

**Changing Firm Boundaries
in Japanese Auto Parts Supply Networks**

Christina L. Ahmadjian and James R. Lincoln

Working Paper No. 137

**Working Paper Series
Center on Japanese Economy and Business
Columbia Business School
September 1997**

Changing Firm Boundaries in Japanese Auto Parts Supply Networks

Christina L. Ahmadjian

Graduate School of Business

Columbia University

707 Uris Hall

Columbia University

New York, NY 10027

(212)854-4417

cla15@columbia.edu

James R. Lincoln

Walter A. Haas School of Business

University of California at Berkeley

Paper prepared for Make Versus Buy Conference, Columbia School of Law

New York City, February 7, 1997

ABSTRACT

The Japanese and the US business presses are full of articles about change in Japanese business practices—in particular, changes in relationships between customers and suppliers. Are closely knit networks of customers and suppliers—the keiretsu—breaking down? We argue that while there is no sign of a dramatic, abrupt breakdown in the system, Japanese automakers are beginning to rethink the make versus buy decision. Automakers are taking firmer control over some transactions while allowing others to become more arms-length. These changes are traceable to some basic changes in the transactions themselves—increased power on the part of suppliers due to changes in technology and globalization, and decreased need for customer-specific investments due to standardization. Furthermore, a sense of economic crisis has caused Japanese firms to question the value of certain business practices, and has made it easier for automakers to rethink their contracting relationships.

INTRODUCTION

Networks of Japanese automobile manufacturers and their suppliers, linked through long-term purchasing relationships, intense collaboration, cross-shareholding, and the exchange of personnel and technology, are a vivid reminder that not all successful organization forms are clustered at the extremes of market and hierarchy. Cooperation between assemblers and their suppliers has allowed Japanese automakers to drastically reduce new model development time, to endure endless rounds of cost-cutting, and to respond quickly to changes in demand. By outsourcing a large percentage of parts development and manufacture to independent, yet closely linked suppliers, Japanese automakers have been able to exploit the incentive benefits of market relationships while reaping the learning and coordination benefits of hierarchy.

Over the last few years, the Japanese automobile industry has been buffeted by changes in environment and technology. Such factors as increased overseas production due to a strong yen, foreign demand for localized investment, and increasing importance of international market; changes in technology, in particular the growing importance of electronics; and US pressure to open auto parts markets to foreign suppliers have had greater impact on the industry than either the oil crises of the 1970's or the *endaka* (dramatic yen appreciation) of the mid-1980's.

Change has not been limited to the auto industry—the effects of globalization, a rising yen, foreign governmental pressure, and the bursting of the bubble economy of the late 1980's have been felt across the Japanese economy. The recession of the early 1990's has led to statements of gloom and doom—both on the part of relieved westerners who only ten years ago predicted Japanese domination of the world economy and depressed Japanese managers and journalists, who fear for Japan's very existence (the *Nihon Keizai Shimbun*, Japan's most prestigious economic newspaper, opened the new year of 1997 with a series

entitled "Nihon ga Kieru" or, "Japan is Disappearing"). Yet discussions of change are rarely accompanied by systematic examination of where and how these changes are actually affecting Japanese economic organization.

The main premise of this paper is that changes facing the Japanese automotive industry are causing automakers and their suppliers to redefine their relationships. In the Japanese auto industry, the make-buy relationship has never been as clear as in economic theory—while automakers do manufacture some parts in house and purchase others at arms-length, the great majority of transactions are carried out at an intermediate level, with independent, yet closely affiliated suppliers. Changes facing the automotive industry are leading to increased polarization away from intermediate levels of transactions towards either more arms length, or more internalized transactions. Evidence of a reconsideration of the make-buy decision in the auto industry is apparent in Toyota's investment in internal manufacture of semiconductors and other electronic parts, and its takeover of the manufacturer of small cars, Daihatsu. Evidence of greater arms-length relationships is apparent in the trend for both customers and suppliers to diversify their business partners, in particular, the growing number of suppliers that are breaking the taboo by which Toyota's closest suppliers never sell to Nissan, and vice versa.

In the popular imagination, changes in the Japanese economy are often linked to a growing convergence between Japan and "The West"—an inexorable trend towards individualist, profit-maximizing behavior (such explanations are a particular favorite of the *Economist*). We argue that while there is some evidence of cracks in the system of mutual obligation between employer and employee, and customer and supplier that have held together the Japanese economic system—they are not yet large, and are not the major factor driving changes in contracting patterns. Observers have been wringing their hands about creeping westernization in Japan for over a hundred years (see, for example, Carol Gluck's (1985) discussion of ideology of the Meiji period). Many institutions that the Japanese themselves

see as true embodiments of Japanese culture, such as paternalistic relationships with employees and suppliers, are relatively recent developments—products of a Japan that had already experienced many decades of westernization (Gordon, 1985).

Further contradicting statements of creeping westernization and wholesale demolition of traditional economic relationships is evidence that customer-supplier relationships are changing much less quickly in other industries, and contrary to popular perception, may in some circumstances even be becoming *less* arms-length. For example, we have found in our interviews that Matsushita—known for arms-length contracting with suppliers—has been moving to a system of supplier cooperation, quite reminiscent of the auto industry (Lincoln, Ahmadjian & Mason, 1996).

Changes in the make-buy decision in the Japanese auto industry do not stem primarily from sweeping changes in Japanese culture—a decrease of trust, or a turn to a US model of a more individualistic business culture—although Japanese business may well be undergoing these changes. In this paper, we argue that the primary impetus for change in contracting in the Japanese auto industry comes from changes in the transactions themselves. Two factors in particular are contributing to these changes. 1) Changes in technology and increased globalization have contributed to a fundamental shift in the balance of power between customers and suppliers. With the importance of electronics, customers no longer have a dominant grasp on a critical area of technology, and, with growing international markets, suppliers suddenly have other options. 2) Increased standardization in parts across models and between car makers threatens to decrease the degree of asset-specific investment necessary and desirable in these relationships: at least for certain parts, there is no longer an advantage in dedicated, specialized suppliers.

In the frictionless world of economic theory, such changes in transactions would lead immediately to changes in governance. In reality, the process is slower. In networks

marked by long-term, intense collaboration such as Japanese auto parts supply networks, maintaining relationships may take priority over responding to underlying economic realities (Seabright, Levinthal & Fichman, 1992). Norms concerning mutual obligation between customer and supplier developed over the course of a long relationship are difficult to break (Ahmadjian, 1996). In the Japanese auto industry, several factors have made it easier for automakers and suppliers to reconsider their relationships. Global expansion has allowed Japanese automakers and suppliers to try new relationships—and to discover that unfamiliar, even distant, suppliers do not mean disaster. A sense of impending economic disaster has been encouraged by the business press may not accurately reflect reality but nevertheless may encourage firms to break inertial patterns of long-term relationships. Accounts of customers severing ties to suppliers and employers laying off employees result in a sense that "everyone else is doing it" and make it easier for manufacturers to make radical decisions about their contracting arrangements.

This paper begins with an overview of the structure of supplier networks in the Japanese automobile industry. We then examine the three areas of change identified above, using case studies based upon our interviews with Japanese automakers and suppliers and an examination of announcements of changes in contracting patterns in the Japanese business press. This is followed by further discussion of some of the underlying themes in these cases, and avenues for future research.

