

# Product Development Partnerships: Balancing the Needs of OEMs and Suppliers

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As products continue to become more technically complex and global in scope, product development managers are relying more and more on suppliers for help. Finding the right suppliers requires intense scrutiny of their capabilities. Sometimes the “right supplier” doesn’t exist; it must be developed. Unfortunately, such a process is expensive and time-consuming. Firms cannot afford to lavish attention on each and every supplier. Limited resources necessitate developing close, longer-term, nontraditional relationships with a few of the most important ones.

Companies such as Procter & Gamble and Ford Motor Company have recognized that only a small group of their suppliers are major contributors to long-run success. This select group provides components or systems that create competitive advantages in the product, such as primary operating and power systems, application-specific circuitry, customized control systems, and crucial, often proprietary, materials. Only these critical few suppliers play “full partner” roles in NPD—new product development. Japanese automakers include only about a dozen of their 100–200 first-tier suppliers in this category.

In addition, suppliers’ contributions to new product success are broadening. Original equipment manufacturers (OEMs) no longer look to suppliers to merely improve product quality and cut production costs. Now they look to them to generate ideas for differentiating products, offer solutions to technical design problems, and communicate insights into global markets and their varying needs. At the same time, suppliers are changing their operations as they seek to acquire new skills and meet the heightened expectations of their customers.

Environments of change are inevitably met with varying degrees of success. And product development partnerships, though hailed as the next manufacturing revolution, are not as successful as many firms would like. Numerous success stories have been documented, but less glowing reports have also emerged as the collective experience has grown.

Change environments also involve conflict. A key reason why partners are struggling with new levels of interaction is that they often have conflicting needs and objectives. Managers need a clearer understanding of these conflicts. Two questions are critical:

1. What motivations of OEMs and suppliers create communication barriers and other difficulties in executing effective partnerships?
2. How should firms manage their own changing roles and needs as well as those of their key suppliers in NPD partnerships?

## THE OEM’S WISH LIST

The traditional mix of criteria used by OEMs to evaluate suppliers—price, delivery performance, defects, and so on—is broadening to include more product development and globalization issues. The “wish list” outlined

*Globalization and technology are deepening the need for manufacturers and suppliers to become long-term partners in creating products. But what is the right mixture for success?*

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**Figure 1**  
**Key Interests of Partners in New Product Development Outsourcing**

<i>The OEM's Wish List</i>	<i>The Supplier's Wish List</i>
Providers of scarce resources and capabilities <ul style="list-style-type: none"> <li>• Turnkey solutions</li> <li>• Shared business strategy</li> <li>• Contributions in NPD</li> </ul>	Rewards for up-front involvement <ul style="list-style-type: none"> <li>• Commitment</li> <li>• Shared plans and insights</li> </ul>
Support of global product strategies <ul style="list-style-type: none"> <li>• Market knowledge or access</li> <li>• Local presence</li> </ul>	Protected business interests <ul style="list-style-type: none"> <li>• Propriety</li> <li>• Competitive advantage</li> </ul>
Minimized risks <ul style="list-style-type: none"> <li>• Assurance of a good design</li> <li>• Confidentiality</li> <li>• Demonstrated ability</li> </ul>	Shared wealth <ul style="list-style-type: none"> <li>• Incentives</li> <li>• Backing</li> </ul>

in **Figure 1** has grown, causing OEMs to expect more from their suppliers.

**OEMs want suppliers that provide scarce resources and capabilities.**

OEMs have always sought the aid of suppliers who provide scarce resources or capabilities. However, the types of resources and capabilities they prize are changing. In the past, OEMs accomplished most product design internally. The few suppliers who supported product development activities were not always likely to be the ones who eventually supplied the parts for commercial production.

**Turnkey Solutions.** Since OEMs are now outsourcing more product design activities and ultimate production, they rely heavily on suppliers to provide technical knowledge and expertise. Successful suppliers offer a greater breadth of capabilities so that the overall number of suppliers for an OEM can be reduced. Suppliers must be good at innovation and discovery; they must also be good at prototyping, tooling development, and production. In short, OEMs are looking for suppliers who can provide turnkey solutions and support throughout the development and production phases of the product's life cycle.

The **Appendix** on pages 67–68 describes a recent product development project between Ford Motor Company and Red Spot Paint and Varnish. The project exemplifies the new model for OEM-supplier relationships. Ford moved to a new, cheaper plastic material for various auto components, expecting suppliers to develop a coating material for the plastic that could meet usage specifications. A competition was held to see which supplier could produce a good solu-

tion first, thereby winning the business. Red Spot emerged the winner by solving the technical problems and, even more important, by impressing Ford with its ability to develop, analyze, and communicate technical information, and demonstrate future production capabilities.

