

EFFECTIVE INTERFIRM COLLABORATION: HOW FIRMS MINIMIZE TRANSACTION COSTS AND MAXIMIZE TRANSACTION VALUE

JEFFREY H. DYER

The Wharton School, University of Pennsylvania, Philadelphia, Pennsylvania, U.S.A.

This study of automotive transaction relationships in the U.S.A. and Japan offers data which indicate that transaction costs do not necessarily increase with an increase in relation-specific investments. We empirically examine the conditions under which transactors can simultaneously achieve the twin benefits of high asset specificity and low transaction costs. This is possible because the different safeguards which can be employed to control opportunism have different set-up costs and result in different transaction costs over different time horizons. We examine in detail the practices of Japanese firms which result in effective interfirm collaboration. © 1997 by John Wiley & Sons, Ltd.

One of the objectives of transactors seeking joint maximization of profits should be to create conditions which allow them to achieve the joint maximization result of the zero transaction cost model (North, 1990: 107)

Economists have long recognized that 'resource owners increase productivity through cooperative specialization' (Alchian and Demsetz, 1972: 777). Indeed, the value chain in modern economies is characterized by interfirm specialization such that individual firms engage in a narrow range of activities that are embedded in a complex chain of input–output relations with other firms. Productivity gains in the value chain are possible when firms are willing to make transaction or relation-specific investments (Williamson, 1985; Perry, 1989).¹ Recent empirical work confirms that investments in relation-specific assets are

often correlated with superior performance (Parkhe, 1993; Dyer, 1996a).

However, increased specialization within a production network cannot be achieved without a cost. When transactors make investments in specialization, transaction costs arise because of the fear of opportunism. A central premise of transaction cost theory is that transaction costs increase as transactors make greater asset-specific investments. The standard reasoning is that as asset specificity increases, more complex governance structures (i.e., more complex contracts) are required to eliminate or attenuate costly bargaining over profits from specialized assets (Williamson, 1985). Thus, transaction costs are presumed to increase with an increase in asset specificity.

The standard empirical test of the markets and hierarchies paradigm has been to predict whether transactions are conducted within firm boundaries, or across firm boundaries, by the extent to which the transactors' assets are specialized. Most research to date has produced results that are consistent with the logic that asset specificity is greater for transactions within hierarchies than across markets (Monteverde and Teece, 1982; Masten, 1984; Walker and Weber, 1984). Thus,

Key words: suppliers; transaction costs; asset specificity; collaborative advantage

¹ I use the terms transaction and relation-specific investments interchangeably, though I typically use the term "relation-specific" assets to suggest a shift in attention from the transaction to the economic relationship as the unit of analysis (see Kogut, 1989).

we have generally accepted that transaction costs increase with increases in asset specificity. However, few studies have attempted to explicitly measure how market transaction costs change with a change in asset specificity. As Williamson (1985: 105) observed: 'A common characteristic of these studies is that direct measures of transaction costs are rarely attempted.'

In a recent study, Dyer (1996b) found that Japanese transactors (suppliers-automakers) made greater asset-specific investments than their U.S. counterparts and that these investments were correlated with superior performance. These results are not particularly surprising since various studies have suggested that Japanese suppliers and final assemblers have close relationships and are often part of a 'keiretsu' group (Asanuma, 1985; Nishiguchi, 1994). But what was particularly intriguing was that Japanese transactors incurred significantly *lower transactions costs*² than U.S. transactors, even though they had made greater asset-specific investments. Moreover, even within Japan (i.e., controlling for the institutional environment), the Japanese automaker with the more specialized supplier group (Toyota) had *lower* transaction costs than the Japanese automaker with the less specialized supplier group (Nissan). These findings appear to be inconsistent with transaction cost theory which proposes that transaction costs increase with an increase in transaction-specific investments (Williamson, 1985). Moreover, these findings are important because they suggest that *firms (production networks) can simultaneously achieve the twin benefits of high asset specificity and low transaction costs*—a condition that could be an important source of competitive advantage. Understanding *how* such a condition is achieved may provide important insights into effective interfirm collaboration.

This paper has two primary objectives. The first objective is to provide evidence that transaction costs do not necessarily increase with an increase in asset specificity. This is accomplished by reporting supplier group specialization and transaction costs for Toyota, Nissan, Chrysler,

GM, and Ford. Interestingly, the automaker with the least specialized supplier group (GM) had the highest transaction costs while the automaker with the most specialized supplier group (Toyota) had the lowest transaction costs. The second, and primary, objective is to explore why those results might have been obtained. To explain these findings, the paper offers five propositions which are developed from an exploratory study of 50 supplier-automaker transaction relationships in the U.S.A. and Japan and a mail survey of 156 suppliers. The exploratory study centered around the question: What increases (or decreases) the costs of transacting with suppliers (automakers)? The objective was to examine what actions taken by suppliers and automakers serve to increase or decrease transaction costs.

THEORETICAL BACKGROUND

Extant transaction cost economics (TCE) theory suggests that as transactors increase their investments in specialized assets, transaction costs increase because transactors must safeguard against the hazards of opportunism (Klein, Crawford, and Alchian, 1978; Williamson, 1985). As Williamson (1991a: 282) has argued, 'asset specificity increases the transaction costs of all forms of governance.' Transaction costs can be decomposed into four separate costs related to transacting: (1) search costs, (2) contracting costs, (3) monitoring costs, and (4) enforcement costs (Williamson, 1985; Hennart, 1993; North, 1990). *Search costs* include the costs of gathering information to identify and evaluate potential trading partners. *Contracting costs* refer to the costs associated with negotiating and writing an agreement. *Monitoring costs* refer to the costs associated with monitoring the agreement to ensure that each party fulfills the predetermined set of obligations. *Enforcement costs* refer to the costs associated with *ex post* bargaining and sanctioning a trading partner that does not perform according to the agreement.

Transaction costs increase when asset specificity increases due to opportunism (defined by Williamson, 1985, as 'self-interest seeking with guile'). Although investments in specialization boost productivity, the incentive to make transaction-specific investments is tempered by the fact that the more specialized a resource becomes,

² An automaker's transaction costs were operationalized as the total number of individuals employed in the procurement function divided by the dollar value of goods they procured. Transaction costs involve search, contracting, monitoring, and enforcement costs. Individuals involved in procurement are primarily representative of these costs.

the lower its value in alternative uses. The contingent value of a specialized resource exposes its owner to a greater risk of opportunism than the owner of a generalized resource (Klein, Crawford, and Alchian, 1978).

Types of safeguards or governance structures

To protect against the hazards of opportunism, transactors may employ a variety of safeguards or governance structures. The term 'safeguard' (or alternatively 'governance structure') as used here can be defined as a control mechanism which has the objective of bringing about the perception of fairness or equity among transactors. The purpose of safeguards is to provide, at minimum cost, the control and 'trust' that is necessary for transactors to believe that engaging in the exchange will make them better off (Williamson, 1985).