An overview of supplier relationships in the Japanese auto industry

A typical Japanese automaker manufactures perhaps 25% of its inputs in house, as opposed to the typical U.S. automaker which internalizes about 48% (Dyer & Ouchi, 1993). A small fraction of its purchases are parts that can be purchased off the shelf and are interchangeable across models and automakers. The rest are procured through a network of independent, yet closely related suppliers. An automaker contracts directly with a set of

first tier suppliers, which number in the hundreds—in contrast to an American automaker which might contract directly with ten thousand suppliers. These first tier suppliers purchase from their own set of second tier suppliers, which have their own third tier suppliers, and on down. A web of formal and informal ties, ranging from equity ties to interlocking directorates, to informal exchange of personnel, and long-term collaboration links automakers to their suppliers. Equity ties, though prevalent, tend to be below controlling levels (averaging under 1% across all suppliers, but higher—about 20% for a customer's most important suppliers (Japan FTC, 1993)).

Written contracts between customer and supplier serve as a general framework for an ongoing relationship rather than a specific governance structure (Asanuma, 1989). Contracts contain no fixed prices and volumes. Rather, purchase volumes are determined by monthly purchase orders, while prices are negotiated and renegotiated twice a year. Twice a year, an automaker announces its general price reduction targets; then renegotiates prices with each parts maker individually. Constant collaboration between customer and supplier to reduce costs ensures that this price negotiation is not a means to extract extra rents from suppliers, but rather provides both parties with an incentive to continuously find new ways to reduce costs (Asanuma, 1989).

Automakers and suppliers have managed to maintain relationships marked by collaboration, open sharing of information, and high degrees of specific investments—without the benefit of ownership or specific, contingent contracts—through a complex mix of cultural, institutional, and economic supports. A heritage of Confucian morality makes firms more likely to behave with goodwill in business relationships and minimizes the fear of opportunism that drives firms in other cultures towards hierarchy (Dore, 1983). A legal system that encourages arbitration over litigation (Williamson, 1985) and a taken-for-granted sense of obligation for customers to take care of their suppliers (Ahmadjian, 1996) as well as strong adverse reputation effects for customers who take advantage of their

suppliers (Sako, 1992) create an institutional environment that supports these relationships. Shared self-interest—an understanding by both customer and supplier that cooperation will lead to higher profits for both (Nishiguchi, 1994)—encourages the parties to cooperate. The understanding that cooperation will lead to higher returns has caused customers and suppliers to consciously invest in developing trust that allows this cooperation (Smitka, 1991).

There are two types of conditions under which such a system might change. The first is a change in the complex system of supports for governance of exchange. If cultural or institutional conditions change—if goodwill decreases, or the public ceases to care if a customer breaks an implicit contract with a supplier—new forms of contracting are likely to emerge. The second is a change in the nature of the transactions themselves. The governance of transactions is likely to change if the degree of hazard involved changes. If the danger of opportunistic behavior increases, firms may resort to higher internalization. Likewise, if the potential for opportunism decreases, for example, if the need for specific investment decreases, firms may move to less costly arms-length forms of transaction.

In the following sections, we outline changes in characteristics of auto parts purchase transactions that have led to changes in the make-buy decision, specifically, in the way purchasing relationships are governed.

Change in the balance of power between customer and supplier

In the last two years, Toyota made two dramatic announcements that represent substantial breaks with its past purchasing management practices. In August 1996, it announced a joint venture (through its close affiliate, Toyoda Automatic Loom Works) with Texas Instruments to manufacture semiconductors. This move was another step in Toyota's strategy, begun in the late 1980's, to move away from dependence for electronics technology on its supplier, Nippondenso. In 1995, it announced that it would increase its

equity stake in Daihatsu, a supplier of small cars to Toyota, from 16.8% to 33.4%, a controlling share according to Japanese law. At stake were Daihatsu's contacts and expertise in the booming China market.

Both announcements are traceable to the changing balance of power between Toyota and its suppliers. In the language of resource dependence theory (Pfeffer & Salancik, 1978), Nippondenso's expertise in electronics gave it control of a critical contingency as electronics became a great part of the value added of an automobile and advanced electronics became a source of competitive advantage. The problem proposed by Nippondenso's increased power was particularly acute since Toyota lacked electronic expertise itself and because Toyota had no alternative suppliers for electronic components. Daihatsu's expertise in manufacture of small cars and its contacts in the China market, made it particularly desirable to Toyota, particularly since Toyota was lacking in both areas. Toyota's decision to buy a controlling position was due to the failure of more traditional means of influence that customers had over suppliers—dispatch of top executives. Daihatsu, with the entire China market before it, was suddenly in a position to say no to Toyota.

Toyota and Nippondenso: Electronics and competence-destroying innovation

One of the most important developments in automotive technology has been the increased importance of electronics. "Car electronics" (a transliteration of the English word is used in Japanese) includes not only electronically controlled mechanical systems such as electronic fuel injection and electronic power steering but also a new category of electronic add-ons, including navigation systems and even karaoke players. Electronic components are an increasingly important percentage of an automobile's value added—particularly in top-of-the-line, high margin models (Ota, Nakanishi, Katsuya & Otani, 1994). Perhaps even more

important is the perception that new generations of navigation and other electronic control systems represent the future in a maturing industry. Navigation systems have attracted particular interest. These systems have been described as the "brains" of the automobile (*Nihon Sangyo Shimbun*, 1995), and there is a perception in the industry that what for now is a clever gadget in high-priced cars will be essential in differentiating between models in the future—in particular in Japan where street names are rare, road signs are sparse, and navigation is notoriously difficult.

Auto manufacturers have long been a source of knowledge, skills, and resources for their suppliers. One of the motives behind the initial establishment of supplier networks in the 1950's, in fact, was transfer of capital and technology between automakers and their less sophisticated suppliers (Odaka, Ono & Adachi, 1988). As time passed, suppliers developed specialized capabilities and automakers entrusted the most sophisticated of them with the actual design process. Asymmetries in information between customer and suppliers were minimized as long as the technology behind these parts never strayed far from the core expertise of automakers. While an automaker might not be familiar with the specifics of a part's design and manufacture, it understood the general principles and technology. Customers were usually able to evaluate a supplier's work and understand whether its assessments of cost and quality were correct.

Electronics is a competence-destroying innovation for automakers (Anderson & Tushman, 1990). Automakers for many years left car electronics in the hands of their suppliers. As electronics became more sophisticated and more important, information and technological asymmetries arose between customer and supplier and threatened the existing balance of power. With the introduction of advanced car electronics, customers suddenly lacked the capability to evaluate what their suppliers were doing.

This situation has been particularly acute in the case of Toyota and Nippondenso. Nippondenso (which recently changed its name to Denso) was spun off from Toyota in 1949. Originally a maker of electrical parts for cars, such as heaters, it developed considerable expertise in electronics and grew with the importance of this technology. Toyota benefited from Nippondenso's expertise and relied on Nippondenso for all its purchases of a number of important parts, breaking its own rule to maintain two suppliers of each part to encourage competition. As Nippondenso's capabilities grew, it began to supply to other automakers, probably with Toyota's blessing, but similar to other top Toyota suppliers, was forbidden (or did not dare) supply to Toyota's arch-rival, Nissan.