The dark side of supplier competitions is the possible disruption of long-term relationships and the damage to trust. Competitions are not advised when a trusted and capable supplier is already available. In situations in which technological and product characteristics are well understood, a com-

petition may be viewed suspiciously by existing suppliers as simply a ploy to get more from them without any commensurate commitment on the OEM's part. Competitions are better suited for situations in which technical needs or existing capabilities are not yet well known.

**Shared Business Strategy.** Building trusting relationships with suppliers is crucial. Most often, trust develops between partners when they share a common view of business and strategy. Consistency in business approaches and frequent contacts are prerequisites for long-lasting relationships. Companies such as Bose Corporation and Honeywell's Home and Building Controls Division have developed a number of ways to locate suppliers on site full-time. At Bose, the suppliers' staff has taken over many of the tasks previously done by Bose purchasing personnel. Suppliers have access to Bose's computer and planning systems and are treated like Bose employees.

Xerox offers an example of shared strategy. Having developed a number of supplier partnerships that should last many years, Xerox expects those suppliers to be willing to share detailed cost structures and process information so that sourcing decisions are well understood. In return, Xerox shares future product development plans with suppliers to obtain help in securing and building long-term supply sources. The plans are communicated during the frequent routine visits Xerox makes to suppliers to discuss progress and solve problems.

**NPD Contributions.** OEMs want suppliers that can contribute to NPD activities in ways that make them quicker, easier, and more effective. They want suppliers that can provide ideas and design concepts early in the fuzzy front end of product development. Thomson Consumer Elec-

tronics asked suppliers to contribute to the RCA Digital Satellite System (DSS) it developed even before establishing many of the communication signal standards (see the Appendix). The project required the rapid development of a number of new product technologies. Through the aid of key suppliers, Thomson was able to develop and market the DSS in about the same time it usually took to execute an incremental television redesign.

As detailed design activities progress, OEMs need suppliers that can analyze, document, and share data via computer-aided design (CAD), computer-aided engineering (CAE), and electronic data interchange (EDI) tools. Experience with cross-functional teams is also a plus. Returning to our Ford/Red Spot example, Red Spot showed initiative as a team player in the program. Even though the firm was not originally invited to join the development effort, it convinced Ford that it would be a valuable team member by offering superior ideas, test data, and other useful information.

Other ways suppliers enhance manufacturers' NPD processes are by offering rapid and "production type" prototyping, tool design, and product testing. When possible, many firms now attempt to build prototypes on production facilities, using soft tools that more closely emulate hard production tools. In addition, OEMs are looking for ways to cut down testing cycle times that can make up as much as 50 percent of total product development time.

One manager summarized his search for good suppliers, saying, "In general, we are looking for suppliers in NPD who emphasize speed, decisiveness, and a winning spirit." Suppliers that are creative, technically skilled, and can contribute openly in a team environment are most likely to win opportunities to contribute to NPD.

### **OEMs want suppliers that support global product strategies.**

Competing in international markets requires developing a global network of suppliers. OEMs are pursuing global operations via regional facilities, joint ventures, and technology transfer agreements. Suppliers contribute to each of these strategies in important ways.

**Market Knowledge or Access.** Local supply sources provide knowledge of or access to foreign markets, regulatory requirements, and local customs. Tapping into their capabilities also gains access to skills or talent not available domestically, such as advanced technologies and engineering talent.

Whirlpool provides a prime example of this approach with its deliberate efforts to establish a worldwide network supplying product R&D,

engineering design skills, and production capacity (see the Appendix). Suppliers in this network contribute to Whirlpool's global strategy by helping design products that appeal to the distinct tastes and needs of different markets. This is largely accomplished through the development of "world products." Pioneered by Ford, world products consist of variations on a basic platform design created to meet a multitude of differing local regulatory and customer requirements.

Whirlpool is seeking to cut the number of different product platforms it produces in half. To succeed, it must collect information on local preferences and then determine which product components may be standardized and which must be customized to meet regional needs. Clearly, suppliers that aid such a process are highly valued. To do so, they need to have a thorough understanding of regional consumer preferences, regulatory requirements, local content laws, and communication norms and customs.

**Local Presence.** In recent years, Hewlett-Packard has implemented a postponement approach by customizing computer and printer products at its foreign distribution centers. Its European center assembles country- and lan-

### **Conference on Global Product Development and the Supply Chain\***

In examining new product development (NPD) relationships between suppliers and original equipment manufacturers (OEMs), we have drawn on a number of field-based studies. But insights were also gleaned from a conference of more than 80 managers from OEMs and suppliers alike who gathered to discuss changing supply relationships and strategies in NPD.