The most prominent safeguard employed in Western economies is the legal contract. A legal contract specifies the obligations of each party and allows a transactor to go to a third party (i.e., courts/state) to sanction an opportunistic trading partner. For simple transactions, when asset specificity is low, a classical contract is typically employed. The costs of writing a classical contract are relatively low since the entire obligations of each party are explicitly written 'within the four corners of the document' (Macneil, 1978). As asset specificity increases, transactors will attempt to write a more complex contract (i.e., a neoclassical contract) with contingency clauses which allow for equitable adjustment as market conditions change.³ In theory, and practice, writing such a contract is more costly than writing a classical contract (Macneil, 1978; Williamson, 1985). Thus, received theory predicts that as asset specificity increases, so does the full array of transaction costs (i.e., contracting, monitoring, and enforcement costs). As asset specificity increases above some threshold, the costs of contracting become prohibitive and transactors move to unified governance/hierarchy (Williamson, 1985).

³ The transactional dilemmas associated with specific assets increase when environmental uncertainty increases. The presence of some degree of uncertainty is assumed throughout this paper. Without uncertainty, even highly specialized assets may be protected contractually (Mahoney, 1992).

Although contracts are viewed as the primary means for safeguarding transactions in Western economies, alternative means have been offered by scholars from various fields. These are typically referred to as 'self-enforcing' agreements, 'private ordering', or 'trust' (Telser, 1980; Williamson, 1985; Sako, 1991). These self-enforcing agreements include informal safeguards such as: *relational or goodwill trust* (Dore, 1983; Bradach and Eccles, 1989; Sako, 1991) and *reputation* (Kreps and Wilson, 1982; Weigelt and Camerer, 1988), as well as formal safeguards such as *financial hostages* (Klein, 1980) and *specialized investment hostages* (Klein, 1980; Williamson, 1983).⁴ Thus, transactors have a variety of ways to protect against the hazards of opportunism.

The choice of safeguard influences transaction costs and value

There are costs associated with constructing a governance structure which we will refer to as governance 'set-up' costs. These are the costs incurred to create the safeguard which governs the ongoing relationship and typically include the costs associated with writing contracts, building personal trust, creating financial hostages, etc. One may consider governance set-up costs as a subset of the total transaction costs incurred in a trading relationship over time. For example, the costs of writing a contract may be viewed as a governance set-up cost, but also as a transaction cost (i.e., the contracting/bargaining portion of transaction costs). The important distinction that we want to make here is that governance set-up costs involve an initial, up-front investment which creates the safeguard, which in turn influences the ongoing transaction costs (i.e., bargaining, monitoring costs) in the exchange relationship.

To date, scholars have paid little attention to the relative costs of different safeguards. However, *different safeguards are likely to have different set-up costs and result in different transaction costs over different time horizons*. A longitudinal perspective towards transaction costs is required. Moreover, previous research has shown that the

⁴ Of course, asymmetric investments in specific assets do not reduce the probability of opportunism but in fact raise the potential for opportunistic behavior. Only *symmetric* investments in specialized assets will reduce the probability of opportunism.

choice and cost of a particular safeguard will vary depending upon the identity of the transactors and the transaction characteristics.⁵ Further, beyond cost minimization, Zajac and Olsen (1993) argue that transactors should be concerned with maximizing transaction value through value creation initiatives. The transactor's choice of governance structure influences the incentives of the transactors to engage in value creation behavior for 'noncontractibles' such as innovation, quality, and responsiveness. For example, in the auto industry the governance structure (i.e., degree of supplier-automaker trust) will influence whether or not the supplier willingly engages in value engineering or value analysis—initiatives designed to continuously lower the cost (and price) of the component but which occur after the vehicle model is introduced. Such initiatives require resources and effort on the part of the supplier that are not specifically called for in the contractual agreement. Further, the governance structure influences whether or not suppliers bring new ideas or new technology to a particular automaker. Suppliers are less willing to bring a new technology or design to an automaker employing arm's length/market governance if they believe the automaker will share it with their supplier competitors (in order to maintain competitive bidding).

To illustrate how the choice of safeguard influences transaction costs and incentives for value creation behavior, consider a hypothetical case in which I am a supplier of automotive components and a particular customer requests that I produce a customized part that requires investments in specialized tools. Let us consider four different transaction situations which result in four different governance strategies. In the first case, assume that the owner of the other firm is my brother. In this case, I agree to make the investment due to previously developed goodwill trust/social knowledge. I may trust him either because I know his 'type' (e.g., he is 'honest')

⁵ Recent empirical studies by game theorists using the prisoner's dilemma game (PDG) have demonstrated that opportunism varies depending upon the identity of the exchange partner (see Axelrod, 1984, for a description of the PDG). For example, one study found that husbands and wives made 100% cooperative (C) choices, compared with 65% for friends, and 22% for strangers (Argyle, 1991). Clearly, the identity of the exchange partner has an influence on whether one chooses to be opportunistic or cooperative.

and/or because I can impose social sanctions on him through our kinship network.⁶ This safeguard is available to me because of considerable prior investments in the relationship. Moreover, the *incremental* transaction costs associated with using this safeguard are minimal because the governance set-up costs have already been incurred. Thus, I choose to make the investment and we transact while incurring very low transaction costs. The safeguard employed in this case (goodwill trust) may be effective for an indefinite duration. Further, I am willing to make efforts at value creation beyond the original agreement because I am confident that the resulting gains will be fairly shared.

When contemplating the same transaction with a graduate school classmate, I may not have enough 'goodwill trust' (enough social knowledge to assess his 'type' or to know if he will respond to social sanctions) to protect my investment. Thus, I may choose to incur additional governance set-up costs in the form of a legal contract. In this situation I rely on both social as well as legal sanctions to control opportunism. Of course, the contract is of finite duration and will need to be rewritten when it expires, thereby resulting in additional transaction costs.

When contemplating the same transaction with a complete stranger, I may be unwilling to rely on a contract to protect my investment. Consequently, I may require that the buying firm purchase the specialized assets and allow me to use them. This solution is also likely to involve a contract which specifies ownership of the assets as well as how I am to use the assets. Moreover, the buyer must incur additional monitoring costs to ensure that I am not abusing the assets. Thus, governance set-up costs and ongoing transaction costs again increase relative to the previous cases. Further, I am relatively unwilling to make efforts at value creation 'beyond the contract' due to uncertainty regarding whether or not I will be fairly rewarded. Of course, a final solution would be for one of the transactors to vertically integrate, thereby bringing the specialized assets

⁶ Of course, I may refuse to make the investment because I know my brother's 'type' (i.e., he is not honest) and/or I know that he would not respond to social sanctions. The key is that my long history of direct interactions with him (i.e., my social knowledge) assists me in choosing an appropriate/efficient safeguard (Sohn, 1994).

under common ownership to mitigate the bargaining problem.

In each of these hypothetical cases the degree of asset specificity did not change, but the choice and cost of the safeguard, as well as the ensuing transaction costs, did change. Thus, we observe that even in situations where the level of asset specificity between transactors is identical, the transaction costs may differ. The point is that *while transaction costs may increase with asset specificity, they will also vary independently of asset specificity.* Further, the transactors' choice of governance will influence not only transaction costs but also the incentives to engage in value creation initiatives. Williamson (1985: xiii) has argued that the central problem of economic organization is to 'devise contract and governance structures that have the purpose and effect of economizing on bounded rationality while simultaneously safeguarding transactions against the hazards of opportunism.' Due to differences in history, preferences, institutional environment, etc., transactors will employ different strategies with regard to both the level of asset specificity as well as the choice of safeguard.

