5. Evidence from the Business Management Literature

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Outline

We next describe empirical evidence from the business management literature regarding outsourcing and other types of vertical relationships.
Business Case Studies Are Consistent with Economic and Business Management Theories

- Relevant areas of empirical evidence:
  - Vertical Integration
  - Strategic Alliances
  - Buyer/Supplier Relationships

- Based mainly on generalizations from case studies or surveys, relatively less statistical evidence

- Consistent with many of the predictions of both transaction cost and business management theory

Business Case Studies Tend to Confirm Economic and Business Management Theories

Three areas of the empirical business management literature seem to be the most relevant to outsourcing decisions. First, studies of vertical integration provide some comparisons and contrasts with the findings of the TCE literature regarding the conditions under which firms decide to perform activities or produce inputs internally rather than buying goods or services from other firms. Second, the empirical literature on strategic alliances focuses on how demand and customer characteristics influence the structure of an alliance. Third, analyses of buyer/supplier relationships describe the management of suppliers of complex subcomponents and services, particularly in manufacturing industries.

The importance of buyer/supplier relationships was made clear in Womack, Jones, and Roos’ [1990] seminal study of lean production. Reductions in inventories, cycle times, and costs and improvements in quality associated with lean production depend on close relationships between buyers and suppliers. In contrast to transaction cost theory, Womack et al. showed that in the automobile industry, these relationships are not only a substitute for, but an improvement
over vertical integration as a means of organizing complex transactions. Many firms seeking to gain the benefits of lean production have adopted these types of buyer/supplier relationships. The literature we discuss below is largely an outgrowth of Womack et al.’s study.

Much of the empirical evidence discussed in the business management literature is based on generalizations from groups of case studies or descriptions of individual cases. Some evidence comes from surveys, but authors typically do not discuss the representativeness of their samples, and the analysis is usually based on simple descriptive statistics. (See, for example, Helper [1991a] and [1994], and Helper and Sako [1995].) Thus, the empirical business management literature relies on less sophisticated statistical techniques than those used in the empirical economics literature on transaction costs.

For the most part, the conclusions of the empirical business management literature are consistent with the predictions of both transaction cost theory and the recommendations of the business management literature on outsourcing. In particular, vertical integration avoids the costs associated with market transactions and can protect valued assets, but it tends to result in higher production costs. Long-term partnerships or alliances between buyers and suppliers promote higher investment in transaction-specific assets, and thus can be a substitute for vertical integration in some circumstances. As uncertainty increases or technological change becomes more rapid, organizations should reduce vertical integration and increase the flexibility of alliances.
Vertical Integration Is Used to Retain Core Competencies and Lower Transaction Costs

- Firms internalize their most important tasks and personnel to
  - Ensure access to scarce inputs
  - Control quality and production
  - Understand product complexity and technology
- Integration can reduce costs associated with market transactions and common administrative functions
- However, integration can increase internal coordination costs and reduce market incentives to maximize value

The empirical literature on vertical integration echoes some of the themes of transaction cost and business management theories of vertical integration. Firms often use vertical integration to gain control over functions that are crucial to maintaining core competencies or competitive advantage. The costs and benefits of vertical integration depend on the trade-off between transaction costs and production costs under different governance structures.

Harrigan [1983] documents and analyzes the vertical integration strategies of 192 firms in 16 different industries beginning prior to 1960 and continuing through 1981. She relates these strategies to characteristics of firms’ markets, firms’ positions in those markets, and firms’ objectives. She finds that vertical integration allows firms to internalize the activities and resources that are most important to their products, i.e., that contribute to their core competencies or their competitive advantage. For example, whiskey distillers began making their own barrels when a federal price ceiling drastically reduced supply. Pharmaceutical firms used their own medically trained sales forces to protect their patents and increase sales. Computer firms manufactured the logic chips
for their product but purchased the common components. Finally, when
demand was strong enough, pharmaceutical firms internalized production of
fine chemicals, bulk pharmaceuticals, and dosage-form operations.

D’Aveni and Ravenscraft [1994] note that vertical integration can reduce total
costs by avoiding the costs associated with market transactions, combining
administrative functions previously performed separately, and providing better
information about costs of downstream and upstream activities. However,
vertical integration can increase coordination and production costs. The
additional coordination of activities required in integrated organizations may
increase overhead. Production costs may increase because of the lack of market
pressure to improve the efficiency of internal suppliers, lower economies of scale,
or failure to innovate. These costs increase with market uncertainty because of
the need to monitor market information, plan production activities, and manage
inventories.

D’Aveni and Ravenscraft use regression analysis to determine whether the
benefits of vertical integration outweigh the costs.¹ Dependent variables include
ratios of cost (advertising, other selling expenses, R&D, production, and
overhead) to sales and of profit to sales. Independent variables include measures
of the degree of integration and controls for economies of scope and scale and for
demand stability.² The authors’ analysis indicates that integration leads to
economies associated with overhead, other selling costs, advertising, and R&D.
These economies are slightly offset by increases in production costs that are
likely to result from the lack of competitive pressure.

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¹The model is estimated in two ways: across all industries with fixed industry effects and
within each industry. The data for the analysis are from the Federal Trade Commission line-of-

²The authors use a measure of market share constructed from the Federal Trade Commission
line-of-business database to control for economies of scale and a Herfindahl index of diversification to
control for economies of scope. These controls ensure that estimated changes in costs associated with
integration strategies are relative to market costs.
More Uncertainty or Bargaining Power Implies Less Vertical Integration

- Uncertainty reduces vertical integration because organizations need to be flexible to deal with
  - Fluctuating demand or uncertain costs
  - Rapid changes in technology
- Organizations with bargaining power do not need to integrate to gain additional control over suppliers, distributors, or customers
- Vertical integration may still be adopted if it increases economies of scale or scope, or helps capture high value-added activities

More Uncertainty or Bargaining Power Implies Less Vertical Integration

The empirical literature on vertical integration introduces some new themes that are not emphasized by transaction cost or business management theories. Greater uncertainty about demand, costs, or technology is associated with less vertical integration, because integration limits the firm’s ability to respond to rapid changes. Firms with bargaining power over suppliers, distributors, or customers have less need for vertical integration to reduce input or distribution costs. However, firms may use vertical integration to achieve economies of scale or scope, or to capture the profits associated with high-value-added activities.