Early signs of the weakening in the relationship between Toyota and Nippondenso came with Nippondenso's establishment of a factory in Battle Creek, Michigan, before Toyota had begun production in the United States. Nippondenso built its plant with the intention of supplying the Big Three, and eventually came to supply even Nissan's US operations—although the taboo against supplying Nissan still seems to be holding in Japan. While Toyota does not discourage its suppliers from selling to other automakers (as long as they are not Nissan) it does not take well to its suppliers collaborating closely with its competitors, and reportedly was perturbed by Nippondenso's cooperation with Chrysler in the development of the subcompact Neon, which was in the worst days of the early 1990's recession Japanese automakers perceived to be a significant competitive challenge to the Japanese auto industry (Lincoln et al., 1996).

As Nippondenso gained in power through its control of the critical contingency of electronics, and as its dependence upon Toyota lessened with growing access to foreign automakers and even the foreign operations of Toyota's competitors, Toyota began to take action. In 1988, Toyota opened its Hirose plant, currently location of four electrical engineering divisions: design and planning of electronic parts, antilock brake systems, car navigation systems, and semiconductors. Toyota made major efforts to recruit electrical

engineers—making sure that a large percentage of new hires were electrical engineers, and taking the relatively unusual step of hiring mid-career electrical engineers.

In 1996, Toyota announced a joint venture with Texas Instruments, through its close affiliate Toyoda Automatic Loom Works, to manufacture semiconductors. This joint venture will build a plant in Aichi Prefecture, home to Toyota and most of its suppliers, and is expected to begin production of 64 MB and 256 MB DRAM's beginning in 1999. Toyoda Automatic Loom Works, though ostensibly an independent firm, is Toyota's closest affiliate—in fact, it is Toyota's parent company, as Toyota Motors was founded when Toyoda Automatic Loom Works spun off its auto business.

Evidence of the weakening of ties between Nippondenso and Toyota is apparent in the lack of assistance on the part of Nippondenso in Toyota's endeavors to obtain expertise in electronics. In the auto industry, as in other industries in Japan, exchange of engineers between customer and supplier to facilitate transfer of technology and development of new capabilities is common—this kind of interchange is critical given the great difficulty in hiring mid-career engineers and managers. Toyota informants told us that initially they received help from Nippondenso in developing electronics expertise. A course to provide electronics training to Toyota engineers was initially staffed by university professors and Nippondenso engineers. Toyota's worsening relationship with Nippondenso put an end to that. In 1994, six engineers were dispatched from Nippondenso—in 1995, none. As a manager in Toyota's human resources department put it, "We have graduated from the Nippondenso phase."

Globalization and shifting power dynamics: Toyota and Daihatsu

The case of Toyota and Nippondenso highlights not only how changing technology has affected the dynamics of supplier relationships, but how globalization has resulted in fundamental changes in bargaining power between supplier and customer. Toyota was

particularly unwilling to entrust Nippondenso with sole responsibility for a critical and unfamiliar technology because Nippondenso had made it clear that it had, and was willing to exercise, other options in the form of Chrysler and even Nissan's US operations. Toyota's response to Nippondenso's challenge was to develop its own electronics capability—to make more components itself, and to make its purchasing transactions with Nippondenso more arms length.

Increased globalization and resulting changes in power dynamics is also behind Toyota's changing relationship with Daihatsu. Daihatsu is a supplier to Toyota of small automobiles under the Toyota nameplate, as well as a manufacturer of its own brand of small cars. An early entrant into the auto industry, Daihatsu turned to Toyota in 1967 when it encountered severe financial difficulty. Toyota purchased a minority equity stake and dispatched top management to Daihatsu, and the two companies entered into a cooperative relationship in which Daihatsu manufactured Toyota automobiles. This type of arrangement, known as *itaku*, in which a smaller automaker or parts supplier manufactures cars for a larger one is quite common: Kanto Auto Works and Toyoda Automatic Loom Works also make Toyotas, while some of Nissan's most famous models (the Z, for example) are made by closely related, but independent firms. Large automakers have used *itaku* to respond to variation in demand without having to build extra internal capacity, as well as to take advantage of competencies of other manufacturers (Shioji, 1995). In the case of Daihatsu, this competence has been the manufacture of small cars.

The relationship between Toyota and Daihatsu was in many respects similar to that of other large automakers and suppliers. Toyota held a large, though not controlling equity stake in Daihatsu, while Daihatsu reciprocated with a small stake in Toyota. Toyota dispatched executives to serve as top managers. Daihatsu differed, however, from other Toyota affiliates in several respects. Daihatsu employees were proud of Daihatsu's long history as an independent firm and its engineering expertise in small cars—which at times made for a

rancorous relationship with Toyota engineers and managers. Daihatsu's location in the city of Ikeda, far from Toyota's home territory in Aichi prefecture, also led to a sense of distinct identity. Daihatsu maintained a main bank relationship with Sanwa, in contrast with other close Toyota affiliates that shared Toyota's principal banks of Mitsui and Tokai (Ahmadjian, 1995). Nevertheless, for many years, this relationship worked as other supplier relationships—with personal influence and reciprocal dependence providing a framework for long term transactions.

A shift in the relationship between Toyota and Daihatsu came with changing patterns in demand in the world auto industry. Markets in Southeast Asia and China began to grow, in contrast to the sluggish markets in US, Europe, and Japan in which Toyota held a strong position. Leading the growth in demand in these markets was demand for smaller cars, and suddenly the expertise of firms such as Daihatsu was in demand. Daihatsu was especially well-positioned to take advantage of the China market with its production of the Charade in a venture with Tianjin Motors in Tianjin. This venture had been so successful that Daihatsu's chairman commented, "There are more Daihatsu's in Tianjin than in Ikeda (location of Daihatsu's headquarters)" (*Nikkei*, 1995).

Toyota had encountered difficulty in finding venture partners in China, and Daihatsu reportedly was not keen on letting Toyota participate in its successful Tianjin venture. In September 1995, Toyota increased its equity stake in Daihatsu to 33.4%, giving it controlling rights over Daihatsu and access to Tianjin Motors.

While official announcements of this move were couched in the language of cooperation, analysts in the business press treated it as a hostile takeover. Toyota had in the past purchased equity stakes in suppliers, but always in the context of rescuing suppliers in financial difficulty—just as it had initially purchased shares in Daihatsu to save it from bankruptcy in the mid-1960's (*Nikkei Sangyo Shimbun*, 1995). This time, Toyota could

not justify its increased stake in Daihatsu as a rescue. Although Daihatsu had encountered some trouble in the early 1990's, it had recovered nicely, thanks to Asian markets.¹ This time, Toyota purchased shares of a supplier as a means to increase its control. Analysts speculated that in the past, when suppliers had less of a mind of their own, financial control was unnecessary and personal influence, through dispatch of executives and other means, was enough. In the case of Daihatsu, these means were no longer effective. Daihatsu's increased power over Toyota—with international resources, and expertise in a critical contingency—small cars—allowed it to break through the ties that have traditionally bound customers and suppliers in Japan.

Power and governance in supply networks

Researchers have offered numerous analyses as to what keeps transactions between automakers and their suppliers in an intermediate range—neither fully internalized nor fully arms length. Rich description of these relations makes it clear that a complex set of social, cultural, institutional, and economic mechanisms keeps customers and suppliers together.