THE PUZZLE: HIGH ASSET SPECIFICITY AND LOW TRANSACTION COSTS

To examine the relationship between asset specificity and transaction costs, we studied transaction relationships in the auto industry. The objectives were (1) to assess the extent to which an automaker's supplier group was specialized to that particular automaker, and (2) to measure each automaker's transaction costs associated with procuring parts from those suppliers. Following is a brief description of the research methods and results of this study (see Dyer, 1996a, 1996b, for a more complete description of the research methods and measures).

Sample and data collection

The sample consisted of two Japanese automakers (Nissan and Toyota), all three U.S. automakers, and a sample of their suppliers. The unit of analysis was the supplier-automaker relationship. Each automaker purchasing department general manager selected a sample of 50 domestic sup-

plier relationships which were representative of their supply base.

A survey was then mailed to the supplier executive identified by the automaker purchasing department as most responsible for managing the day-to-day relationship. Usable responses were received from 36 Nissan suppliers (72% response rate), 38 Toyota suppliers (76% response rate), 31 Ford suppliers (62% response rate), 24 General Motors suppliers (48% response rate) and 23 Chrysler suppliers (46% response rate). In addition, the purchasing agent at the automaker most responsible for the supplier relationship was asked to complete a survey to provide the automaker perspective. Usable surveys were received from purchasing agents for 192 of the 250 suppliers.⁷ On objective questions (e.g., distance between the supplier and automaker plant), suppliers and purchasing agents were asked the same question. In these instances, purchasing agent responses were used only if the supplier did not respond. Consequently, for some questions the response rate was as high as 48 out of 50 for a particular automaker.

Operational measures

Williamson (1985) identified site, physical, and human asset specificity as distinct types of transaction-specific investments. Operation measures of each were included in this study. In addition, we attempted to measure the 'transaction costs' incurred by the automaker in managing transactions with outside suppliers (see Table 1 for a description of the asset specificity and transaction cost operational measures). Automaker transaction costs were measured as the total number of individuals employed in procurement for production parts (including management, purchasing agents/buyers, lawyers, and support staff) divided by the total value of goods they procured in 1991. This is expressed as the dollar value of goods (parts) purchased per procurement employee. We believe this is a reasonably accurate measure of the relative transaction costs incurred by automakers because the procurement staff (including lawyers) (a) is completely responsible for searching for new suppliers, (b)

⁷ One U.S. automaker limited its participation in this part of the study and did not have purchasing agents fill out a survey for its 50 suppliers.

Table 1. Summary of asset specificity and transaction costs operational measures

Variables	Description
<i>Asset specificity</i>	
1. Site specificity	The distance in miles between the supplier plant producing the highest dollar volume component and the automaker's small and mid-size model plants to which it delivers
2. Physical asset specificity	Percent of supplier's total capital equipment investment which is not redeployable to other customers (estimated by supplier respondents)
3. Human specificity: face-to-face contact	Total annual 'man days' of face-to-face contact between supplier salesmen and engineers and automaker purchasing personnel and engineers.
<i>Transaction costs</i>	
Procurement costs	The total number of individuals employed in procurement for production parts (including management, purchasing agents/buyers, lawyers, and support staff) divided by the total dollar value of goods they procured. This is expressed as the dollar value of goods (parts) purchased per procurement employee

is completely responsible for contracting with suppliers, (c) is primarily responsible for gathering information from the other operational units to create an overall evaluation (monitoring) of performance (though procurement does not actually do all of the monitoring), and (d) is primarily responsible for enforcing performance (i.e., the lawyers will take the legal actions necessary to ensure contract fulfillment). Thus, we believe our measure is a reasonable proxy for the relative transaction costs incurred by automakers.

Data analysis

The unit of analysis was the supplier-automaker relationship. One-tailed *t*-tests were used to test for differences in supplier-automaker asset specificity. For example, the site specificity (plant distance) supplier group mean for Toyota's suppliers was compared to the site specificity supplier group mean for each of the other automakers.

Results

The results presented in Table 2 indicate that not only were the Japanese transaction relationships characterized by higher asset specificity than their U.S. counterparts, but they also had lower transaction costs. Toyota and Nissan's suppliers were more specialized on all three measures of asset specialization. Their plants were significantly closer (greater site specificity), they had a higher percentage of capital investments which were not redeployable to other customers (greater absolute

physical asset specificity), and they had more face-to-face contact and more guest engineers (greater human specificity). Interestingly, Toyota's suppliers were significantly more specialized than were Nissan's on both the site and human specificity measures. Furthermore, we found that U.S. automakers, and in particular General Motors, had higher transaction costs than did Japanese automakers. The purchased volume of goods per person was only \$1.6 million for GM, while it was \$5.3 million for Ford, \$5.7 million for Chrysler, and \$9.7 and \$12.6 million for Nissan and Toyota respectively. This analysis suggests that Chrysler and Ford incur roughly twice the transaction costs procuring parts as Japanese automakers, while GM's transaction costs are six to eight times higher. These differences exist despite that fact that transaction-specific investments are considerably lower for the U.S. automotive transactors. Furthermore, even though Toyota's supplier group was more specialized than Nissan's, Toyota's transaction costs were roughly 20% lower than Nissan's.

These findings can be interpreted as being either consistent or inconsistent with extant transaction cost theory, depending on one's point of view. On the one hand, according to received theory, a pair of transactors who employ general-purpose assets in the exchange relationship should incur lower transaction costs than competing transactors who choose to make transaction-specific investments. Recall that Williamson (1991a: 282) has argued that 'asset specificity increases the transaction costs of all forms of governance.'

Table 2. Sample means on asset specificity and transaction cost variables (by automaker)

Variable	Chrysler	Ford	GM	Nissan	Toyota
<i>Site specificity:</i> Distance between manufacturing plants (miles)	543.9	508.8	427.0	113.9†	59.2**
<i>Physical specificity:</i> Percent of capital equipment which is not redeployable	18.1%	19.5%	13.6%**	21.4%†	21.2%†
<i>Human specificity:</i> Annual 'man days' of face-to-face contact	756.9	1206.2	1106.9	3344.2†	7235.8**
<i>Automaker transaction costs:</i> Dollar value of goods procured per procurement employee	\$5.7m***	\$5.3m	\$1.6m	\$9.6m	\$12.6m

Tests of group differences are one-tailed *t*-tests assuming unequal variances.

**Significantly lower/higher than all other automakers ($p < 0.01$).

†Significantly lower/higher than all U.S. automakers only ($p < 0.01$).

*Significantly lower/higher than other U.S. automakers only ($p < 0.01$).

***m indicates millions of dollars.

Our data show that in the auto industry this relationship does not seem to hold. However, one can argue that the relationship between asset specificity and transaction costs will only hold if environmental and other factors are held constant. Variables such as the legal and institutional environment (i.e., culture) can influence opportunism and the nature of controls and safeguards employed. Thus, one might simply argue that we would expect asset specificity to be higher, and transaction costs lower, in Japanese supply relations because the environment is different. The Japanese institutional environment may reduce the prevalence of opportunism due to informal constraints (Dore, 1983). Williamson (1985) would view the environment as a shift parameter which must be held constant for empirical work to be valid. Further, one can argue that Japanese transactors have simply chosen more efficient safeguards than U.S. transactors, and thus minimized transaction costs by more effectively aligning transactions with governance structures. Thus, the findings can be interpreted as being consistent with transaction cost theory.