Harrigan [1983] finds that early in an industry’s development, when capital costs and risks are high relative to demand, firms generally operate with low degrees of vertical integration. For example, in the earliest days of the automobile

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3 The empirical transaction cost literature finds that uncertainty increases vertical integration, but only when transaction-specific assets are also involved. The empirical business management literature emphasizes that uncertainty by itself actually reduces vertical integration.

4 Harrigan’s result contrasts with Stigler’s [1951] hypothesis that firms integrate early in industry development to achieve a competitive advantage.
industry (roughly 1899-1909), assemblers were highly dependent on outside suppliers, which tended to be stable firms established to serve older industries. They were also an important source of innovation in components such as engines, carburetors, and roller bearings. With the rapid growth of the industry, automakers and suppliers began to make investments specific to automobile production. As the assemblers gained capital, they began to buy out suppliers and produce components in-house in order to capture the gains from higher investment in specialized assets. (See Helper [1990] and [1991b].) Young industries sometimes use vertical integration when firms need to work with others to share risks and to create markets for their products. Harrigan [1983] cites the coal gasification industry, in which high capital costs and risks made it necessary for firms to work with natural gas distributors and others to commercialize their product. Residential solar heating firms needed air conditioning and ventilation firms to market their product because of the high cost associated with selling to a fragmented market. As an industry matures, firms tend to engage in higher degrees of vertical integration. For example, as the computer industry grew and technology stabilized, firms began to make more components such as microprocessors and memory chips internally. As an industry declines, firms move away from integration strategies. As sales declined in the whiskey industry, distillers moved away from barrel-making, ownership of grain elevators, and wholesaling activities.

High levels of vertical integration are risky for firms in industries with excess capacity, rapidly changing technology, or fluctuating demand. More generally, integration limits firms’ abilities to respond quickly to industry changes. Eccles [1981] suggests that in the construction industry, general contractors use subcontracting rather than employing people with a variety of construction-related skills because of the uncertainty associated with the skill mix needed for future construction projects.

Harrigan [1983] also finds that firms with bargaining power over suppliers, distributors, and customers can reduce input prices by squeezing supplier profit margins, can reach desired customers, and can avoid having to provide special services without internalizing upstream or downstream activities. Conversely, firms with less bargaining power are more likely to have high levels of vertical integration. For example, in the late 1970s, when the personal computer industry was developing, manufacturers who initially sold their products through retailers began selling their own products because of the poor quality of the sales

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5However, there is an inherent tension between using bargaining power to squeeze suppliers and developing long-term partnerships with suppliers to maximize value, as we discuss in greater detail below.
force provided by retailers. However, firms with bargaining power may still want to perform important activities in-house. Petroleum refiners had the power to set their own prices for crude oil inputs, but they used backward integration to guarantee access to supplies when they were needed.

Sometimes firms will have higher degrees of vertical integration than predicted by market or industry characteristics because of internal synergies between vertically related activities. Such synergies include economies of scale and scope that can help firms achieve cost, market share, or technology leadership. Firms also integrate to protect high-value-added activities. For example, some pharmaceutical firms perform toxicology studies in-house to provide additional activities for research personnel who help sustain the firm’s competitive advantage. When the computer industry was young, Tandy/Radio Shack, IBM, and Digital Equipment used forward integration to educate customers about computers and to understand customer needs.

Harrigan’s analysis suffers from some of the same weaknesses as the empirical transaction cost studies because it implicitly assumes that the vertical integration strategies observed in the market are “optimal” in some sense. This may be a particular weakness for an analysis based on 1960s and 1970s case studies because vertical integration and diversification were popular management strategies during this time period. Some of the highly integrated firms formed through mergers during that period have since been unbundled. Thus, market conditions may have changed such that these strategies are no longer optimal, or they may never have been optimal.
Structure and Autonomy of Strategic Alliances Should Be Tailored to Economic Environment

Many of the same factors that influence vertical integration also influence the structure and autonomy of strategic alliances. Structural issues include the closeness of the alliance and the amount of equity investment by the partners, whereas autonomy refers to the degree of independence that the alliance (which may be a separate entity) has from the parent firms. Uncertainty and human-capital intensity (i.e., the degree of reliance on employees’ talent, creativity, and knowledge) are associated with alliances that are less structured and more independent of their parent firms. However, shared facilities or changing technology may require the alliance to be more closely integrated with one or both of the parent firms.

Harrigan [1988] analyzes a sample of 895 strategic alliances to provide a framework for choosing among alliance options. Her analysis suggests that organizations operating in environments with uncertainty should avoid formal venture agreements and instead form several less-structured cooperative agreements or spider’s web alliances. Such arrangements allow firms to reduce the risk of not being able to satisfy growing demand when customers have
greater power over the direction of the market. In Harrigan’s data, cooperative agreements were overrepresented (46 percent) in environments with uncertainty about demand growth, relative to the entire sample (37 percent).

Other sources of uncertainty are market fragmentation, high exit barriers with excess capacity, and frequent technological changes. In these environments, organizations are less willing to risk investing equity in alliances. An organization will be especially reluctant to enter into alliances when the resources that are the source of its competitive advantage are likely to be appropriable by potential partners. However, when the alliance activity is important to an organization’s core activities, the organization may be willing to enter into cooperative agreements or form a spider’s web of alliances.