We convened the conference to address these critical issues and the best practices used by OEMs and their suppliers. The conference was motivated by the realization that OEMs must often develop or customize products so that they can be sold in one or more foreign markets. Suppliers are assisting in these efforts in important ways, sometimes following OEMs' customers around the globe. We focused on the following key questions:

- Are firms moving toward more global or more regional product designs?
- How is globalization affecting OEM-supplier relationships for new product development and material supply?
- What changes are on the horizon and how should OEMs and suppliers respond?

Representatives from selected companies presented and discussed their current objectives and initiatives related to these questions: General Motors' Allison Transmission Division, Cummins Engine Company, Mallory Controls Company, Nor-Cote International, Procter & Gamble, Red Spot Paint and Varnish Company, Regal Rugs Inc., Thomson Consumer Electronics, and Whirlpool Corporation. Other firms in attendance included: Allison Engine Company, Arvin Industries, Batesville Casket Inc., Boeinger-Mannheim Inc., Delta Faucet Company, Dow Chemical Corporation, Ford Motor Company, Eli Lilly and Company, Inland Steel Corporation, Kimball International, PSI Energy Company, Square D Company, and United Parcel Service. All the presentations and discussions were captured on videotape for review.

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guage-specific printers by packaging the printer, correct power cord, language-specific manual, and software needed to meet each specific mar-

*"Because the company is supplying competing firms, establishing close business relationships while maintaining a high level of confidentiality is a continual challenge."*

ket requirement. To enable this manufacturing and distribution approach, Hewlett-Packard sources such items as the printer engine internationally and a number of final configuration components locally. In some cases, suppliers have established local units or developed joint ventures to meet Hewlett-Packard's needs.

A similar approach used by Cummins Engine is described in the Appendix. Cummins has asked its suppliers to follow it into foreign markets as it seeks to establish a local presence in major areas. Smaller suppliers frequently lack the resources to establish foreign facilities and must rely instead on joint ventures or other partnering agreements with suppliers already located in host countries.

#### **OEMs want suppliers to minimize their risks.**

Although OEMs need suppliers to become more intimately involved in NPD and global supply, they are often reluctant to allow the suppliers to take greater responsibility in development and distribution processes because of the risks involved. In the past, OEMs have hedged against supplier failures by maintaining a stable of multiple sources for each product. Today, longer, intensive, sole-source relationships potentially expose OEMs to greater risks, forcing them to find other ways to protect themselves.

**Assurance of a Good Design.** An important aspect of risk encountered by OEMs seeking closer NPD relationships with fewer suppliers is the risk of inadvertently excluding the supplier that might come up with the best product design. The Ford/Red Spot project exemplifies an increasingly common approach used by OEMs to mitigate this risk. A group of preferred suppliers is involved early on in NPD. Technical meetings are held regularly so that suppliers can propose and demonstrate component designs. Although all the invited suppliers are expected to commit resources to cover up-front tooling and development expenses, only one of them will eventually win the business.

**Confidentiality.** OEMs are looking for suppliers who can be trusted with the firm's product plans and business strategies. Even when a supplier is capable of producing outstanding design concepts—perhaps especially in this case—the

risk of leaked information can cause the OEM to shy away from the supplier. Just as bad, the OEM might resist sharing all the information the supplier needs out of a concern that the information might be revealed to competitors. OEMs may also seek to minimize competitive risks via exclusivity arrangements designed to protect unique product features. If the supplier provides an innovative technology or design concept, the OEM may try to limit the supplier's use of the design in other products for competitors.

Sometimes these demands can be quite taxing on suppliers. The Appendix illustrates the situation faced by Mallory, a manufacturer of controls for home appliances. Suppliers such as Mallory are expected to meet the individual needs of their customers while also seeking ways to be cost-effective through standardization. Because the company is supplying competing firms, establishing close business relationships while maintaining a high level of confidentiality is a continual challenge.

**Demonstrated Ability.** Production and supply risks also affect OEM-supplier alliances. To reduce these risks, OEMs seek suppliers who can demonstrate that they are the best-in-class in terms of product cost, quality, and delivery, with the ability to improve over time. In addition, OEMs need suppliers who have developed a strong business base through multiple facilities and multiple customers in various industries. These suppliers are expected to absorb cyclical demands, economic swings, and disruptions due to labor strikes or physical catastrophes.

#### **THE SUPPLIER'S WISH LIST**

**W**hile the maxim "The customer is always right" tends to dominate business relationships, another maxim—"Be an excellent customer"—can help sustain OEM-supplier partnerships. To be an excellent customer, it is important to understand the supplier's motivations and requirements (refer back to Figure 1).