However, the fact that GM (which employs an arm's length strategy with suppliers) and Chrysler (which is now employing a partnership approach with suppliers) operate in the identical institutional environment and yet have dramatically

different transaction costs suggests that differences in the institutional environment cannot solely explain these differences in transaction costs. It seems possible that Williamson (1985) may have significantly underestimated the long-term search and contracting costs associated with managing arm's length market transactions. But regardless of whether these findings are interpreted as consistent or inconsistent with received theory, an examination of why these results were obtained is warranted.

AN EXPLORATORY STUDY: BACKGROUND AND METHOD

The findings from this study were the catalyst for an exploratory study designed to understand why these results might have been obtained. However, before describing the findings of the exploratory phase of the study it is important to note that differences in procurement costs across automakers may be driven by a number of factors. In particular, two factors which we would expect to influence procurement costs are (1) automaker size (volume) and (2) the number and complexity of models produced. For example, larger automakers should enjoy economies of scale in managing suppliers, thereby resulting in fewer personnel in procurement (per dollar of goods procured).

However, although GM is the largest automaker, it had the highest transaction costs. Moreover, Ford and Toyota are similar in size and yet their procurement costs differ markedly. Although there is likely to be a size effect, it does not appear to be a major explanatory variable.

A second possible reason for transaction cost differences might be due to differences in the number of models produced and the complexity of the models. For example, if GM produces more models (per dollar of sales) with more different types of components (i.e., perhaps due to a differentiation strategy) then we might expect more individuals required in procurement to manage that complexity. However, studies by Clark and Fujimoto (1991) and Nishiguchi (1994) suggest that Japanese automakers have developed more models (per million dollars of sales) than their U.S. counterparts. Moreover, Japanese suppliers are more likely than U.S. suppliers to develop unique parts for their customers.⁸ Thus, if we were to make a prediction based on component complexity/customization, these studies suggest that Japanese automaker transaction costs should be higher than U.S. automaker transaction costs.

A third possible reason for transaction cost differences (i.e., between GM and other automakers) may be that GM has chosen a market power strategy and is using a large procurement staff to pit a large number of suppliers against each other so that GM gets its inputs at the very lowest price. Thus, GM may be trading off higher transaction costs for lower cost inputs, thereby lowering GM's production costs. This, of course, could be a viable (and not necessarily ineffective) strategy. However, every piece of research evidence from the auto industry to date indicates that GM does *not* get lower input prices from suppliers. For example, Cusumano and Takeishi (1991) found that the input prices for Japanese automakers were lower than those received by U.S. automakers. Moreover, the input prices were also declining faster for the Japanese automakers

⁸ Clark and Fujimoto (1991) found that 38% of U.S. automaker parts were 'off the shelf' parts, while only 18% of Japanese automaker parts were 'off the shelf.' Similarly, Nishiguchi (1993) found that when a U.S. supplier develops a component for a U.S. customer, the same auto component is fitted into 8.3 car models. In contrast, Japanese suppliers sell the identical part for only 5.7 models, indicating higher customization of Japanese auto parts for car models.

than the U.S. automakers. This held true even when the Japanese transplants used U.S. suppliers.

Furthermore, Dyer (1996a) found that between 1982 and 1992 GM, and a sample of its suppliers, were less profitable than Toyota, Nissan, Chrysler, and Ford and their suppliers. GM's pretax return on assets (ROA) was 2.8% while Toyota's was 13.0%. Further, GM's suppliers' ROA was 4.8% while Toyota's suppliers' was 7.1%. Again, if GM's strategy of obtaining lower input prices was successful, we might expect it to have some positive effect on GM's profits since purchased inputs represent a high percent of the value of any automaker's vehicle. Although it is possible in theory that GM is trading off higher transaction costs for lower input prices, in practice this does not seem to be the case.

In summary, many of the factors (i.e., size and complexity) which we might expect to explain transaction cost differences among automakers did not offer compelling explanations for these variances. Thus, other factors within Japanese transaction relationships must explain how they simultaneously achieve high asset specificity and low transaction costs.⁹

Data collection

To understand why Toyota and Nissan had lower transaction costs than their U.S. counterparts (as well as why GM had higher transaction costs than Ford or Chrysler), we conducted exploratory interviews with both the suppliers and automakers. We conducted semistructured interviews with each automaker's general manager of procurement as well as at least two other executives/purchasing agents from each automaker. In addition, we interviewed sales and engineering vice presidents at 50 suppliers (20 Japanese and 30 U.S.

⁹ There may be two additional reasons, which we could not control for, that U.S. firms (in particular GM) might have lower procurement productivity. One is that GM may have been too divisionalized. Until 1992 GM's purchasing was decentralized into a number of divisions. Since procurement incurs fixed costs, separating the firm into many separate divisions may have created duplication of purchasing resources. Our data were collected shortly after purchasing was centralized. Second, since productivity is also a function of the degree of effective competition, the collusive behavior of U.S. automakers joined to erect trade barriers against their Japanese competitors may have increased the degree of slack among U.S. automakers, thereby influencing procurement productivity.

suppliers). Interviews were typically 2 hours in length. The purpose of the interviews was to explore the actions of the transactors that resulted in an increase or decrease in the costs of transacting, namely search, contracting, monitoring, and enforcement costs (see Appendix 1 for interview questions).

Data analysis

We coded the interview transcripts using constant comparative analysis in which each comment or event was assigned to an emergent open coding scheme (Glaser and Strauss, 1967; Strauss and Corbin, 1990). Open coding is the process of naming and categorizing of phenomena. During open coding, the data are broken down into discrete concepts and compared for similarities and differences. This produced 21 initial codes of actions/behaviors that influenced transaction costs. These were subsequently reduced into five increasingly abstract categories through axial coding (Strauss and Corbin, 1990). Although open coding fractures the data and allows one to identify numerous discrete concepts and their properties, axial coding puts these data back together in new ways by making connections between subcategories and combining them into categories. This is done by utilizing a coding paradigm involving conditions, context, action/interactional strategies, and consequences (Strauss and Corbin, 1990: 60–115).

Validity

We used the processes involved in the constant comparative method as internal checks on the validity of the data. The process is described well by Browning, Beyer, and Shetler (1995: 121):

As the research proceeds and new data are collected, they are constantly being compared to prior data in terms of categories and hypotheses. When new data yield new or inconsistent information, conceptual categories and the emerging theory are modified to take them into account. This process is repeated until theoretical saturation is reached: until no new categories are emerging and no new information inconsistent with the categories and tentative hypotheses is being generated (Glaser and Strauss, 1967; Strauss and Corbin, 1990).

