooperation models are indispensable.** Such models, which are currently underused, play a vitally important role in promoting better relationships between OEMs and suppliers. On the one hand, cooperation and collocation models between R&D and purchasing can contribute to a much more stable innovation process within an OEM. On the other hand, staffing sales teams with specialized engineers as well as key-account managers can bring the impact of the supplier’s full range of knowledge to the point of sale. The critical lesson here is that in order to improve their interface, OEMs and tier one suppliers need to work on a better internal alignment of their own functions, while also working to improve external relationships.

Obviously, the changes described above will not happen overnight. However, if the automotive industry wants to remain a cornerstone of national economies around the globe, it will have to ensure product differentiation at competitive cost. Industry leaders can achieve this goal only by putting OEM-supplier relationships on a new basis—in other words, by reinventing the OEM-supplier interface.
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Reinventing the Automotive OEM-Supplier Interface