Suppliers are working hard to respond to the growing demands of OEMs. At the same time, those who are developing distinctive competencies in product development and globalization are able to ask for more from their customers. In general, suppliers are looking for good customers who provide additional information and rewards to compensate them for their unique capabilities and aid them in meeting manufacturers' needs.

#### **Suppliers want OEMs that reward up-front involvement.**

**Commitment.** Suppliers are usually expected to bear most of the risk of investing up-front design



and development efforts. They are looking for those rare OEMs that reward NPD involvement by compensating their development efforts or committing early to long-term agreements or production contracts. OEMs can support up-front supplier efforts through investments in training, equipment, or systems needed to integrate development efforts. Xerox has an agreement with one of its suppliers, Schaffstall Manufacturing, in which Xerox guarantees future purchases of components as new models are ramped up for production. This arrangement reduces Schaffstall's risks when the firm makes investments in the design and manufacturing of production tooling for Xerox components. Schaffstall's initial investment in prototype parts and tooling to support Xerox's product development will be rewarded later with increased business as the product is launched into full production.

**Shared Plans and Insights.** Suppliers are also looking for OEMs that are willing to share future product strategies, planned changes in technology, regulatory and customer data, and so on. OEMs are often reluctant to share information they consider proprietary or that could put them at risk. Many types of useful information, however, can be shared at minimal risk. Ford recently aided one of its suppliers by identifying which of its other current suppliers were high-potential joint venture partners in other parts of the world. Although this meant that Ford had to reveal to the supplier some of its plans for future business relationships, the benefits of a coordinated global supply base justified the risk.

### **Suppliers want OEMs that protect their business interests.**

**Propriety.** Just as OEMs worry about their suppliers sharing design secrets with other OEMs, suppliers worry that their customers will share secrets with other suppliers. This concern is heightened when a new product innovation is created. Consider Mallory's recent development of an innovative new timer design, containing unique features at a very low cost. Secrecy was a huge priority in product development. Mallory managers were afraid that their major customer would inform other suppliers about the new design. Such fear is often justified when OEMs share a supplier's ideas with its competitors to drive down costs through competition. These concerns often work against a productive environment. In Mallory's case, this threat and the resulting emphasis on tight secrecy ended up hurting both the supplier and its primary customer. Limited communications between the two parties during product development caused numerous mistakes that had to be reworked. The program was completed nearly two years behind

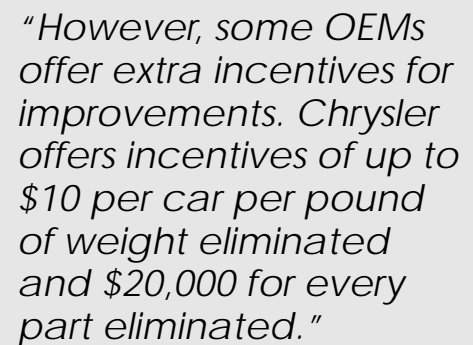
schedule, and serious strains were placed on relations between the two firms.

**Competitive Advantage.** Several suppliers have expressed their desire for OEMs to help them get the greatest returns on their product development efforts. Situations commonly occur in which an OEM forces Supplier A to license Suppliers B and C to produce a technology that Supplier A developed. These conditions make it difficult for suppliers to justify heavy up-front NPD efforts, because they know they will have limited opportunity to enjoy proprietary advantages from the development. On the other side of the issue, suppliers greatly value OEMs that are either willing to pay for exclusive rights to a product design or willing to allow the supplier to use what it learns in NPD to accommodate its other customers. Going one step further, some OEMs realize it is in their best interest to promote their suppliers to other potential customers, because a stronger business base for the supplier minimizes the OEM's long-term risk. In the Xerox-Schaffstall relationship, Xerox has actively supported expanding Schaffstall's business with other OEMs through testimonial letters. By doing so, it has gained more technical knowledge and experience, ensuring long-term survival of a healthy supplier to support its requirements.

### **Suppliers want OEMs that share the wealth.**

**Incentives.** In addition to compensation for up-front NPD efforts, suppliers want OEMs that motivate ongoing design improvements by passing back cost reductions or quality improvement savings in production. Shared savings programs are fairly common in many industries. Most automakers offer 50/50 sharing arrangements. However, some OEMs offer extra incentives for improvements. Chrysler offers incentives of up to \$10 per car per pound of weight eliminated and \$20,000 for every part eliminated. Another attribute that sets some OEMs apart is their willingness to make adjustments in contractual arrangements as economic conditions change. Johnson Controls produces various plastic components for automotive OEMs. Its contracts contain clauses adjusting costs to reflect changes in oil prices.