In qualitative research, the primary checks on

validity are among informants and between informants and archival sources. Only data that were consistent across informants and sources are reported here. However, to further verify the accuracy of our analysis and interpretations, we conducted a second phase of research which involved collecting additional data from a larger sample of suppliers. We developed a follow-up survey based on the exploratory interviews and sent it to the original 250 suppliers. Responses were received from 118 (55 Japanese and 63 U.S.) suppliers and these data are used to validate the propositions developed during the exploratory interviews. In the survey we operationalized the various safeguards described in the first section to determine which safeguards were most widely used by suppliers–automakers in each country (see survey questions in Appendix 2). The data from the interviews and surveys are the basis for the propositions regarding how Japanese automotive transactors simultaneously achieve higher asset specificity and lower transaction costs than their U.S. counterparts (see Table 3 for a summary of data sources).

RESULTS: WHY JAPANESE TRANSACTORS HAVE LOW TRANSACTION COSTS

Through our interviews we identified five separate, but interrelated, propositions to explain the differences in transaction costs among automakers. For simplicity in developing the propositions, the remainder of the paper focuses primarily on comparing Japanese transactors (Toyota and Nissan) and U.S. transactors (GM, Ford, and Chrysler). However, the propositions also serve to explain differences between GM and Ford/Chrysler.¹⁰ We argue that Japanese automakers have lower transaction costs than their U.S. counterparts primarily due to:

1. repeated transactions with a small set of suppliers;
2. economies of scale and scope in transacting with that small supplier group (high volume of exchange between transactors);

¹⁰ This is true with the exception of Proposition 2, which does not hold for the U.S. automakers.

Table 3. Summary of interview and survey participants

Interview group	No. of companies	No. of interviewees	Total interview hours
U.S. automakers	3	12	28 h
Japanese automakers	2	8	19 h
U.S. suppliers	30	61	62 h
Japanese suppliers	20	41	44 h

Survey group	No. of companies	No. of companies responding	Response rate
U.S. suppliers	150	63	44%
Japanese suppliers	100	55	55%

3. extensive interfirm information sharing which reduces asymmetric information;
4. the use of noncontractual, self-enforcing safeguards (i.e., goodwill trust) which are effective for an indefinite time horizon (as opposed to contracts which are effective for a finite time horizon); and
5. investments in cospecialized assets.

The theoretical, and preliminary empirical, support for these propositions is offered below.

Repeated transactions with a small supplier group

Japanese automakers work with a much smaller group of suppliers than U.S. automakers and engage in repeated exchange with those suppliers (see Table 4). Our interviews suggest that repeatedly working with fewer suppliers results in low transaction costs for three primary reasons. First, empirically we found that Japanese suppliers re-win the business at a car model change over 90% of the time compared to Chrysler and Ford at roughly 79%, and GM at 52%. By making the transaction a repeated game, Japanese automakers increase the cost of defection/opportunism on the part of the supplier.¹¹ The cost of losing the

business is greater for suppliers with: (1) a higher volume of exchange with the automaker, and (2) the expectation of a long-term relationship. As one Japanese supplier executive observed, 'For us to try to take advantage of Toyota would be very short-sighted. We have too much business with them to risk such a foolish action' (author interview, 1992). Thus, the cost of opportunism is higher for the typical Japanese supplier than for the typical U.S. supplier. The creation of a high-volume, repeated game increases the 'incentive compatibility' of the transactors.

Second, a 'repeated game' allows for more opportunities in the future to correct for transaction inequities, thereby reducing bargaining costs. More than 75% of the Japanese suppliers interviewed indicated that they knew that if an inequity emerged in the current set of transactions, it would be 'remembered' and corrected in the future. The majority of U.S. suppliers indicated that inequities were rarely, if ever, remembered by the automakers. Japanese transactors are much more likely to rely on a 'social memory' which is created through repeated interactions. This memory allows Japanese transactors to achieve 'serial equity' (equity over a longer period of time) rather than requiring immediate or 'spot equity' (Ouchi, 1984). Thus, it reduces the need for transactors to invest heavily in bargaining over profits from the current set of transactions.

¹¹ The logic for how repeated games result in more cooperative behavior is well documented in the game theory literature (Axelrod, 1984; Parkhe, 1993). The prospect of continuing interaction alters the pay-off structure and increases the cost of 'defection.' Thus, the future casts a 'shadow' back upon the present, affecting current behavior patterns. Cooperation is promoted by the establishment of a direct connection

between a transactor's present actions and anticipated future benefits.

Table 4. Sample characteristics of supplier–automaker relationships (by automaker)

Variable	Chrysler	Ford	GM	Nissan	Toyota
Average number of suppliers ^a	2033	2033	2033	303	303
Percent of time the supplier re-wins the part business at a model change	78%	80%	52%**	90%†	92%†
Percent of time the automaker rebids the part before a model change	21.1%	20.7%	67%**	4.7%†	4.0%†
Annual dollar volume of parts exchanged	\$100.9m***	\$111.7m	\$237.1m*	\$346.8m†	\$687.2m**
Average number of different types of parts exchanged (different part numbers)	136	226	274	1613†	2379**

^aFor confidentiality reasons the number of suppliers reported for each automaker is the nation (U.S./Japan) average (i.e., 2033 is the average number of suppliers for Chrysler, Ford and GM).

Tests of group differences are one-tailed *t*-tests assuming unequal variances.

**Significantly lower/higher than all other automakers ($p < 0.01$).

†Significantly lower/higher than all U.S. automakers only ($p < 0.01$).

*Significantly lower/higher than other U.S. automakers only ($p < 0.01$).

***m indicates millions of dollars.

Proposition 1: The higher the probability of repeated exchange, the lower the transaction costs per unit of exchange.

Economies of scale and scope in transacting

On average, Japanese suppliers sell much larger volumes of goods to automakers than do U.S. suppliers (see Table 4). The fact that Japanese suppliers sell large volumes of product, as well as multiple products (i.e., part numbers), to the automaker reduces transaction costs in two ways. First, the costs of sharing information go down as a percentage of the value of goods exchanged due to economies of scale in transacting. The automaker typically must collect much of the same information from the supplier (on management, finances, production processes, etc.) whether the automaker is buying \$5 million or \$500 million of parts from the supplier. The larger the absolute volume of goods exchanged, the lower the transaction costs per unit of exchange. Just as scale economies lead to lower per unit production costs, economies of scale associated with increasing the volume of exchanges with a given transactor leads to lower per unit costs associated with completing the transaction.

Second, *ex ante* and *ex post* bargaining costs are reduced because economies of scale and scope in transacting provide many more options for correcting transaction inequities. For example, when suppliers bid on the business for a particular component, they receive a projected unit volume from the automaker on which they base their costs and prices. Of course, this unit volume is an estimate but the supplier must make the investments in plant, tooling, manpower, etc. in order to be able to produce the projected unit volume. Automakers verify this investment before production to ensure that all suppliers have the ability to produce the parts they expect they will need. Of course, in most cases the estimate is incorrect—in some cases too high and in some cases too low. However, according to both suppliers and automakers, the estimate is much more likely to be too high than too low.¹² In the case of a particularly inaccurate estimate, it is impossible for the supplier to fully recoup its investments because the assets dedicated to production are not fully utilized (the supplier's unit price to the automaker was based on a unit

¹² Suppliers indicated that U.S. automakers' estimates were typically 20–30% too high while Japanese automaker estimates were more likely to be within 5–10% of actual volume.

volume that did not materialize). The supplier can respond to this dilemma in a number of ways. First, the supplier can simply ask for a higher price *ex ante* which reflects the risk involved.¹³ Second, the supplier can insist on a more complex, contingent claims contract to protect its interests and specify damages in the event that the estimated unit volume does not materialize. Or finally, the supplier can go back to the automaker *ex post* and ask for some type of compensation.