Toyota's changing relations with Nippondenso and Daihatsu suggest that one of the most important factors holding these relationships together has been either omitted or underplayed in much of this literature. Power—the domination of suppliers by customers—has been a dirty word in much of the research on supplier networks over the last decade. In part, this is a reaction to many years of theory and research according to which these relationships were only about power. A Marxist-influenced perspective, that supply networks were instruments of domination of small firms by large, guided the work

¹ There is some controversy regarding Toyota's motives, and other auto industry experts and even some Daihatsu managers have said that Toyota upped its equity share in Daihatsu in part because Daihatsu was losing market share in small cars in Japan. It is always difficult to assess a firm's motives in these situations, but regardless of Toyota's motives, Toyota chose to increase its equity to controlling levels—something that it has in the past resisted doing, even in bailouts of troubled suppliers. The fact remains that Toyota felt a need to establish financial control over Daihatsu because traditional methods of influence seemed no longer effective.

of Japanese economists who studied small firms and contracting (Watanabe, 1985) and found its way into the English-language literature as well (van Wolferen, 1989).

More recently, researchers have pointed out that it is difficult to reconcile the persistence of small firms and their growth in numbers and degree of sophistication with exploitation (Nishiguchi, 1994). The application of transaction cost economics to supplier relationships (Dyer, 1996; Nishiguchi, 1994) has also contributed to the disfavor into which power explanations have fallen. Transaction cost economics has been averse to the use of power to explain interfirm relationships in any context. Williamson (1985) writes: “The problem with power is that the concept is so poorly defined that power can be and is invoked to explain virtually anything (p. 237-238).”

Yet these denials of the role of power are not entirely satisfying. Asymmetry between customer and supplier in size, prestige, and access to resources persists. Automakers dominate their suppliers in size. Toyota, for example is more than four times the size of its largest supplier, Nippondenso, in assets, and Nippondenso much larger than the average auto parts supplier. In Japan, firm size is highly correlated with prestige and access to resources. Banks favor large firms in lending (Patrick, 1994). Employees prefer to work for large firms than small. With limited access to resources, suppliers often depend upon their customers for financial capital, in the form of trade credit (Hodder & Tschoegl, 1985) and human capital, in the form of *shukko*, in which a larger firm dispatches employees to an affiliate.

Suppliers also have long had few other options for establishing new lines of business and new customer relationships. Although customers solicit new suppliers with the development of a new model, even “new” suppliers tend to be suppliers with which they have already established a relationship, and beginning a relationship on any scale with an

unknown supplier is quite rare. It is dangerous, if not suicidal for a supplier to sever a relationship with a customer.

We cannot understand customer-supplier relationships in the Japanese auto industry without taking into account their fundamental asymmetry in power. While customers and suppliers cooperate, they are by no means on an equal footing. While it is perhaps anathema to mention power in the same breath as transaction cost economics, there may be room to incorporate the notion of power into the governance of customer supplier transactions without resorting to notions of exploitation. Transaction cost interpretations of customer supplier relationships have paid particular attention to the hazard of opportunism on the part of suppliers. In the case of Japanese customer-supplier relations, dependence of suppliers on customers—dependence stemming from the structure of the Japanese economy—means that suppliers are unlikely to behave opportunistically. Suppliers are dependent upon good relations with their customers for financing, for technology, and for skilled personnel. And if they compromise their relationship with a customer, they are likely to have few other opportunities. A customer does not have to worry so much about governance of such relationships, because the threat of opportunism is so low.

As the examples of Nippondenso and Daihatsu suggest, electronics technology and international expansion have shifted the asymmetry long present in customer-supplier relations. As certain suppliers become particularly powerful and can say no to their customers' demands and seek other customers and markets, they are more likely to behave opportunistically, and automakers must rethink governance of transactions with them.

Standardization of parts

The changes in Toyota's relationships with Nippondenso and Daihatsu highlight the role of power in governance of supply relationships and the relationship between increased supplier power to increased internalization and control of certain transactions by the

customer. A concurrent trend towards standardization of certain parts is moving other transactions in the opposite direction—towards the arms-length end of the continuum.

One of the foundations of Japanese automotive supply networks has been a high level of interfirm co-specialization. Suppliers invest in non-redeployable assets, in physical plants located in close proximity to those of their customers, and in customer-specific human capital and relationships (Nishiguchi, 1994). This co-specialization, it is argued, has been a source of competitive advantage to Japanese automakers (Dyer, 1996). It has facilitated transfer of technology from customer to supplier, and promoted the diffusion of such developments as the kanban system, statistical quality control, value engineering and value analysis, and advances in human resource management. Highly specialized networks of suppliers who work closely with their customers have allowed Japanese automakers to reduce development time and squeeze costs out of the system from the earliest stages of product development throughout the manufacturing process.

In part a result of this system supplier specialization, parts themselves have become highly customized. Banri Asanuma (1989), one of the most insightful observers of Japanese supply relations writes: "Core firms in [the auto industry] increasingly have come to issue specifications even for those items for which they have not acquired manufacturing capabilities and which have been thought by outside researchers to be marketed goods. Thus, virtually all of the parts supplied from outside firms can now be regarded as ordered goods. It is indeed very difficult to find, from among those items that are being supplied from suppliers on the first tier, parts that fall under the marketed goods category" (p. 11). This reliance on customized parts stands in contrast to the consumer electronics industry, in which 20% or more of parts procured by large manufacturers are purchased off the shelf and are interchangeable between models and manufacturers (Wu, 1991).

In the last few years, Japanese managers have begun to call into question the merits of specialization and resulting proliferation of parts types. Efforts to control parts proliferation within the same manufacture have received the most attention. Nissan's president, Yoshifumi Tsuji, for example, became known among Nissan employees as "Mr. Steering Wheel" for his pet peeve—proliferation of steering wheel types (*Nikkei Kinyu Shimbun*, 1994). Nissan, he reminded employees and journalists, had 86 types of steering wheel for a single model, and parts had proliferated "to the point where it was meaningless" Nissan and other automakers began to announce major reductions in types of parts.

While this streamlining of parts within automakers may not have many implications for management of supply relationships, the next step, standardization of parts between automakers, does. There has been considerable interest in, and a number of prominent moves towards, sharing of parts between automakers. Consistent with economic theory on standardization, much of the impetus for parts standardization has come from smaller automakers, in an attempt to realize the cost efficiencies of economies of scale that they cannot achieve on their own (Gabel, 1991). In 1994, MITI, with the cooperation of the six manufacturers of small automobiles, announced a list of 84 parts for which standardization was desirable (*Nikkei Sangyo Shimbun*, 1994). In some cases, impetus for standardization has come from suppliers: for example, the transmission supplier, Jatco, urged Fuji and Suzuki to standardize their automatic transmission parts to help it increase economies of scale (*Nikkei*, 1994).

Among larger automakers, highly visible efforts to introduce standard parts have come from Mitsubishi and Honda. The most highly publicized example was the decision of Mitsubishi to purchase a critical part—drive shafts—from Honda in 1993 (*Nikkei Sangyo Shimbun*, 1993). The collaboration between Mitsubishi and Honda was seen by some analysts as natural since they shared the same main bank, Mitsubishi, and were thus

"relatives" albeit distant ones since Honda is not a member of the inner circle—the Mitsubishi group presidents' council.

Nissan, in its efforts to recover from its financial troubles, has been willing to use parts designed for Toyota. In 1993, Nissan announced that it would begin purchases of automatic transmission parts from Tokai Rika Denki, a supplier close to Toyota—and reduce purchases from its closely affiliated supplier, Fuji Kiko. Nissan decided to move to a Toyota supplier in part because Tokai Rika Denki had US production facilities, and in part because Tokai Rika Denki could take advantage of Toyota's large market share to achieve lower costs due to greater scale economies. This move was not exactly welcomed by Toyota or by Fuji Kiko. The *Nikkei* quotes a manager at Toyota, saying approximately (half jokingly, admits the *Nikkei*), “This is like giving away our lifeblood to the enemy.” A Fuji Kiko manager is quoted as saying: “Sure it hurts to have 10% of our business taken from us.” (*Nikkei*, 1993).