In human-capital-intensive industries, organizations are usually less willing to enter into shared-equity alliances. The difficulty of protecting important human-capital assets make shorter-duration, cooperative agreements more likely. In her analysis, Harrigan [1988] found that a more than proportionate percentage of alliances in human-capital-intensive industries did not involve any equity (48 percent vs. 37 percent for the whole sample) and that most ventures in these industries lasted less than four years.\(^6\)

When demand is growing slowly (or declining) and uncertainty is low, organizations should favor participating in fewer, but larger, horizontal ventures with shared equity that can help the industry better align capacity with demand. For example, prior to the availability of cheap overseas sources of iron ore, steel firms formed mining alliances to ensure a stable supply of raw materials. Once overseas sources became available, steel firms delayed abandoning these alliances until they became exit barriers. By 1984, horizontal firms formed joint ventures to disintegrate the mining alliances. Similarly, U.S. farm equipment firms used joint ventures to consolidate excess capacity after a reduction in demand.

In many circumstances, alliances need autonomy from their parent organizations to respond to uncertainty. When demand is growing in the alliance’s market, it needs to be able to take actions quickly to satisfy customers. Alliances need to be free to adopt new product standards, implement better processes, and work with new suppliers while industry infrastructure is still developing. When more-formal ventures are formed in human-capital-intensive industries, they tend to

\(^6\)As we note below, the length of formal contracts does not necessarily reflect the length of relationships between firms. For example, Japanese firms tend to have short formal contracts but stable long-term relationships between buyers and suppliers. See Helper and Sako [1995].
have autonomy from the parent organizations. This independence helps preserve the morale and creativity of personnel in the venture.

Parent organizations will desire close coordination with their alliances when resources such as facilities and personnel are shared. Coordination will also be desirable when technology is changing rapidly. For example, even when the cable TV programming industry was young, the ventures needed help from the owners in modifying products and incorporating technologies.
Buyer/Supplier Relationships Can Be “Exit” or “Voice”

- Buyers with market power can influence the structure and behavior of the supplier industry
- Nature of relationship depends on how buyer reacts when problems arise with supplier
  - Exit Strategy: Find a new supplier
  - Voice Strategy: Work with existing supplier to correct problems
- Trade-off between short-term price reductions from suppliers (exit) and long-term, continuous improvement of supply chain (voice)

Helper’s [1990] and [1991b] studies of the historical development of the U.S. and Japanese automobile industries suggest that in markets for complex products and services, the behavior of buyers with market power can have a strong influence on the structure and behavior of the supplier industry. Suppliers tailor their investments and develop expertise to fit the tasks that are delegated to them by buyers.

In comparing the U.S. and Japanese approaches to buyer/supplier relationships, Helper adapts a framework developed by Hirschman [1970]. Helper divides buyer/supplier relationships into two categories based on the buyer’s response when problems arise in the relationship. One is “exit,” where the buyer’s response is to sever the relationship and find a new supplier; and the other is “voice,” where the customer works with the supplier until the problem is corrected. Until the 1980s, U.S. automobile manufacturers typically had exit relationships with their suppliers, whereas Japanese automobile producers used voice relationships.
The buyer’s choice between these two supplier strategies affects the buyer’s and supplier’s relative bargaining power and their incentives to make long-term investments in the buyer/supplier relationship. By making a credible threat to sever the relationship if the supplier does not comply with its demands, the buyer increases its bargaining power and is able to reduce the price it pays the supplier in the short term. However, suppliers will not be willing to invest in innovative activity or in coordinating their processes with the buyer’s if all the gains are likely to be appropriated by the buyer through lower prices. Therefore, although buyers give up some bargaining power with suppliers by using a voice strategy, over the long term, voice relationships promote greater technological innovation by suppliers, higher investment in transaction-specific assets, and greater coordination along the supply chain. This suggests that long-term relationships with suppliers can substitute to some extent for vertical integration of activities involving transaction-specific investments, while still preserving some market incentives to reduce cost and improve performance.

Helper [1990] argues that as a result of voice relationships with suppliers, Japanese automobile producers were eventually able to gain an advantage in terms of technology, quality, and cost over U.S. producers using the exit strategy. In response, some U.S. automakers have attempted to adopt voice relationships with suppliers in order to improve their performance. In a comparison of responses to similar surveys conducted in 1989 and 1993, Helper and Sako [1995] find that there has been an overall trend toward convergence in U.S. and Japanese buyer/supplier relationships, with U.S. suppliers moving toward closer partnerships.

Although many of the case studies and surveys regarding buyer/supplier relationships are based on procurement of subcomponents in the automobile industry, many other types of manufacturing corporations are developing closer buyer/supplier relationships as part of broader efforts to adopt lean production techniques. Examples discussed in Burt [1989] include Xerox, Polaroid, GE Appliance, and Hewlett-Packard. Boeing adopted close supplier partnerships to speed the development and cut the costs of its 777 jet. (See Sabbagh [1996].) Close buyer/supplier relationships can also improve performance of complex support services that must be integrated with the buyer’s operations. Facilities maintenance contractors such as Fluor Daniel’s Facility and Plant Services division and Morrison Knudsen’s Operations and Maintenance division emphasize close partnerships with their customers in their corporate literature.