**Backing.** Other types of wealth sharing include OEMs that provide financial backing for suppliers that have difficulty supporting global



*"However, some OEMs offer extra incentives for improvements. Chrysler offers incentives of up to \$10 per car per pound of weight eliminated and \$20,000 for every part eliminated."*

strategies; they need the partnership of OEMs to build facilities in other parts of the world. The Cummins/Fel Pro relationship bears witness to the problem. OEMs are supportive when they assist in arranging joint ventures or developing acceptable license agreements between domestic and local suppliers.

### BALANCING NEEDS

Numerous potential conflicts exist between OEMs and suppliers because of their differing needs. Consider the following trade-off examples.

- OEMs need suppliers to play key roles in NPD to enhance the product's technical features, producibility, and so on. But OEMs often find it risky or difficult to share the depth of information suppliers need to make these contributions.
- OEMs want suppliers that offer broad capabilities so they can have fewer suppliers and source by product family or system. However, they also want suppliers to be technical experts, possessing "deep" knowledge in certain areas.
- OEMs want suppliers to bear the cost of early investments in product development, testing, and tooling. Suppliers want early rewards and commitments for these efforts.

- OEMs want to leverage discoveries offered by suppliers by maintaining exclusive rights to the innovation and licensing their other suppliers to produce the technology. But neither of these options promotes the innovative supplier's business interests.

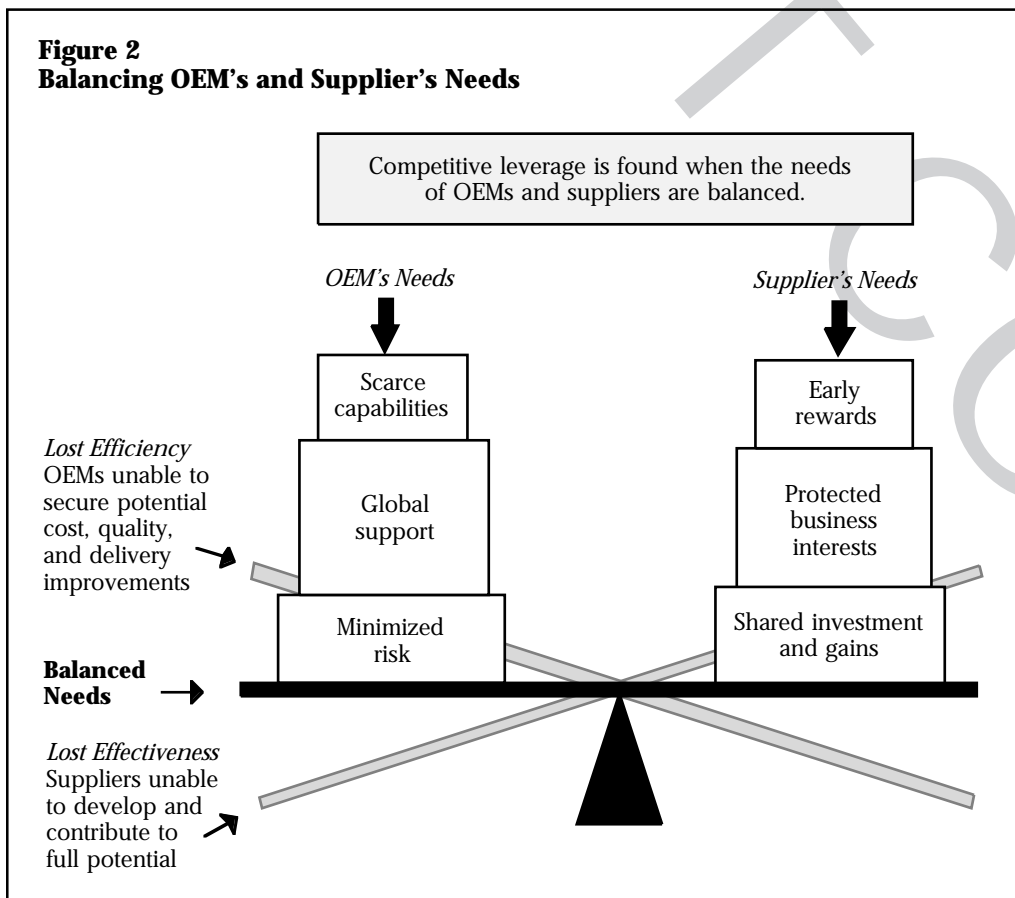
- OEMs typically minimize risk by maintaining a portfolio of multiple suppliers—a method that is inconsistent with long-term commitments and sole sourcing. Instead, OEMs must minimize risks by making sure the supplier does not fail.

Usually, the degree to which OEMs' and suppliers' needs are balanced depends on how much bargaining power one partner has over the other. Regardless of which one has the most power, both parties will receive the greatest long-term gains when a truer balance is achieved. This balance requires greater information sharing and more frequent communications between them.