Nissan has also announced that it will procure electric car batteries from a Toyota-Matsushita venture, even though it has devoted considerable resources to developing its own in conjunction with Sony (*Nikkei*, 1996). Toyota and Nissan-affiliated screw makers announced a joint venture in the United States in 1995 (*Nikkei*, 1995), and the fact that collaboration between screw makers of rival camps is big news reflects the great deal of specialization that has existed up until now—even in what would seem to be such logical candidates for standardization as screws.

A number of factors have driven this move towards standardization. Most often cited is the proliferation of parts during the late 1980's—the years of the "bubble economy." Automakers have also looked towards standardization of parts as way to wring further costs out of the system in the face of a strong yen. The move towards standardization of parts also reflects more fundamental changes in the auto industry—in particular, changing

markets and changing sources of competitive advantage. In the 1980's, automakers profited through selling high-priced cars in western markets. There is a strong perception that today, the key to competitive advantage has shifted to production of small cars for rapidly growing markets in developing countries. Mitsubishi Motors, in particular, long a distant follower of Toyota and Nissan in Japanese and Western markets, has met with unexpected success of late due to its popularity in Southeast Asian markets. Now that the ability to make inexpensive small cars rather than the ability to differentiate high-end cars through endless variations of steering wheels or cup holders is critical, the advantages of maintaining networks of highly specialized suppliers to provide highly customized parts may be no longer worth the cost.

A purchasing manager of a medium-sized auto maker gave us further insight into why advantages of specialization may be disappearing. In the past, a tightly knit, highly specialized network was advantageous to a firm such as Toyota—since it could use its network to diffuse breakthroughs in quality control, production engineering, and personnel management and derive competitive advantage from an integrated network of suppliers familiar with these new practices. The result of these highly specialized, close networks was highly customized, non-interchangeable parts. Today, there is little need to maintain such close relationships to diffuse technology to Japanese suppliers. The manager told us, "10 years ago, we considered quality, delivery time, and stable supply as well as cost in making purchasing decisions. Today, we consider primarily cost. These days, Japanese suppliers are all at pretty much the same level in terms of reliability and quality—so we take these for granted."

One consequence of parts standardization is likely to be a higher degree of arms-length transactions. As suppliers no longer need to make specialized investments in their customers, there is no longer a need for the close, long-term collaboration that has been typical in supply networks. In conjunction with a greater degree of arms-length

transactions, we are likely to observe consolidation among suppliers, with stronger suppliers expanding to take advantage of economies of scale, and others disappearing through merger or failure. Recent mergers between auto parts suppliers and an increased gap between strong and faltering suppliers are evidence that this is indeed occurring.

Another consequence of standardization is likely to be greater competition between individual suppliers, in contrast to the competition between entire systems of suppliers (e.g. the Toyota group versus the Nissan group) that has been the rule until now (Gabel, 1991). Increased competition between group members is already apparent in the Toyota group, in growing competition between Nippondenso and Aishin. For many years, these two firms worked in a natural division of labor, with Nippondenso supplying electrical and electronics parts and Aishin supplying critical mechanical parts such as automatic transmissions and disk brakes. The division of labor has blurred now that it has become difficult to distinguish separate electronic and mechanical parts. Aishin has moved into electronics and now competes with Nippondenso in certain businesses—for example, both firms are developing electronic navigation systems (along with Toyota and a whole host of other firms inside and outside of the auto industry).

Breaking the inertia

Economically rational reasons for change in interfirm transactions between firms is no guarantee that change actually will occur. Even in the United States, where relationships have been considered more arms-length than Japan, relationships often persist even when the underlying environmental conditions and the economic rationale for whatever configuration exists disappears. People get to know each other, get used to each other's way of doing business: breaking a relationship between two firms is in fact breaking relationships between individuals.

The complex set of social, cultural, and economic supports that governs Japanese supply networks makes it all the more difficult to terminate relationships. Relationships between automakers and their most important suppliers have persisted in many cases for 30 years or more (Japan FTC, 1993). "Life-time" employment and low levels of job rotation within the purchasing departments enable purchasing managers to develop highly personal relationships with their suppliers. A top purchasing manager at a major automaker described the relationship of buyers at his firm with presidents or other top management of their suppliers as covering everything from purchase of auto parts to setting of strategic direction, to solving that manager's personal problems.

Customers and suppliers are further tied together by a sense of appropriate customer behavior—a strongly held norm that customers simply do not just terminate a relationship with no grounds—and even if there are grounds for termination, except in the case of blatant violations of trust or quality problems suppliers must be given ample warning. In part, customers are careful about terminating relationships with suppliers out of fear for their reputation—the threat of being exposed for mistreating suppliers (Sako, 1992). Managers we interviewed echoed this concern about negative public perception if they did anything to threaten jobs—jobs of their own employees or jobs of their suppliers. A company that laid off its own employees, or caused a supplier to go out of business or downsize might be subject, they said, to picket by their or their supplier's union, to critical newspaper coverage, or even consumer boycott of their products. In one case, a purchasing manager mentioned to us fear that tax officials would pay them increased scrutiny if they were known for mistreating their suppliers.

In addition to this fear of sanctions, we noted in our interviews a strong sense of taken-for-grantedness in what is appropriate customer behavior towards suppliers. Purchasing managers described the lengths to which they went to keep their suppliers in business—from bringing them new products to manufacture, to finding them new customers, to

quietly merging them with other firms. In the event that there was no alternative but to terminate a relationship, a customer might give the supplier a year or even two years of notice, to allow it to prepare. Customers did this not only in fear of sanctions but because this was "they way things are done" in Japan, and it would not be right to do otherwise.

Another factor making these relationships difficult to break is the risk in starting new relationships. The kanban system, in which inventory is shaved to a minimum, means that a small problem with a supplier can have drastic repercussions throughout the system. This is combined with a general sense of risk-aversion and hesitance among managers to make any kind of radical decision, commented upon by many of our informants. The wrong decision to take on a new supplier could be a career-breaker, while cultivation of a successful new relationship has little upside in a system in which promotion and salary are based more upon age than achievement.

Two developments have jolted the auto industry from this inertia. The first is increased globalization, which is giving Japanese automakers a chance to experiment with new suppliers (often Japanese transplants), and to manufacture at great distance from their suppliers. While automakers have replicated many of their traditional supplier relationships in manufacturing ventures abroad, they have also established new linkages—with foreign suppliers and with Japanese suppliers with whom they had not, and perhaps even could not do business in Japan (Martin, Mitchell & Swaminathan, 1995). The most striking example of this is Nippondenso's relationships with Nissan abroad, even as it maintains the taboo against supplying to Nissan in Japan. Smooth functioning of these new relationships have helped to assure automakers that disaster will not ensue if they purchase from suppliers with whom they have not gone through the long ritual of developing trust through years of gradually increasing and more complex purchases (and years of golf games and holiday parties).

Experience in managing production far from headquarters has also caused automakers to rethink their supplier relationships. Japanese automakers, Toyota in particular, have long been cautious about expanding their manufacturing operations out of a concentrated area. By keeping parts suppliers and assembly plants in a limited area, auto firms could encourage supplier specialization and maintain constant cooperation. This pattern has been broken in overseas production: although many Japanese suppliers have followed Japanese automakers to the United States, they are often not located as close to the assembly plants as they are in Japan, and many critical parts are still shipped from Japan.