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These types of buyer/supplier relationships might also be considered “strategic alliances,” since they are intermediate between full ownership and arm’s-length relationships.
# Air Force Currently Uses Exit Strategy with Support Services Contractors

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<td><strong>• Buyer specifies tasks delegated to suppliers</strong></td>
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<td><strong>• Suppliers chosen by competitive bidding</strong></td>
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<td>- Little recognition of past performance</td>
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<td>- Frequent recompetition</td>
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<td><strong>• Buyer can make a credible threat to exit if its demands aren’t met</strong></td>
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<td>- Short-term contracts</td>
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<td>- Access to many interchangeable suppliers</td>
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<td>- Ability to revert to in-house production</td>
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<td><strong>• Buyer uses bargaining power to limit supplier profits</strong></td>
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The Air Force’s current relationships with support services contractors have much in common with descriptions of exit strategies in the empirical business management literature. Contracts specify in detail the tasks to be performed, rather than defining the level of service with performance metrics. Contracts are subject to frequent recompetition and awarded to the lowest bidder, with little attention to past quality or responsiveness. For many support services, the Air Force maintains a credible threat to exit the relationship by recompeting the contract among multiple potential suppliers or by taking the service back in-house. Acquisition and contracting regulations, as well as competition from other suppliers, limit the profits that suppliers could gain by investing in improved processes.

In the U.S. automobile industry, buyers maintained a competitive supplier industry and kept the components relatively simple so that they could be transferred easily from one supplier to another. Helper [1990 and 1991b] argues that Ford and GM created a fiercely competitive components industry by keeping complex functions such as engineering and R&D almost completely in-
house, and dividing parts into small, easy-to-produce pieces. They made huge investments in engineering and management staffs to simplify the tasks delegated to suppliers, thereby reducing barriers to entry for supplier industries. Task simplification included supplying blueprints so that suppliers had no need for design capability, and coordination of subassembly so that each supplier provided a small number of relatively simple parts. Growth and consolidation in the U.S. automobile industry also allowed the dominant automakers to buy out suppliers of more complex components and to expand internal capacity to design, produce, and subassemble parts.

Under an exit strategy, each part was subject to annual competitive bidding on detailed blueprints provided by the buyer, in which the winner was usually the lowest bidder. The supplier’s track record for performance and quality was relatively unimportant in the source selection decision. The U.S. automakers employed six to eight competing suppliers for each part, and required suppliers to license major innovations. In the 1970s, this mode accounted for about 99 percent of supplier firms and about two thirds of the dollar volume of outside sourcing. Exit strategies were used primarily with suppliers of easy-to-make parts. The U.S. automakers did maintain longer-term relationships with a few suppliers of more complex parts, but often “cheated” on these voice relationships by bringing production in-house before suppliers could recover their investments in technology and production facilities.

After establishing a competitive supplier industry with many interchangeable suppliers, the U.S. automakers maintained a credible threat to sever the relationship if their demands were not met. This threat was based on short-term contracts (typically lasting one year), access to many interchangeable suppliers, and/or the ability to tool up quickly for in-house production. This system was intended to prevent suppliers from developing expertise, so that the automakers could capture more of the supply chain profits.

There is some evidence that U.S. automakers were successful in capturing supplier profits. Crandall [1968] estimated that automakers’ peacetime rates of return over the period from 1930 to 1961 averaged 23.8 percent, whereas suppliers averaged 8.2 percent. Based on 1947-1965 data, he found that the auto and truck assemblers’ average rate of return of 20.2 percent was significantly greater than the 13.2 percent average for all manufacturing, whereas the 13.8 percent average for automotive suppliers was not.

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8Until the 1980s, buyer demands usually involved supplier price reductions. More recently, at least one U.S. automaker seems to have adopted an “intensified exit” strategy in which it also requires suppliers to provide more detailed process information, improve quality, and make just-in-time (JIT) deliveries without the security of a long-term relationship. See Helper [1991a].
The primary drawback of an exit strategy is that it reduces incentives for innovation. Intense competition leads to supplier industries dominated by tiny firms lacking both organizational and physical capital. In the U.S. automobile supplier industry, firms were so small that diffusion of capital-intensive technologies was sometimes blocked by lack of investment capital. Exit strategies also slowed down and increased the cost of the new product development process. Dyer’s [1996] description of Chrysler’s development process under an exit strategy indicates that the firm devoted 12 to 18 months to sending out bids for quotations, analyzing bids, rebidding, and negotiating contracts with suppliers. Work on hard tools began before the first prototype was produced, so when problems were discovered with the prototype, changes had to be made in hard tools that had already been ordered. Often suppliers did not know whether they had won the business until 75 to 100 weeks before volume production, so had relatively little time to work out production and integration problems. The separation between component design and production led to a lack of accountability. When suppliers had problems producing a component at the required cost or quality, they would often blame the design. Since adopting voice relationships with its suppliers, Chrysler has reduced the time and cost of developing new vehicles and reduced incompatibilities among components.
Voice Relationships Promote Investment and Improved Performance

- Greater investment in transaction-specific assets
  - Suppliers locate closer to buyers, enabling more frequent deliveries or better service
  - Customized investments in information systems, equipment, and flexible manufacturing or repair systems
  - Employee transfers between buyer and supplier

- Higher quality at a lower cost
  - Easier to detect and correct quality problems
  - Smaller inventories for buyer and supplier
  - Fewer purchasing managers

- Faster and less costly development of new products and services

Surveys and descriptive studies of the U.S. and Japanese automobile industries indicate that voice relationships can improve the buyer’s performance. Voice relationships promote investment in transaction-specific assets and help both buyers and suppliers provide higher quality products or services at a lower cost. In addition, involving suppliers in the design of new products or services allows them to be developed more quickly and at lower cost, and improves the manufacturability of the design. Similar benefits could potentially be gained by the Air Force if it adopted longer-term relationships with the suppliers of complex support services, as it already does to some extent with suppliers of weapons systems.