**Figure 2** illustrates the balance concept. When the OEM's needs outweigh the needs of the supplier, both lose. The supplier loses the opportunity to grow its capabilities and technical knowledge. The OEM loses the contributions to product uniqueness or reduced cost that might have come from a more fully developed supplier. Similarly, both lose when the supplier's needs are overemphasized. The OEM loses the cost, quality, or delivery improvements that might have come from tighter efficiencies in NPD activities, production, or global logistics. The supplier loses the increased business the OEM might have developed with a continually improved product.

Recognizing the necessity for balance in new OEM-supplier partnerships has led many firms to change their operating practices. OEMs have revised the ways they attract and develop qualified suppliers. Many have formed global sourcing committees to evaluate potential suppliers. Selections are now made on the basis of total acquisition cost, including the value of technical contributions the supplier might make in addition to production cost estimates. Sole-sourcing is the primary strategy for suppliers of core components; multiple-sourcing is the exception. To help minimize the risks of sole-sourcing, OEMs attempt to maintain a healthy portion of the supplier's productive capacity, usually in the neighborhood of 25 to 40 percent. This usually means the OEM is the

**Figure 2**  
**Balancing OEM's and Supplier's Needs**



supplier's largest customer. In addition, they examine suppliers' internal operations with closer scrutiny and work together with supplier personnel to identify problems and suggest process improvements.

Suppliers are working hard to expand their scope of operations, both technically and geographically. Some are hiring additional engineering talent to staff their burgeoning R&D departments. Others are employing technology transfer agreements as another means to bolster their R&D capabilities in different parts of the world.

Acquisitions and joint ventures provide opportunities for gaining new technologies or local presence in countries that represent high-growth markets. Suppliers frequently visit these countries to perform local market studies and evaluate customers and competitors. Moreover, they sometimes find they must rationalize their areas of competence. Staying product-focused helps them maximize technical expertise. However, suppliers are also looking for horizontal or vertical integration opportunities that enhance the overall package of capabilities they offer to their customers. According to one manager of a supplier firm, "Achieving a 'best overall cost' position is crucial; OEMs only want the best operations in the world as their sole sources."

The needs of both OEMs and suppliers are extensive and often in conflict, complicating ongoing relationships and often making them difficult to manage. Partnerships frequently span many years and involve significant resources. So managers must recognize that OEM-supplier relationships should be organic in nature, evolving to meet changing business requirements. We suggest some guidelines to help manage these challenging relationships.

## TEN COMMANDMENTS FOR OEM-SUPPLIER PARTNERSHIPS

**O**EMs and suppliers are rapidly changing their operating practices to meet each other's changing needs. However, our research suggests that there is still considerable room for improvement. A number of helpful suggestions emerged from our study and from conference discussions (see the box on p. 61). We summarize these in the form of ten "commandments": three for OEMs, three for suppliers, and four that apply to both parties.

### For OEMs

#### 1. Don't manage all suppliers equally.

Suppliers that provide technical solutions should be treated differently than "commodity" suppliers. To make the most valuable contributions, key suppliers need and deserve greater up-front sup-

port, incentives, rewards, data sharing, and access to strategic plans.

**2. Realize that good suppliers are hard to find.** Relationships take lots of time to develop. Focus on a few key ones that can serve and supply multiple product and business needs.

**3. Demand more of suppliers, but learn to be a good customer/partner too.** Consider the types of information and support your supplier requires to contribute the highest quality ideas, improvements, and consistency to your development and production processes. Involve the supplier more directly by getting on-site supplier support and including it in team celebrations, "field trips," or "best practices" conventions. Practice the Golden Rule: *Provide the kind of support you would want. Expect only what you would be willing to give in return.*

### For Suppliers

**4. Recognize that competition is getting tougher and broader-based.** Success in supporting OEMs now includes more business dimensions. Suppliers need to offer technical solutions by developing skills in R&D, discovery, and team integration in addition to providing production competence. Try to understand your customer's customers. Come up with innovative design suggestions that exceed OEMs' expectations. Make yourself indispensable as a supplier of good ideas, not just productive capacity.

**5. Explore new business sourcing arrangements.** Consider developing joint ventures or alliances with partners in hot markets—China, Brazil, India, Europe, and the like. Look for opportunities to expand or leverage your technical skills and market knowledge through these arrangements.

**6. Use speed to alleviate the need to maintain propriety in NPD.** Be careful about the timing of new product design efforts, and improve the speed of your development processes. Before you approach your customer with a new design concept, make sure you can deliver the new product so quickly that your competitors have insufficient time to react. If you can do this, then secrecy will be less important.