One of the more unexpected effects of the expansion of Japanese automakers into North American markets has been a move of a number of Japanese automakers to *terra incognita* in Japan—the island of Kyushu with its abundant labor and lower wages. Observers of the Japanese auto industry have argued that the experience of managing abroad has emboldened Japanese automakers to establish operations at the other end of the Japanese archipelago—far from their suppliers. Both Toyota and Nissan set up factories in Kyushu in 1992, and while a number of suppliers have followed them there, many other parts are being shipped from existing supplier plants in the region around their headquarters and main plants. The decision to source from local suppliers has been based upon transportation costs, rather than the need for cheek by jowl collaboration in design and manufacture (*Nikkei*, 1996).

Another factor facilitating changes in relationships between customers and suppliers is the general sense of crisis, fanned by the business press. There has been much "hand-wringing and rhetoric" as Hugh Patrick (1995) puts it about the breakdown of the Japanese system—in particular the breakdown of relationships between firms and employers and between firms and other firms. Dire articles about layoffs (often announced, but not actually followed through on), and accounts of small suppliers struggling to find a new livelihood in the newer, more competitive environment, are an almost daily occurrence. Interviews

with managers and analysts all suggest a new Japan, in which traditional relationships will not mean much. A typical example is a quote in the *Nikkei Sangyo Shimbun* of an auto industry analyst at the Mitsubishi Research Institute: "From now on, keiretsu membership won't matter—only [auto parts suppliers] that are internationally competitive will be selected." (*Nikkei Sangyo*, 1993).

Dire announcements of layoffs by companies are often not followed through on, or are implemented much more gently than the initial announcement would suggest, through reductions in hiring or *shukko* of employees to related firms. We found that often announcements of severance of customer supplier relationships were less drastic than announced, with customers decreasing purchases over a long period, or retaining a certain level of orders. Yet even announcements of changes not actually implemented have value—as symbols of the need for drastic change that many believe must occur if Japanese industry is to survive (Lincoln & Nakata, 1997). Such announcements report what is happening as well as what top management wish could happen—and in turn, facilitate the process of change. Managers and the public become inured to announcements of broken commitments, become convinced that relationships with suppliers must indeed become more arms-length, and are led to believe that everyone else is doing it. Slowly, the taken-for-granted nature of these commitments is eroding.

Despite the jolt to inertia in relationships caused by globalization, and despite a change in discourse on implicit contracts and customer obligations to suppliers, it remains very difficult to break long-standing relationships. Managers we interviewed showed considerable ambivalence about making once close relationships more arms-length or severing them entirely. Our visit to Nippondenso is a good example: during our conversations with Nippondenso about Toyota there was a sense that under the rhetoric of a new improved business-like relationship, we were talking to someone about their ex-

spouse after a particularly bitter divorce. Toyota went even further—giving us permission to visit the Hirose electronics factory only if we did not mention Nippondenso.

A purchasing manager described how his firm made the decision to terminate purchases of automatic transmissions from a long-standing supplier and bring manufacture in-house (and how, in fact, they were not entirely terminating the relationship): "Even though [the supplier] is a closer to [Toyota] than to us, it was tough to end the relationship. We have after all been a large chunk of their business. Our purchasing managers broke the news to them, and our top management went to explain it to them as well. We decided to cut orders slowly and even after cuts are made, will still purchase 10% of this type of transmission from them. Why? Because this is Japan. They have been supplying transmissions to us since we began to make passenger cars—and it is difficult to sever a relationship with so much history behind it."

Discussion and Conclusion

In this paper, we identified how fundamental changes in the technology and environment are affecting relationships between Japanese automakers and their suppliers. "Make or buy" was never quite an accurate description of how Japanese automakers made their purchasing decisions since such a large percentage of parts was purchased from suppliers that were neither wholly independent nor wholly internalized. Today, as changes in technology and expanding global and domestic opportunities have made some suppliers more powerful, and as standardization makes the need for high levels of specific investment less necessary in certain transactions, automakers are beginning to move transactions from networks—intense, cooperative relationships with closely linked, yet independent parts suppliers—to hierarchy on one hand, and markets on the other.

Though popular discourse often links change in the Japanese economy (and non-western economies in general) to sweeping changes in culture, changes in contracting patterns in the

auto industry are driven by changes in the characteristics of the transactions. Yet culture, and social and economic institutions particular to Japan play a role as well—in embedding these networks in a complex set of supports that make change very difficult. Perhaps contracting patterns never would have changed without serious shocks: globalization has provided an opportunity for automakers and suppliers to experiment with new patterns of relationships, and the pervasive sense of crisis and rhetoric about the breakdown of the Japanese system has caused managers and the general public to call into question some of the taken-for-granted patterns of relationships and obligations between firms and employees and firms and other firms.

We explored the first trend, a shift in the balance of power between customer and supplier, through case studies of Toyota and two of its suppliers. We argued that Toyota's response to Nippondenso's expertise in electronics and Daihatsu's global resources, was to take greater control over these transactions. It did so in two very different ways. In the case of electronics, it built internal capacity to lessen reliance upon Nippondenso, while in the case of Daihatsu, it internalized the entire firm through purchasing a controlling equity stake.

Our explanation diverges from the transaction cost interpretation often applied to the make-buy decision. We argue that power is a factor in these changing relationships. In the past, customers did not need to worry about supplier opportunism because customers were able to understand a supplier's technology, because suppliers were dependent upon their customers for resources, and because suppliers had few alternatives. Now that certain suppliers, such as Nippondenso, have expertise in technology that their customers do not understand, and due to this technological expertise, have automakers around the world seeking their business, problems of opportunism have arisen. Issues such as leakage of confidential information (one of Toyota's fears surrounding Nippondenso's collaboration with Chrysler on the Neon), concern about withholding of critical cost information in price

negotiations that have always been based upon an honest exchange of cost data, have surfaced.

The case studies examined here raise a number of questions that warrant further research. In its attempt to take control over transactions, Toyota took two very different routes—purchasing Daihatsu and bringing it closer, while, at the same time, developing internal capacity and driving Nippondenso further away. Why didn't Toyota just buy a controlling stake in Nippondenso? This may be due to Nippondenso's size—double Daihatsu's size in sales—and because the very strong performance of Nippondenso shares would make institutional investors hesitant to sell out to Toyota. The difference in Toyota's response may also be due to fundamental differences in transactions. In the case of Nippondenso, Toyota's objective was to decrease dependence upon Nippondenso in electronics, but at the same time, to maintain competition among parts suppliers. Toyota, as its managers explained to us, had to become Nippondenso's competitor itself. In the case of Daihatsu, what was at stake was access to markets. Perhaps Toyota felt that it could not make, or it was not worth making, the huge investment to develop connections in Asian markets and small car capability. More research is required to understand why Toyota took these two different approaches to increasing control over transactions.

We have used just two case studies, both involving Toyota, to illustrate the changing balance of power between customer and supplier. Toyota is distinct from other automakers in its enormous cash position (Toyota is jokingly known as “Bank of Toyota”). Toyota's supplier management practices are also distinct from others in the industry. Toyota introduced such innovations as the kanban system and appears to be the automaker with the most carefully designed program of supplier management. What researchers often refer to as “Japanese supply management practices” are often in reality, Toyota's supply management practices (Liker, Kamath, Wasti & Nagamachi, 1995). Toyota has the highest level of cooperation with suppliers, wraps its suppliers into the tightest web of equity,

banking, and personnel ties (Ahmadjian, 1995) and demands the highest levels of specific asset investments on the part of its suppliers (Dyer, 1996). Can we observe a more general pattern of customers taking control over transactions in which the balance of power has shifted in favor of suppliers? Further examination of other automakers is necessary.