Customized investments made by buyers and suppliers may involve site specificity, physical asset specificity, or human capital specificity. In the automobile industry, voice relationships support investments such as building supplier plants close to customer plants, installing specialized equipment, customizing information systems, and temporary or permanent transfers of employees between buyer and supplier firms. Dyer [1994] reports that
customized investments in information systems, plants, and flexible manufacturing systems were important to the success of Toyota’s just-in-time (JIT) system. A survey of Toyota suppliers found that the distance from supplier plants to the Toyota assembly plant averaged 30 miles for affiliated suppliers and 87 miles for independent suppliers, allowing all suppliers to make an average of eight deliveries a day. In contrast, the distance from supplier plants to GM assembly plants is 350 miles for internal parts divisions and 427 miles for independent suppliers, and they deliver an average of 1.5 times per day.

Voice relationships can be a substitute for buyer ownership of transaction-specific assets. Japanese suppliers typically invest their own funds in customized tools and equipment. In contrast, U.S. automakers often own the customized tooling used by their suppliers, eliminating the need for suppliers to invest in transaction-specific assets. Dyer and Ouchi’s [1993] survey of U.S. and Japanese suppliers found that 31 percent of the capital investments made by Japanese suppliers could not be redeployed to other products, whereas only 15 percent of investments made by U.S. suppliers could not be redeployed.

In response to competition from the Japanese automobile industry, U.S. automakers are beginning to adopt voice relationships with suppliers. For example, Chrysler has reduced its supplier base, increased contract length, and involved suppliers in the development of new vehicles. According to Dyer [1996], suppliers have responded to Chrysler’s adoption of voice relationships by increasing their investments in dedicated assets. Nearly all suppliers have purchased Catia, Chrysler’s preferred computer-aided design/computer-aided manufacture (CAD/CAM) software, and the average distance between Chrysler’s assembly plants and its suppliers’ facilities has been decreasing. Textron built a plant dedicated to producing interior trim parts for the LH model9 and located a new design facility less than two miles from the Chrysler Technology Center. Other U.S. firms, such as Boeing, Xerox, Polaroid, and Hewlett-Packard, are also adopting voice relationships with suppliers as part of their efforts to implement lean production techniques. (See Burt [1989] and Sabbagh [1996].)


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9LH is the code name for the development program for the Chrysler Concord, Eagle Vision, and Dodge Intrepid (intended to compete with the popular Ford Taurus).
relationships. About 36 percent of firms with contracts of one year or less had no computer numerically controlled (CNC) machinery (which makes it easier to customize parts), whereas only 21 percent of the firms with longer contracts did not have CNC machinery. Similar results were found for robots and programmable logic controllers. Median lot sizes for both production and delivery were significantly smaller, and the gap between production and delivery batch sizes was smaller for suppliers that had voice relationships.

The same surveys found that voice relationships were associated with lower costs and higher quality. U.S. firms with voice relationships won 28 percent more quality awards from automakers, had market share growth between 1989 and 1993 that was 1.5 percentage points higher, and were 10 percent more likely to adopt JIT delivery without a cost increase than firms that did not meet the criteria. In Japan, suppliers with voice relationships received 18 percent more quality awards from customers, and were 50 percent more likely to adopt JIT without a cost increase. Voice suppliers are also able to deliver more frequently (which reduces buyer inventory costs) and to produce in smaller batches (which reduces supplier inventory costs) than nonvoice suppliers.

Cole and Yakushiji [1984] estimated that voice-based supplier relationships gave the Japanese industry a $300-$600 per car cost advantage in the early 1980s. A similar study reported in Fortune found that in 1985, U.S. automakers spent an average of $3350 on parts, materials, and services for small cars, compared with $2750 for Japanese automakers, attributed mainly to more efficient vendor relations. Japanese-owned plants in the United States enjoyed a $700 per vehicle cost advantage over U.S.-owned plants in the late 1980s.

Both production and transaction costs can be reduced by dealing with a smaller number of suppliers. Focusing business on a small number of suppliers can reduce supplier production costs by helping suppliers move down the learning curve more quickly. The buyer’s production costs can also be reduced, because when fewer suppliers are used for a given part, variation decreases and reliability goes up. Dyer and Ouchi [1993] report that a 1985 Bain & Company study found that Toyota had two suppliers of electrical wiring harnesses, whereas a U.S. firm had more than 20 suppliers. The transaction costs associated with managing 20 suppliers were substantially higher, and tracking quality

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10 Suppliers were defined as having a voice relationship with the buyer if they provided the buyer with a detailed breakdown of their process steps, buyers offered a contract longer than one year, and both pledged to alter their agreement if unexpected events occurred.

11 These results contradict the assumption of the empirical transaction cost literature that observed industry structures are optimal, particularly for studies of vertical integration decisions in the U.S. automobile industry (see Monteverde and Teece [1982a] and [1982b]).
problems was difficult. In 1986, GM employed 3000 purchasing personnel, and produced 2000 cars per buyer. Toyota employed 340 buyers and produced 10,590 cars per buyer. Thus, GM’s procurement costs were approximately five times higher than Toyota’s, even though GM was more vertically integrated. A GM executive explained that most activities were geared to making sure that they weren’t stung by an unscrupulous supplier.

Dyer [1996] reports that since 1988, Chrysler has reduced its number of buyers by 30 percent and increased the dollar value of goods procured by each buyer. These changes were made possible by reducing the number of suppliers and preselecting suppliers based on quality and performance, thus eliminating the competitive bidding system. In November 1994, Chrysler requested that its suppliers eliminate sales representatives and shift those resources to engineering. Adopting voice relationships with suppliers has contributed to Chrysler’s increased share of the U.S. car market, which has risen from 12.2 percent in 1987 to 14.7 percent in 1994. Its return on assets has been the highest among U.S. automakers since 1992, and its profit per vehicle has increased from approximately $250 on average in 1985-1989 to $2110 in 1994.