When a supplier is only transacting with the automaker on a small number of components (as in the U.S.), these responses—which result in high transaction costs—are the only ones available to the supplier. However, because Japanese suppliers typically sell multiple components for multiple car models, *ex ante* precision is less important, and *ex post* bargaining is less problematic. Japanese suppliers claimed that if the actual unit volume for a particular model was lower than expected, they typically did not worry about it because they were usually selling a component on another model where the estimate was low. Thus, according to numerous Japanese supplier executives, ‘the high and low estimates tend to cancel each other out.’ In situations where the automaker estimates were particularly inaccurate and the supplier had made large investments that could not be recouped, rather than engage in expensive haggling on that particular component, the supplier simply asked for additional business on existing or upcoming models, perhaps at a more favorable price. Consequently, Japanese transactors spend less time on *ex ante* contracting and *ex post* bargaining. Economies of scale and scope in the transaction relationship lower transaction costs by providing more options to correct for transaction inequities.

Proposition 2: The greater the total volume of exchange between transactors, the lower the transaction costs per unit of exchange.

¹³ In practice, in a bidding situation it is virtually impossible for suppliers to add in a risk premium and still win the business. Most suppliers claim that they price based on the automaker’s estimated volume and hope they will find other ways to make up the shortfall if the estimated volume does not materialize.

Substantial information sharing

Japanese automotive transactors share more information than their U.S. counterparts, thereby reducing information asymmetry as well as the potential for opportunism (see Table 5). This in turn reduces transaction costs. The link between information sharing and transaction costs is straightforward. In neoclassical economics, transaction costs are assumed to be zero because transactors have perfect information. Information asymmetry is necessary in order for transactors to behave opportunistically. As North (1990: 108) observes, ‘the costs of transacting arise because information is costly’ and ‘asymmetrically held by the parties to the exchange.’ In a transaction world of perfect information, transaction costs are negligible.

The transaction world of Japanese automakers more closely approximates a world of perfect information. Japanese suppliers and automakers share a tremendous amount of information on their costs, methods of production, technology, and so forth. This reduces the ability of transactors to behave opportunistically by concealing relevant information (Akerlof, 1970; North, 1990). The comment of a Japanese supplier executive illustrates this point. When asked why his company does not try to build additional profit into the cost estimates that they provide to Nissan, he answered as follows:

It would be virtually impossible for us to get away with inaccurate cost estimates. Nissan has much data; they have very good information on our operations and they can analyze our cost position. They can visit our plants and gather information. They know us and our operations so well, they would surely discover it. Moreover, they have at least one other supplier that competes with us and they have detailed information to compare us. We can hide nothing (author interview, 8 August 1992)

Over 90% of the Japanese suppliers we interviewed answered this question in a similar manner. Indeed, the supplier selection process is such that Japanese automakers ‘screen’ for suppliers who are willing to share information. Suppliers who are unwilling to share information are effectively screened out.¹⁴ This point is highlighted by

¹⁴ Procurement managers at both Japanese automakers indicated that they screen for suppliers who are willing to share information; suppliers who are unwilling to share information

Table 5. Measures of information sharing (by automaker)

Variable	Chrysler	Ford	GM	Nissan	Toyota
Trust automaker with confidential information	4.3*	3.6	2.6**	5.4†	6.1**
Share detailed information on cost structure	4.1	4.5	4.0	5.3†	4.9†
Share information to assist supplier with cost reduction	2.0	2.0	2.1	3.3†	3.3†
Share information to assist supplier with quality improvement	3.1	3.7*	2.2**	3.5*	3.7*
Share information to assist supplier with delivery/inventory management	2.5	2.2	1.9	2.8	3.8**

Note: Answers are on a 1–7 Likert scale; 1 = Not at all, 4 = To some extent, 7 = To a very great extent. Tests of group differences are one-tailed *t*-tests assuming unequal variances.

**Significantly lower/higher than all other automakers ($p < 0.01$).

†Significantly lower/higher than all U.S. automakers only ($p < 0.01$).

*Significantly lower/higher than other U.S. automakers only ($p < 0.01$).

the business strategy manager of a GM component division.

I probably shouldn't admit this but we actually share more information with Toyota than we do with our internal assembly divisions. Why do we share more with them? Because they demand it. That's just the way they do business. If we didn't give them the information they wanted, they would not do business with us (author interview, September 1992)

Japanese automakers demand significant cost, quality, and production information from suppliers for two reasons. First, a supplier's willingness to share information is viewed as a signal of the trustworthiness of the supplier. Second, they do not take for granted that the supplier can perform as promised. Thus, they want to verify the capabilities of the supplier. This high degree of information sharing reduces information asymmetries, thereby reducing contracting and monitoring costs because both parties are negotiating with similar information.

Proposition 3: The greater the degree of information sharing between transactors, the

are not viewed as being trustworthy and therefore are eliminated from consideration.

lower the information asymmetries and the lower the transaction costs.

Use of self-enforcing vs. contractual safeguards

Japanese automotive transactors do not control opportunism through legal contracts but instead rely on self-enforcing safeguards such as relational trust and financial hostages (stock ownership). These safeguards presumably have high initial 'set-up' costs but once in place they have relatively low maintenance costs.¹⁵

Our supplier survey found that Japanese automakers, notably Toyota, have been more effective than U.S. automakers at getting suppliers to trust them (see Table 6). Japanese suppliers indicate that they are more likely to trust Japanese automakers to treat them fairly.¹⁶ Further, Japanese

¹⁵ We cannot empirically examine whether the set-up costs are higher, but theory and some empirical evidence suggest they would be (Sako, 1992).

¹⁶ Extensive face-to-face interactions between supplier and automaker tended to personalize the exchange which increased goodwill trust (Sako, 1991). Japanese procurement personnel indicated that long-term friendships and loyalty were factors which prevented them from taking advantage of suppliers. U.S. purchasing personnel were much less likely to mention friendships and loyalty as reasons for cooperating with suppliers.

Table 6. Measures of self-enforcing safeguards (by automaker)

Variable	Chrysler	Ford	GM	Nissan	Toyota
<i>Trust:</i> Trust automaker to treat you fairly	5.4	5.0	3.2**	6.1†	6.4†
If given the chance, automaker might try to take unfair advantage of supplier	2.9	3.6	5.4**	1.8	1.4**
<i>Reputation:</i> Automaker has a reputation for fairness among supplier community	5.2	4.8	2.8**	5.7†	6.3**
<i>Financial hostages:</i> Percent of supplier stock owned by the automaker	0%	0%	0%	12.5%†	8.9%†

Note: Answers are on a 1–7 Likert scale; 1 = Not at all, 4 = To some extent, 7 = To a very great extent. Tests of group differences are one-tailed *t*-tests assuming unequal variances.
 **Significantly lower/higher than all other automakers ($p < 0.01$).
 †Significantly lower/higher than all U.S. automakers only ($p < 0.01$).

suppliers were more willing to make investments based upon the oral promises of the automaker, without a written contract. Interestingly, GM was significantly less likely to have fostered trust than Chrysler or Ford. During interviews, suppliers reported cases of patent infringement, sending proprietary design blueprints to competitors, and broken contracts as reasons that they did not trust GM. Stated one supplier executive:

Three years ago we were honored by GM as a high performance supplier. In fact, we were the only supplier featured with a picture in their annual report for our performance. But this year they came back and said we would have to drop our price 20% in order to keep the business. They said they had a lower bid. When we refused to drop our price that much, they forced us to ship the tools to a new supplier and even had the nerve to ask us to help the new supplier to get up and running.