The second factor that we identified as driving change in customer supplier relationships is standardization. We argued that greater use of parts that are interchangeable across models and automakers threatens to reduce the advantages in high levels of asset-specific investment on the part of suppliers. We also suggested a deeper-rooted reason for decreased advantage in supplier investment in specific assets. Supplier networks in the Japanese auto industry have facilitated learning. Supplier networks have helped leading automakers, in particular Toyota, to quickly diffuse organizational and manufacturing innovations—such as the kanban system and statistical quality control—to suppliers. Competition was in the form of competition between systems—the Toyota system, well integrated, and completely steeped in all of these innovations, versus the Nissan, Honda or other system. Today, Japanese auto parts suppliers have developed to the extent that diffusion of such innovations is no longer necessary. An automaker can be assured of a given level of quality, reliability, and expertise among most first tier suppliers, and the need for networks of dedicated suppliers that are able to learn from their customers has consequently decreased.

More research on how far standardization has really penetrated the auto industry is necessary. Further study of changes in the degree of diversification of suppliers and customers is also necessary. For example, we discussed Nissan's decision to purchase from Tokai Rika Denki, a close Toyota supplier. To what extent has the taboo against Toyota suppliers supplying to Nissan broken down above and beyond this and other well-publicized examples? Analysis of changing patterns of purchasing transactions across the auto industry is warranted.

In this paper, we have examined a trajectory of change rather its endpoint—although in reality, all research on organization is by necessity the study of trajectory, a set of snapshots in the midst of constant change. The unpredictable course of organizational evolution, especially in a highly uncertain, global economy, makes it nearly impossible to foresee where supplier networks will end up, a few years from now, let alone a few decades. Nevertheless, it is interesting, and perhaps even useful, to speculate through following the current trajectory to its logical end, and by looking for clues in other industries.

Taken to its extremes, the process on which Japanese automakers have embarked seems to threaten to take them back to US patterns discredited years ago. Excess vertical integration has long been a problem for GM—one they are having extreme difficulty shedding as recent labor unrest over outsourcing shows. Standardization across models, too, harks back to the dark days of the US auto industry in the 1970's and 1980's. Curiously, the pattern of turning back the clock to models of organization popular in the US years ago is reflected in other practices in other industries. A number of firms, in particular in the electronics industry, have introduced multi-divisional organization structures. The law against holding companies is about to be repealed—with the strong support of much of big business. Is Japan in the midst of another phase of borrowing from the west? If it is, it has chosen a peculiar set of practices to borrow. On the other hand, given the ability of Japan to take foreign concepts and turn them into something distinctly Japanese, and often more successful than their original incarnation (Shioji, 1994; Westney, 1987) perhaps we are seeing the beginnings of a new system of production.

Another source of clues as to where this process is heading lies in the electronics industry. The make-buy decision in the electronics industry has always been more stark than in the automobile industry, with electronics manufacturers producing more themselves and maintaining tighter control over fewer close affiliates, while at the same time procuring a

large percentage of inputs on an arms-length basis. Electronics manufacturers have had to face the problems of maturing products, cost pressure from the strong yen, and a "hollowing out" due to greater overseas production earlier than the auto industry, and have responded in many cases by making the contrast between close affiliate and arms-length supplier even starker. Matsushita, for example, is winnowing out suppliers—selecting a set of excellent suppliers and helping them to upgrade their production capabilities and technological knowledge—and requesting them to not share specialized knowledge with competitors (Lincoln, Ahmadjian, & Mason, 1996). Suppliers that do not make the cut are terminated, often in favor of foreign suppliers that can offer standard, generic products at more favorable prices.

Toyota offers a parallel in the auto industry. Toyota seems to have increased reliance on some of its extremely close affiliates—as we can see in its entrusting its semiconductor venture with Texas Instruments to Toyoda Automatic Loom Works, and bringing Daihatsu (albeit kicking and screaming) more closely into the fold, at the same time spinning away others—by turning relationships more arms length in the case of Nippondenso, and completely severing ties with other suppliers.

The decision to entrust this semiconductor joint venture to Toyoda Automatic Loom Works is interesting—since Toyota's relationship with Toyoda Automatic Loom Works is distinctively Japanese in flavor. Although Toyota only owns about 25% of Toyoda Automatic Loom Works' shares, the degree of reciprocal obligation between the two firms is the stuff of legend. Toyota Motors was originally a division of Toyoda Automatic Loom Works—a new-fangled technology spun off in 1937. As the auto industry grew and the textile industry shrank, Toyoda Automatic Loom Works began to take on the role of subsidiary to Toyota, manufacturing engines (a critical part that most automakers are loath to entrust to other firms) and assembling Toyota automobiles. Toyota's investment in semiconductors is a move away from one relationship, with Nippondenso, to another

relationship, with Toyota Automatic Loom Works—an independent firm, but one so tightly linked to Toyota through capital, personnel and shared history, that the danger of opportunistic behavior is low. The move away from Nippondenso to Toyota Automatic Loom Works suggests that Japanese types of relationship are far from dead—and that traditional supply relationships with a handful of close, trusted (and safely dependent) suppliers may persist.

A different direction for supply relationships is a move from lifetime relationships to collaboration with suppliers on projects with a limited temporal duration. This is more along the lines of networks in Silicon Valley—in which firms are not linked through life-long relationships, but come together to share specific skills and competencies and move apart when a project ends. We can imagine, for example, the relationship between Nippondenso and Toyota ending up on these terms, with the two firms collaborating on certain parts and models but not on others, and Toyota turning to NEC, Toshiba, or even Hitachi—rival Nissan's lead electronics firms—as the situation warrants. It will be interesting to see what sort of governance structures arise to manage these sort of intense, yet short term relationships.

Regardless where these relationships evolve, understanding how relationships between customers and suppliers are being reconfigured, and more generally, assessing how the organization of the Japanese economy is evolving, requires constant attention to the changing nature of specific transactions in specific industries. Sweeping statements that Japan is changing, that it is becoming more western, or following its own distinct path are of limited use. Rather, we must examine how such factors as globalization, changing technology, and changing markets are changing transactions—and how these changes, in the face of high levels of inertia, are changing relationships.

REFERENCES

- Ahmadjian, C. L. (1995). Power and Mutualism in Japanese Supply Networks. Unpublished doctoral dissertation, University of California at Berkeley.
- Ahmadjian, C. L. (1996). Japanese supply networks and the governance of interfirm exchange, presented at the Academy of Management 1996 annual meeting in Cincinnati.
- Anderson, P., & Tushman, M. L. (1990). Technological discontinuities and dominant designs: A cyclical model of technological change. Administrative Science Quarterly, 35, 604-633.
- Asanuma, B. (1989). Manufacturer-supplier relationships in Japan and the concept of relation-specific skill. Journal of the Japanese and International Economies, 3, 1-30.
- Dore, R. (1983). Goodwill and the spirit of market capitalism. The British Journal of Sociology, 34(3), 459-82.
- Dyer, J. H. (1996). Specialized networks as a source of competitive advantage: Evidence from the auto industry. Strategic Management Journal, 17, 271-291.
- Dyer, J. H., & Ouchi, W. G. (1993). Japanese-style partnerships: Giving companies a competitive edge. Sloan Management Review(Fall 1993), 51-63.
- Gabel, H. L. (1991). Competitive Strategies for Product Standards: The Strategic Use of Compatibility Standards for Competitive Advantage. New York: McGraw-Hill.
- Gluck, C. (1985). Japan's Modern Myths: Ideology in the Late Meiji Period. Princeton, NJ: Princeton University Press.