According to Burt [1989], Xerox reduced its supplier base from over 5000 companies to 400, and developed closer relationships with the remaining suppliers. From 1981 to 1984, net product costs were reduced by nearly 10 percent per year, and rejects of incoming materials were reduced by 93 percent. In 1982, Polaroid began to develop supplier partnerships as part of a comprehensive program called Zero Base Pricing, which tracked not only the acquisition price but also all the costs involved in getting a component into the finished product, including costs resulting from the product’s failure to function in the field. Over the following six years, Polaroid documented cost reductions and cost avoidance averaging $20 million per year, as well as reduced scrap, rework, and field failure.

In the Japanese system, suppliers are an integral part of the development process: they are involved early, assume significant responsibility, and communicate extensively with product and process engineers. As a result, Japanese automakers develop new vehicles about 30 percent faster than U.S. automakers. Dyer [1996] reports that after adopting voice relationships, Chrysler reduced the amount of time it takes to develop a new vehicle from an average of 234 weeks in the 1980s to 183 weeks for the LH program. It has already developed and introduced six new vehicles since 1990, compared with four new vehicles between 1980 and 1989, without increasing the size of its engineering staff. Suppliers become involved at the conceptual stage, about 180 weeks before volume production, so they have an extra 18 to 24 months to prepare. Hard tools
can be purchased later in development, after problems with the first prototype have been corrected, which results in lower investment costs and fewer changes in those tools. The overall costs of developing a new vehicle have been falling. Following the LH model, the Dodge Ram truck cost $1.3 billion, the Neon $1.2 billion, and the Cirrus/Stratus less than $1 billion. This compares favorably with GM’s Saturn ($3.5 billion), Ford’s Escort ($2.5 billion), and Ford’s Mondeo/Contour ($6 billion).
Converting to Voice Relationships Requires Long-Term Commitments with Suppliers

Voice relationships are based on

- Intensive and regular sharing of cost and technical information
- Extensive face-to-face communication between buyer and supplier
- Flexible legal contracts, not always explicitly long-term
- Partial ownership or financial support
- Reciprocal dependence between buyer and supplier

Converting to Voice Relationships Requires Long-Term Commitments to Suppliers

To improve their relationships with suppliers, many firms are adopting the characteristics of voice relationships. These relationships rely on a high degree of mutual commitment, i.e., the buyer’s and supplier’s degree of certainty that the relationship will continue for some length of time. Long-term commitment is needed to establish trust when exchanging proprietary information and to induce both buyers and suppliers to make investments that benefit the relationship. Long-term commitment also benefits the parties because it is costly to establish close relationships with multiple partners.

In the automobile industry, Helper [1991a] associates voice relationships with extensive information sharing. For example, suppliers may provide a breakdown of process steps (sometimes including the cost of each step), production scheduling information, and statistical process control charts. Imai’s [1986] case study of Ricoh (a Japanese producer of office equipment and copying machines) indicates that Ricoh engineers often visit suppliers and ask them to write out production processes or show them the tools and molds they would use if they got a particular order. Every year, Ricoh holds a companywide
purchasing managers’ convention to share information and to present awards to outstanding suppliers. Dyer [1996] reports that as part of Chrysler’s effort to transform its relationships with suppliers, it created a shared e-mail system with its suppliers, established an advisory board with representatives from its top 14 suppliers, holds an annual meeting with its top 150 suppliers, and holds quarterly meetings with each supplier to discuss performance and review priorities for the coming year. Many buyers convey information to suppliers through supplier rating systems and award programs for top suppliers. For example, Hewlett-Packard rates its suppliers on technology, quality, responsiveness, dependability, and costs. Ratings are done quarterly, semiannually, or annually, depending on the sensitivity of the component, and suppliers are given their ratings relative to their competitors.12 (See Burt [1989].)

Open communication is a crucial part of just-in-time delivery systems. At the end of each month, Ricoh places a firm order for the following month, except specially designated “kanban” parts. Kanban parts are ordered daily for delivery at a specified hour three days hence. Ricoh also tells suppliers what it expects to order during the first, second, and third ten-day periods of the next month, as well as estimates for the following two months, so that suppliers can plan their production schedules.

Information sharing is facilitated by extensive face-to-face contact between buyer and supplier personnel. Dyer and Ouchi’s [1993] study of the Japanese automobile industry indicates that suppliers often send guest engineers to work on the automakers’ design teams, and may work at the parent firm’s facility for two to three years. These transfers help to build trust and to transfer knowledge about how to optimize the efficiency of the value chain. In addition to employee transfers, suppliers and buyers encourage a tremendous amount of face-to-face contact between their salespeople, engineers, and purchasing agents. Japanese suppliers had an average of 7235 employee-days per year of direct contact with automakers, compared with 1129 employee-days for U.S. suppliers. Managers’ career paths often include temporary or permanent transfers between partner firms. Dyer and Ouchi’s study indicated that almost 30 percent of the top management teams at Nissan’s core group of suppliers are former Nissan employees. Cusumano [1985] found that employee transfers usually precede other forms of cooperation, including technical assistance, loans, and transaction-specific investments.

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12Developing an improved supplier rating system could help the Air Force to make better use of information on past performance in its source selection decisions, and to defend itself against legal challenges from suppliers who do not win contracts.
Long-term relationships may be reinforced by long-term contracts or by less formal agreements. To improve its relationships with suppliers, Chrysler has increased its contract length from an average of 2.1 years in 1989 to an average of 4.4 years on the LH program in 1994. Excruciatingly detailed contracts have been replaced by a greater reliance on oral agreements. (See Dyer [1996].) However, Japanese voice relationships often do not involve long-term contracts. Helper and Sako [1995] found that two-thirds of Japanese suppliers had no productspecific contracts. Basic contracts are usually renewed annually, but include ambitious continuous improvement goals to ensure that the supplier remains cost-competitive with the market. However, over half of Japanese suppliers had served the same buyer for 20 years or longer, and 87 percent thought their customer’s commitment would last more than four years.