Consistent with the hypothesis that trust is an efficient governance mechanism (Dore, 1983; Sako, 1991), these findings support an inverse relationship between trust and transaction costs.

Finally, Japanese transactors are much more likely to use financial hostages, rather than contracts, to make a credible commitment. For example, Japanese automakers have minority ownership positions in many key suppliers. Nis-

san and Toyota own an average of 23% of the stock of their affiliated suppliers and roughly 10% across all suppliers in our sample (Table 6). Stock ownership in a Japanese trading relationship is representative of a credible commitment that one firm has made to another firm (Gerlach, 1992). A stock ownership position held by an automaker acts as a financial hostage which encourages the supplier to make partner-specific investments. The use of hostages increases the costs of unilateral defection by the automaker and lengthens the 'shadow of the future' by signaling good-faith intentions and long-term commitments (Schelling, 1978; Parkhe, 1993).

The short-term 'set-up' costs of building trust or investing in financial hostages are high relative to simply writing a legal contract to attenuate the hazards of opportunism. However, once Japanese transactors have made the upfront investment to develop these self-enforcing safeguards, the transaction costs decline over the long term. Self-enforcing safeguards can control opportunism over an *indefinite time horizon*. Conversely, contracts control opportunism for only a *finite time horizon*. When the finite duration of the contract is over, transactors must find other means to control opportunism (i.e., write a new contract).

In contrast to Japanese practice, U.S. automakers have historically worked with a large set of

suppliers and relied on legal contracts to control opportunism.¹⁷ The pattern for U.S. auto companies has been to establish requirements and play suppliers off against one another in a contest for 1-year contracts (Clark and Fujimoto, 1991). Helper (1991) found that the average length of a legal contract employed by a U.S. automaker was only 2.3 years in 1989, up from 1.2 years in 1984. This requires annual or biannual requests for bids from suppliers followed by the subsequent costs of analyzing the bids, negotiating, rebidding, selecting a supplier, and writing a legal contract. In short, this practice leads to high search and contracting costs. Two-thirds of GM suppliers in our survey indicated that historically GM has rebid their component before a model change (Table 4). In contrast, Toyota and Nissan rebid components less than 5% of the time. As one GM executive noted, 'It has been necessary for us to maintain a large purchasing department to manage the large number of suppliers and the frequent rebidding of parts' (author interview, February 1991). U.S. automakers continually face the costs of *recontracting* with suppliers because legal contracts are only efficacious for a finite period.

In summary, Japanese automotive transactors minimize transaction costs by minimizing search, contracting, monitoring, and enforcement costs over the *long term*. They do this by controlling opportunism in their exchange relationships through self-enforcing safeguards rather than legal contracts. Conversely, U.S. automakers recontract with an ever-changing line-up of suppliers and thus continue to incur considerable search and contracting costs. While a legal contract may minimize transaction costs in the short run, the safeguards used in Japanese alliances result in lower transaction costs over the long run.

Proposition 4: Self-enforcing safeguards (i.e., goodwill trust, financial hostages) result in lower transaction costs than legal contracts if the expected duration of exchange is long term.

Investments in relation-specific or cospecialized assets

Helper and Levine (1992: 566) have observed that 'in much of the transaction-cost literature,

¹⁷ Though this pattern is changing significantly, especially at Chrysler (Kamath and Liker, 1994; Dyer, 1996c).

asset specificity is assumed to be exogenously determined by the technology' and 'purchasers always choose the socially efficient level of asset specificity ... Governance structure follows in a straightforward way from the degree of asset specificity.'¹⁸ However, our interviews suggest that due to uncertainty and bounded rationality, *transactors do not know ex ante what level of investment in specialized assets will be optimal*. Within Japanese supplier-automaker relationships, the level of investment in relation-specific assets tends to deepen over time, particularly as transactors make initial investments, share information, build trust, and 'discover' new ways to enhance performance through relation-specific assets. For example, a Nissan seat supplier decided to build its plant on the property adjacent to a Nissan assembly plant. This decision was made primarily because Nissan had a minority equity position in the supplier and the two parties had developed a high level of relational trust. Once this site-specific investment was made, the two parties discovered that rather than transport the seats by truck (a general purpose asset), it would be more economical to build a conveyor belt (a highly specialized asset) to carry the seats directly from the supplier plant to the automaker plant. Consequently, the supplier and automaker jointly invested in building the conveyor belt. This example of an initial specialized investment (i.e., a site-specific plant) being followed by subsequent specialized investments (i.e., customized equipment) is not unusual among Japanese suppliers-automakers. A high degree of information sharing and trust results in higher levels of relation-specific investments because the parties *discover* new ways to enhance performance through specialized investments.

In addition, we found that the level of relation-specific investments made by suppliers was strongly influenced by the automaker's strategy with regard to supplier management and governance. To illustrate, when suppliers considered making a particular relation-specific investment they asked the following question: 'Will we make the necessary return on investment during the payback period or length of the transaction

¹⁸ Williamson (1985: 34) has argued that asset specificity (technology), contractual safeguards, and price are determined 'simultaneously.' Thus, asset specificity may be viewed as partly endogenous in his model.

agreement/contract? According to Japanese suppliers, a sizable portion of their automaker-specific investments in customized equipment, tools, processes, and capacity had a payback period of at least 8 years or two model cycles (most Toyota and Nissan models have a 4-year development cycle). Thus, for the investment to pay off, the supplier needed to be assured that it would be awarded the component business for at least 8 years. Japanese automakers provided those assurances by giving credible long-term commitments to suppliers (as evidenced by the high re-win rates). In contrast, U.S. suppliers considered the duration of the legal contract as the payback period—which was typically 5 years or less. Thus, U.S. suppliers rationally refused to make relation-specific investments with a payback period longer than the length of the contract. The practical result of these differences in governance strategy was that a larger set of durable relation-specific investments made economic sense for Japanese suppliers than for U.S. suppliers.

Thus, firm-level (buyer) strategies towards governance ultimately influences *both transaction and production costs*. If one supplier uses special purpose technologies and assets for production while another refuses to do so due to concerns regarding opportunism, the suppliers will have different production costs.¹⁹ Governance of supplier relations has an effect on production costs by influencing the level of relation-specific investments employed in the relationship. Thus, investments in specific assets are at least partly endogenously determined. These findings suggest that asset specificity is not the cause, but to a large degree the consequence of governance strategy.