Gordon, A. (1985). The Evolution of Labor Relations in Japan. Cambridge, MA.: Harvard University Press.

Hodder, J. E., & Tschoegl, A. E. (1985). Some aspects of Japanese corporate finance. Journal of Financial and Quantitative Analysis, 20(2), 173-191.

Japan Fair Trade Commission [Kosei Torihiki Inikai] 1993. Jidosha Buhin Torihiki ni Kansuru Jittai Chosa [A Survey of Transactions of Auto Parts]. Tokyo: Kosei Torihiki Inikai.

Liker, J. K., Kamath, R. R., Wasti, S. N., & Nagamachi, M. (1995). Integrating suppliers into fast-cycle product development. In J. K. Liker, J. E. Ettl, & J. C. Campbell (Eds.), Engineered in Japan: Japanese Technology-management Practices, . New York: Oxford University Press.

Lincoln, J. R., Ahmadjian, C. L., & Mason, E. (1996). Organizational learning and purchase-supply networks in Japan: Hitachi, Matsushita, and Toyota compared. presented at JAIS Conference on "International Comparative Study of Knowledge Creation: Implications for Business Enterprises of the 21st Century" Honolulu, Hawaii, December 1996.

Lincoln, J. R., & Nakata, Y. (1997). The transformation of the Japanese employment system: Nature, depth, and origins. Work and Occupations 24 (February), 33-55.

Martin, X., Mitchell, W., & Swaminathan, A. (1995). Recreating and extending Japanese automobile buyer-supplier links in North America. Strategic Management Journal, 16, 589-619.

Nihon Keizai Shimbun [Japan Economic Journal], "Buhin Meka go Shudo, Fuji to Suzuki, Jidohensokki o kyotsuka" [With parts maker leading, Fuji and Suzuki standardize automatic transmission], 6/11/94, p. 10.

Nihon Keizai Shimbun [Japan Economic Journal], "Daihatsu Kogyo—Toyota ga Keieiken o shutoku" [Toyota Takes Control of Daihatsu] 10/16/95, morning edition, p. 45.

Nihon Keizai Shimbun [Japan Economic Journal], "Toyota-kei ni Nissan-kei ga Shusshi" [Nissan group member invests in Toyota group]. 12/21/95, p/ 13.

Nihon Keizai Shimbun, Chiho Keizaimen [Japan Economic Journal, Regional Economies Page], "Dai Sanbu Tenki no Kigyo Jyoka-machi (4)" [The Third Phase of The Industrial Castle-Town] 4/2/96, p. 14.

Nihon Keizai Shimbun [Japan Economic Journal], "Nissan, Denki Jidosha-yo no Denchi Chotatsu, Toyota-Matsushita-kei kara" [Nissan to procure batteries for electric car from Toyota Matsushita group] 10/16/96 p. 1.

Nikkei Kinyu Shimbun [Nikkei Financial News], "Buhin Kyotsuka" [Parts becoming interchangeable] 3/14/94, p. 18.

Nikkei Sangyo Shimbun [Nikkei Industry News], "Nissan, Toyota-kei kara Buhin Chotatsu" [Nissan procures parts from the Toyota Group]. 6/5/93, p. 1.

Nikkei Sangyo Shimbun [Nikkei Industry News], "Honda, Mitsubishi Jidosha ni Kikan Buhin" [Honda supplies major part to Mitsubishi Motors]. 11/30/93, p.1.

Nikkei Sangyo Shimbun [Nikkei Industry News], "Tsusansho, Kei Buhin Kyotsuka Risuto Kohyo" [MITI announces a list of light auto parts to be standardized] 6/1/94, p. 11.

Nikkei Sangyo Shimbun [Nikkei Industry News], "Hashiri o Sasaeru (7) Zuno to Naru Canabi" [Supporting Driving (7), Car Navigation, the Brains], 1/25/95, p.11

Nikkei Sangyo Shimbun [Nikkei Industry News], "Toyota, Daihatsu Keikei-ken Nigiru " [Toyota Takes Control of Daihatsu] 9/21/95, p. 1.

Nishiguchi, T. (1994). Strategic Industrial Sourcing: the Japanese Advantage. New York: Oxford University Press.

Odaka, K., Ono, K., & Adachi, F. (1988). The Automobile Industry in Japan: A Study of Ancillary Firm Development. Tokyo: Kinokuniya Company Ltd.

Ota, F., Nakanishi, H., Katsuya, K., & Otani, T. (1994). Jidosha no Erektoronikusuka to Bungyo Seisan Taisei no Henka [Electrification of Automobiles and Changes in the Specialized Production System]. MITI Research Institute [Tsususho Sangyo Kenkyusho].

Patrick, H. T. (1994). Comparisons, Contrasts and Implications. In H. T. Patrick & Y. C. Park (Eds.), The Financial Development of Japan, Korea, and Taiwan. New York: Oxford University Press.

Patrick, H. (1995). Crumbling or transforming? Japan's economic success and its postwar economic institutions. Center on Japanese Economy and Business, Columbia Business School, working paper no. 98.

Pfeffer, J., & Salancik, G. R. (1978). The External Control of Organizations: A Resource Dependence Perspective. New York: Harper and Row.

Sako, M. (1992). Prices, Quality and Trust. Cambridge: Cambridge University Press.

Seabright, M. A., Levinthal, D. A., & Fichman, M. (1992). Role of individual attachments in the dissolution of interorganizational relationships. Academy of Management Journal, 35(1), 122-160.

Shioji, H. (1994). Toyota shisutemu keisei katei no shotokushitsu [Some characteristics of the development process of the Toyota system]. Kyoto Daigaku Keizai Gakkai: Keizai Rongyo (Kyoto University Department of Economics), 154(6).

Shioji, H. (1995). "Itaku" automotive production: An aspect of the development of full-line and wide-selection production by Toyota in the 1960's. The Kyoto University Economic Review, LXV(1).

Smitka, M. J. (1991). Competitive Ties: Subcontracting in the Japanese Automotive Industry. New York: Columbia University Press.

van Wolferen, K. (1989). The Enigma of Japanese Power. London: Macmillan.

Watanabe, Y. (1985). Shitauke, keiretsu chusho kigyo [Subcontracting and keiretsu small and medium companies]. In K. Takizawa (Ed.), Nihon no Chusho Kigyo Kenkyu [Research on Japanese Small and Medium Companies] (Vol. 1,). Tokyo: Yuhikaku.

Westney, D. E. (1987). Imitation and Innovation: The transfer of Western Organizational Patterns to Meiji Japan. Cambridge, Massachusetts: Harvard University Press.

Williamson, O. E. (1985). The Economic Institutions of Capitalism. New York: The Free Press.

Wu, D. (1991). Nihon no seizogyo ne okeru kigyokan bungyo kankei ni kansuru kenkyu: Nihon no ote terebi meka to sono sapuraiya o jitsuretsu to shite [Research on organization of production in Japan: A case study of a large Japanese television manufacturer and its

suppliers]. Kyoto Daigaku Keizai Gakkai. [Kyoto University Economic Research Study Group].