### For Both Parties

**7. Don't let distance hamper performance.** Physical proximity is important for successful partnerships. Locate NPD and support teams near chosen markets or manufacturing facilities.

**8. Keep score.** Frequent and routine communications on operational and financial performance are critical to a healthy relationship. Develop shared data exchange systems and inte-

grated CAD/CAM systems. Use e-mail, the World Wide Web, and other means to share operational data.

**9. Be creative in using the capabilities of global partners.** Work together to devise strategies aimed at getting the most out of your partnership. Consider shifting some NPD or supply activities to other locations in the supply chain. For example, use modular product designs to meet varied customer/market needs around the world, and shift activities such as final assembly and packaging to supply/distribution partners.

**10. Develop and encourage trust.** Trust grows when both parties take risks over time and are rewarded for doing so. Trust involves multiple contacts between the parties at engineering and high management levels. Trust comes from working together over time to improve product cost, quality, and delivery.

Throughout the 1990s, companies initiated programs to reduce their supply base and establish OEM-supplier partnerships to improve production quality and cost. These successful programs represented first steps toward a "virtual integration" of OEMs and suppliers. Virtual integration, like virtual reality, is a new way of viewing things. OEMs and suppliers have traditionally seen themselves as highly independent entities. Virtual integration, in contrast to vertical integration, requires independent firms to operate in a coordinated manner by sharing information, resources, and risks for mutual benefit. To meet the fast pace of global competition, many firms are now taking the next step by forming product development partnerships that improve development capabilities and open up new geographic markets. This strategic shift requires a new set of working relationships that both OEMs and suppliers must recognize and cultivate. □

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## OEM / Supplier Challenges in Product Development and Globalization

### Red Spot Paint and Varnish

#### *Competing and Winning Business Through R&D*

Red Spot Paint and Varnish provides specialty paints and coatings, primarily to the auto industry. In the early 1990s, its largest customer, Ford, began experimenting with the use of thermoplastic olefin (TPO) materials as a substrate for exterior auto parts. These new materials had unique surface characteristics that required new paints and coatings.

Red Spot's existing product offerings could not be used with the new TPO materials. So Red Spot was not initially identified by Ford as a potential supplier of coating materials for TPO products. However, the company was invited to participate in data sharing and information development in this area so it could aid in developing product specifications and learn about the technology. Red Spot's management realized that it was crucial for the company to develop a coating system that could compete effectively in this emerging arena. Otherwise, Red Spot would be seriously disabled in sustaining a profitable position in the auto coating marketplace.

Through aggressive and timely support activities, Red Spot was able to develop a suitable product that eventually won the Ford business. Speed was a critical element of success. Red Spot quickly developed and tested a set of products, offering experimental results and coating samples to prove to Ford that it would be a capable and responsive supplier. To maximize speed and responsiveness, it dedicated a small cross-functional team to the effort, including representatives from R&D, marketing, laboratory testing, technical services, and manufacturing support. To mitigate the risk of falling behind its competitors in this important new technology, Red Spot staff participated in capability discussions and frequently shared information on-site at Ford. Marketing and engineering representatives developed close personal relationships with Ford engineers and participated directly in defining the needs and uses of the product. Through its aggressive development and sharing of process experience, Red Spot quickly and convincingly demonstrated its technical capability for TPO coatings.

### Thomson Consumer Electronics

#### *Relying on Suppliers to Quicken NPD and Reduce Risk*

Thomson Consumer Electronics designs and manufactures televisions and peripheral equipment that are sold to consumers under the RCA label and other brand names. In the mid-1990s, Thomson introduced a Digital Satellite System (DSS) for home television, offering the consumer a smaller receiving dish, clearer television reception, and the capacity to handle a larger number of channels than traditional home satellite systems. The DSS represented an enormous opportunity for Thomson; profits in the first year were projected to exceed the profits of all of Thomson's combined television sales.

Rapid development was critical for the DSS project. Completion of the product design and development was contractually tied to a satellite launch date that had been specified well in advance of product development. If the launch deadline was missed, the product introduction might have to be postponed

by as much as two years. Thomson, Hughes, and several key suppliers had to work closely together to combine their expertise in digital compression, consumer electronics, satellites, and uplink technology.

Refinements of digital compression technology were required to make the DSS technically and economically feasible, refinements that required extensive development of new mechanical devices, electrical components, and software. Rather than take the time to develop in-house expertise for this broad array of technologies, the company employed suppliers with expertise in key technologies and included them in the project in its earliest stages. The contributions of a particular vendor of Application-Specific Integrated Circuits (ASIC) were crucial to the success of the project. The vendor was able to work closely with Thomson designers to evaluate various design alternatives even before many of the communication signal standards were established.