Minority investments in partner firms can be used to cement long-term relationships. In Japan, stock swaps or minority ownership of suppliers by the parent firm help to underpin the sharing of gains between buyers and suppliers. Dyer and Ouchi [1993] report that Nissan owns an average of 33 percent of the shares of its major supplier partners.

As a result of voice relationships, Japanese automakers are reciprocally dependent on their suppliers. The suppliers have significantly more knowledge than the automaker about the design and manufacture of their parts. Because parts are customized to a specific model, the automaker would have difficulty shifting its business immediately to another supplier. Some suppliers claim that when they submit their design drawings for approval, they intentionally leave out important details such as tolerances, which make it difficult for the automaker to switch suppliers. Thus, both buyer and supplier have an incentive to maintain their long-term relationship.

\[13\] However, as we discuss below, Japanese automakers typically maintain at least two active suppliers for each component, although each may be supplying a different model. See Dyer and Ouchi [1993].
### Source Selection Should Focus on Long-Term Relationships with High-Quality Suppliers

- **Small number of suppliers**
  - Pre-qualified based on quality, cost, and technological capability
  - Two-vendor policy preserves competition
- **Suppliers participate in both design and production of products or services**
- **New suppliers go through an initial trial period with close performance monitoring**
- **Suppliers will not lose business unless they fail to cooperate with improvement efforts**

Source Selection Should Focus on Long-Term Relationships with High-Quality Suppliers

Converting to voice relationships also involves a different approach to source selection. Buyers typically limit the number of suppliers they deal with, based on a prequalification process involving the supplier’s quality, cost, and technological capability. However, they usually work with two or more suppliers of each component or service to maintain competition. Suppliers become involved in the design of the product or service, rather than simply being asked to bid to perform defined tasks. New suppliers may have to go through an initial trial period with strict quality inspections until they have established a reputation for good service. Once accepted, suppliers will keep the buyer’s business unless they fail to meet performance requirements.

Womack, Jones, and Roos [1990] report that Japanese automakers involve fewer than 300 suppliers in each project, compared with 1000 to 2500 by U.S. and European automakers. Whole subsystems are assigned to first-tier suppliers who often supply the same components for other models and are long-term partners of the producer. The first-tier suppliers in turn work with teams of second-tier suppliers who are manufacturing specialists. The system may extend to a third
or fourth tier. In contrast, Western automakers often contract directly with suppliers of subcomponents and with multiple suppliers of the same parts.

Before converting to voice relationships, Chrysler had often split responsibility for component design, prototyping, and volume production among separate companies (or among internal and external sources), resulting in a lack of accountability. Under its new supplier relations system, the purchasing department gives each project’s cross-functional development team a prequalified list of suppliers considered to have the most advanced engineering and manufacturing capabilities. Suppliers are “presourced,” or chosen early in the vehicle’s concept development stage. In addition to having responsibility for design, presourced suppliers build prototypes during development and then manufacture the part when it goes into production. As prime contractors, they take total responsibility for the cost, quality, and on-time delivery of their systems.14 (See Dyer [1996].)

However, voice relationships do not necessarily involve sole-sourcing or cozy relationships. Dyer and Ouchi [1993] report that Japanese firms usually employ a two-vendor policy to motivate suppliers to continue to innovate and improve performance. Although the Japanese automakers typically buy a specific part for each car model from a single source, they maintain at least two active suppliers of the generic component to bid for each new model. The proportion of components sole-sourced by Japanese automakers in Japan was 12.1 percent in 1990, compared with 69.3 percent for U.S. automakers (largely because of vertical integration). Under the two-vendor policy, one supplier’s ability to generate cost or quality improvements provides an incentive for the other supplier to keep up. The automaker invites guest engineers from both suppliers to work on the design team for a new model. The supplier with the superior design and cost becomes the major supplier for the model. The other may become a secondary supplier for that model, or may have an opportunity to develop a design for another model. The buyer may make the price paid or the volume given to each supplier dependent on relative performance.15

However, the buyer does not abandon a weak supplier, but works with it to help it compete with the stronger supplier. Both Toyota and Nissan have large

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14 Shifting responsibility for design to suppliers may be helpful for the Air Force. Traditional buyer responsibility for and ownership of design sometimes give suppliers an excuse when quality problems arise, enabling them to claim that they were building to the design they were given.

15 Similarly, the Air Force may not have enough production volume to use dual sources for a particular weapons contract, but it has an interest in maintaining more than one active supplier of each major type of system to preserve competition to build future versions. When volume is sufficient to use more than one supplier, there is a trade-off between economies of scale gained through single sourcing and enhanced competition and greater scope for innovation through dual sourcing.
supplier-assistance consulting groups who work with suppliers to improve production techniques. These groups employ at least one consultant for each four to six suppliers. If a supplier does not respond to their recommendations and make changes, the consultants may recommend that the buyer reduce its business with that supplier. This puts tremendous pressure on suppliers to improve. They refer to the process of working and negotiating with Toyota as *Toyota jigoku* (Toyota “hell”), but the result is that Toyota and its suppliers make 50 percent higher profits than their U.S. competitors.