More than 20 major design activities, both internal and external to the firm, were executed simultaneously, including software design, signal definitions, communication network design, and custom integrated circuit designs. A key emphasis of the program was the integration of external parties who had expertise in the required technologies. The primary communications were among design engineers and technical experts from the different vendors and partner firms, who frequently communicated face-to-face. Numerous formal design reviews also fostered the integration of internal and external organizations.

### Whirlpool Corporation

#### *Development of World Products*

With approximately \$9 billion in annual revenues, Whirlpool is a major producer of home appliances. Until 1990, the company focused primarily on the domestic market. In the years since then, however, it has purchased Philips' European appliance business for \$1 billion and invested in or pursued joint venture agreements with more than ten other companies in various regions around the world. Now it manufactures products on five continents and designs them for virtually every market in the world.

While pursuing this rapid globalization strategy, Whirlpool has also sought to reduce the number of different platforms it produces for appliances by 50 percent. Suppliers that aid in design standardization across regions are highly esteemed. Whirlpool also benefits from tapping local suppliers' capabilities and access to skills not available domestically, such as advanced technologies and engineering talent.

As a result of Whirlpool's strategy, microwave ovens designed and fabricated in Sweden are now assembled in the U.S., Brazil, and China, using electronics developed in Asia. By employing a global network of suppliers, Whirlpool gains easier access to capital it needs to support manufacturing in multiple regions. Moreover, suppliers improve Whirlpool's global supply base by providing economies of scale from centralized production in low-cost areas, such as printed circuit boards produced in Mexico or China.

### **Cummins Engine Company** ***Global Supplier Alliances***

Cummins Engine designs and manufactures diesel engines for heavy-duty and mid-range trucks, power generation equipment, buses, light commercial vehicles, industrial products, and marine products for both domestic and international markets. To provide global coverage, Cummins operates both wholly owned international facilities and numerous joint venture arrangements. While its internal product development efforts focus on 5 percent of the design features, which control about 80 percent of an engine's performance, the company looks to its JV partners and suppliers to provide product designs meeting diverse local market needs.

For the last six years, Cummins has been arranging a limited number of supplier alliance programs with key vendors, both large and small, to support its international operations. In high-tariff locations such as India and China, establishing local subsidiaries for support and supply is difficult for alliance partners without using a JV arrangement. Moreover, small suppliers with limited resources frequently have difficulty supporting Cummins's global strategies. Licensing and JV agreements offer opportunities to extend their reach. However, suppliers often see these approaches as risky, posing threats to their control over proprietary knowledge. They are faced with the choice of lowering proprietary interests to support an important customer.

An example is provided by Fel-Pro, a small Chicago-based supplier to Cummins with a very close working relationship in the design and supply of gasket material. Cummins wanted a nearby supply source for its UK facility, but Fel-Pro was unable to accommodate this need. Having few other options, Fel-Pro eventually licensed another Cummins supplier, T&N, to provide the materials, recognizing that being responsive was important to its long-term business interests with Cummins. Because Fel-Pro is no longer an exclusive supplier of material, its future business prospects clearly rest on its abilities to offer advantageous

R&D capabilities and maintain an intimate working relationship with Cummins.

### **Mallory Controls**

#### ***Meeting the Needs of Local Markets and Competing OEMs***

Mallory Controls is a division of Emerson Electric Corporation, drawing annual sales of around \$230 million. It primarily designs and manufactures electrical and mechanical controls for clothes washers, dryers, dishwashers, and refrigerator defrost systems sold in both domestic and international markets. The division supplies such OEMs as Whirlpool, Maytag, GE, and Frigidaire.

Mallory has followed OEMs into international markets by purchasing overseas operations and signing JV agreements in India and China. In the highly competitive appliance industry, knowledge of local customs and regulations is very important in the design of timer controls. For example, while top-loading, vertical-axis clothes washers are common in the United States, front-loading, horizontal-axis machines dominate in Europe and Asia. These differences plus other local preferences for water temperature and wash cycle length exert major influences on the design of control cycle systems for local markets. Mallory provides separate domestic and European design and manufacturing capabilities to support its customers. This regional approach helps keep it close to the end-user customers, making it a preferred provider.

Working closely with several OEMs competing in the same markets creates a number of challenges for Mallory. For example, each OEM wants unique features incorporated into its control designs that help differentiate its products. When redesigning a platform control system, Mallory must work through these numerous and varied customer desires. Such a process lengthens the product development cycle. In addition, each OEM would like exclusive rights to any cost or performance-improving innovations Mallory develops. The company must carefully negotiate its relationships with the various OEMs while maintaining secrecy and sensitivity to their individual needs.