The closeness of the relationship between buyers and suppliers often depends on how long they have been working together. Imai [1986] discusses three stages in manufacturer/supplier relations. In the first stage, the buyer performs quality checks on the entire lot delivered by the supplier. In the second stage, the buyer sample checks. In the third stage, the buyer accepts everything without checking the quality; i.e., responsibility for quality checks is delegated to the supplier. Only in the third stage is a truly worthwhile relationship established. At Ricoh’s Atsugi plant, suppliers are divided into “designated” and “nondesignated” suppliers. Once a year, Ricoh reviews the performance of all suppliers. Those that have reliable product quality and delivery are eligible to become “designated” suppliers. Designated suppliers enjoy first priority on Ricoh orders, and are entitled to special incentives and favorable payment terms. Ricoh has about 70 designated suppliers, which make up the majority of its suppliers. When a Japanese supplier wins a contract, it is essentially guaranteed four years of business over the lifetime of a model. Dyer and Ouchi [1993] found that, historically, Japanese suppliers have a more than 90 percent probability of winning the next contract when the model changes. One supplier indicated that the business was theirs unless they didn’t perform. These practices encourage long-term investments and development of ideas for future models. In contrast, U.S. automakers have repeatedly disrupted their relationships with external suppliers by splitting their business among many suppliers and rotating them frequently. According to Dyer and Ouchi’s survey (conducted in the early 1990s), U.S. suppliers typically had only a 69 percent chance of keeping their business after a model change.16 This uncertainty results in fewer long-term relationships with automaker engineers, and less long-term planning and

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16This figure may conceal considerable variation among U.S. automakers. Helper and Sako [1995] see three different strategies being pursued by U.S. automakers: consistent voice relationships, steady transition from exit to voice, and an intensified exit strategy. Furthermore, a firm could have sole-sourcing relationships with its vertically integrated internal suppliers, but have exit relationships with its external suppliers.
investment. Persistent uncertainty about buyer demand can also result in higher supplier costs. For example, plant capacity utilization averages 77 percent for U.S. suppliers, compared with 88 percent for Japanese suppliers.
Gain-Sharing Motivates Suppliers to Invest in Process Improvement

- Supplier designs products or services to meet target costs
- Buyer works with supplier to enhance performance
  - Focus on total cost and quality throughout the supply chain
  - Transfer of technology and process improvement techniques
- Gains from process improvement are shared between buyer and supplier
  - Price reductions tied to cost reductions by supplier

Gain-Sharing Motivates Suppliers to Invest in Process Improvement

Gain-sharing increases the incentives for suppliers to improve performance and reduce costs over time. This approach begins at the design stage, when suppliers are asked to design products or services to meet target costs rather than to bid on pre-designated tasks. As the work is carried out, the buyer and supplier exchange ideas on how to improve integration of activities, reduce costs, and improve quality. This may involve transferring technology or process improvement techniques from buyer to supplier, or vice versa, depending on areas of expertise. As performance improves, gains are shared between the buyer and supplier. Supplier profit margins are maintained by tying price reductions to supplier cost reductions, in contrast to exit strategies, in which supplier profit margins are intentionally squeezed.

Japanese automakers using voice strategies do not rely on competitive bidding to establish the price of components. Instead, they use target costing during the design phase, which involves determining what price the end customer will pay for the vehicle, and then working backward to calculate the allowable costs for systems, subsystems, and components. Historically, Chrysler had put pressure
on suppliers to reduce price, regardless of whether they were able to reduce costs. When Chrysler adopted voice relationships, it did not have a good idea of what target costs should be, so it negotiated with suppliers about performance and cost targets. With experience, it has been able to set better targets at the outset of the program. The focus on cost instead of price creates a win-win situation with suppliers, because the company works with suppliers to meet common cost and functional objectives. (See Dyer [1996].)

The goal of a voice relationship is to create a “see-through” value chain where both parties’ costs and problems are visible. Both parties then work jointly to solve the problems and expand the pie rather than fight over how to split it. According to Imai [1986], integrating suppliers into process improvement efforts is a top priority of managers in Japan. Purchasing agents constantly work to improve their relations with suppliers and to find ways to reduce the costs that the buyer imposes on its suppliers, including

- establishing better criteria to measure optimum inventory levels;
- improving how orders are placed;
- improving the quality of information provided to suppliers;
- establishing better physical distribution systems; and
- understanding the suppliers’ internal requirements better.

Japanese manufacturers have made considerable efforts in such areas as assisting suppliers to initiate Total Quality Control (TQC) programs, suggestion systems, small group activities, and better communication on product quality, quantity, and delivery schedules. These efforts have led to such achievements as improved yields, better identification of new materials, and lower break-even points. Honda meets with suppliers every month to study subjects such as employee education, new materials, physical distribution systems, improved production lines, and better Quality Assurance (QA) systems. Manufacturers and suppliers also form joint project teams to work on new product development, resource savings, and energy conservation. Ricoh invites technical personnel from its designated suppliers to work on solving problems with Ricoh technicians. It also sends its technical experts to suppliers to help them implement process improvement activities.

Dyer [1996] reports that Chrysler started the Supplier Cost Reduction Effort (SCORE) in 1989 to increase the flow of ideas with its suppliers. The purpose of SCORE is to help suppliers and Chrysler reduce systemwide costs without hurting suppliers’ profits. Chrysler keeps detailed records of the number of proposals each supplier makes and the dollar savings they generate, and uses
those records (along with the supplier’s record on price, quality, delivery, and technology) to grade the supplier’s performance. When Chrysler accepts a SCORE idea, the supplier has two choices: it can claim half of the savings or it can share more of the savings with Chrysler and boost its performance rating. As of December 1995, the SCORE program as a whole had resulted in the implementation of 5300 ideas that generated more than $1.7 billion in annual savings.

According to Dyer and Ouchi’s [1993] study of Japanese buyer/supplier relationships, prices are usually renegotiated every six to twelve months based on how much suppliers have been able to reduce their costs. Thus, gains are shared between buyer and supplier, and supplier profit margins are maintained. Suppliers may also work independently of buyer assistance programs to reduce internal costs. Toyota suppliers often set up a jishuken (cooperation and assistance group) to share ideas on how to reduce costs or improve quality. Improvements realized through jishuken activities accrue primarily to the supplier in the short term, but are shared with the buyer over the long term.