Finally, because Japanese automakers and suppliers often made symmetrical or cospecialized investments it resulted in a hostage situation, thereby increasing the interdependence of the transactors (Klein, 1980; Williamson, 1983; Dyer and Ouchi, 1993). Cospecialized investments increase the transactors' interdependence and, consistent with theory, serves as an economic rationale for cooperative, long-term relationships.

¹⁹ This finding is consistent with Lyons (1994), who found that 60% of U.K. transactors in the engineering field claimed that they were *not* utilizing the optimal level of specialized investments with their main customer, primarily because they were unwilling to expose themselves to the risk of being opportunistically exploited.

Of course, transactors will not make the initial investments unless they feel sufficiently protected against the hazards of opportunism. Thus, transaction costs increase with initial investments in specialized assets. However, once a high level of trust is achieved and the initial relation-specific investments are made, subsequent investments serve as a credible signal of trust and commitment. Thus, they are self reinforcing. Specific investments, by their very nature, increase the 'shadow of the future' and increase the expectation of future interaction, thereby leading to a pattern of cooperative behavior (Heide and Miner, 1992; Parkhe, 1993). Thus, we propose a curvilinear relationship between asset specificity and transaction costs with trust as a moderating variable (see Figure 1). During the early stages of a relationship, transaction costs increase as transactors invest in safeguards to protect initial investments in specific assets. However, once a sufficiently high level of trust is achieved and specialized investments are made, the investments themselves serve as a signal of trust and commitment. Thus, transaction costs may actually decrease with increased investments in specific assets.

Proposition 5: Above some minimum threshold level of trust, additional relation-specific investments serve to increase commitment and the costs of unilateral defection, thereby resulting in lower transaction costs.

A model of interfirm collaboration and value maximization

Figure 2 proposes a model of interfirm collaboration that maximizes transaction value based on the propositions developed previously. The model proposed here suggests that the credibility of a firm's promise to behave cooperatively increases as transactors: (1) demonstrate through behavior a commitment to future interaction (e.g., by increasing the re-win rate and volume of exchange), (2) increase the amount of information sharing, and (3) employ self-enforcing safeguards to govern the relationship. In turn, an increase in 'promise credibility' (or trustworthiness) within the trading relationship reduces transaction costs and increases the likelihood that transactors will invest in relation-specific assets. Furthermore, increased investments in specialized assets serve

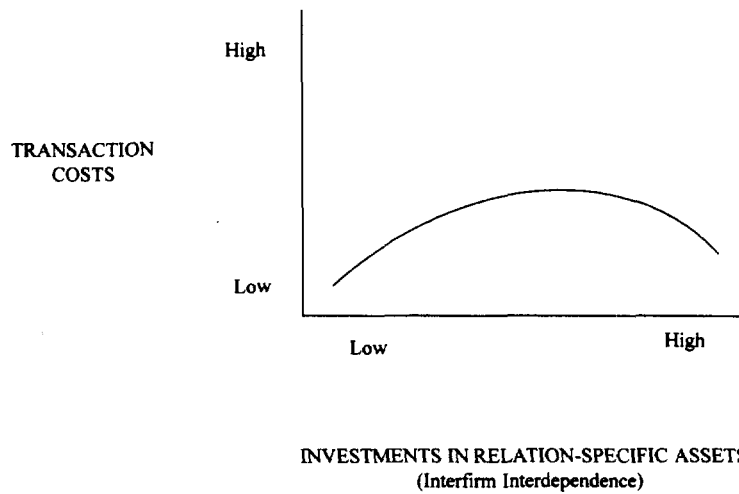


Figure 1. The relationship between asset specificity and transaction costs

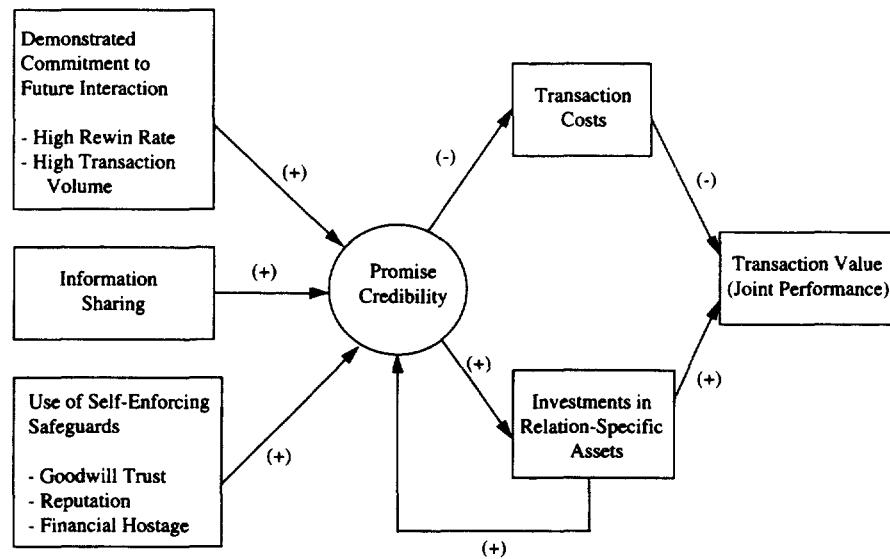


Figure 2. A model of interfirm collaboration

to reinforce the transactors' promise credibility by increasing the cost of unilateral defection and lengthening the 'shadow of the future.'²⁰ Finally, lower transaction costs and greater investments in specialized assets maximize transaction value, or the joint performance of the transactors.

CONCLUSION

This study suggests that transaction costs do not necessarily increase with an increase in relation-specific investments. Empirically we found that Japanese automakers incur lower transaction costs than U.S. automakers even though their suppliers are more specialized to them. Through exploratory interviews we developed a number of propositions to explain these results. In particular, we found that transaction costs differ among automakers due to: (1) differences in their commit-

²⁰ In support of this proposition, Smith and Aldrich (1991: 28) found that asset specificity created trust by increasing information sharing between suppliers and buyers.

ment to suppliers to engage in repeated exchange, (2) differences in the scale and scope of exchanges between the supplier and automaker, (3) differences in interfirm information sharing, (4) differences in the mix of safeguards chosen to govern the exchange, notably a reliance on self-enforcing safeguards which are efficacious over an indefinite time horizon (as opposed to contracts which are only effective for a finite time horizon), and (5) differences in investments in cospecialized assets. We have suggested that these propositions are interrelated, meaning that they are highly correlated and mutually reinforcing. For example, engaging in repeated transactions (Proposition 1) is important for achieving high volume/scale economies (Proposition 2), sharing information (Proposition 3), developing self-enforcing safeguards (Proposition 4), and discovering new ways to enhance performance through specialized assets (Proposition 5). We presume that each proposition holds true if each of the other propositions is held constant, but it may be that in order to significantly reduce transaction costs these actions must be taken in combination.

These findings also have implications for how firms in a production network can maximize transaction value. In particular, a *production network that can simultaneously achieve the twin benefits of asset specialization and lower transaction costs will have efficiency advantages over a less specialized network with higher transaction costs*. Williamson (1985: 1) has remarked that 'the transaction cost approach maintains that these institutions [governance structures] have the main purpose and effect of economizing on transaction costs.' Indeed, the fundamental governance question, as posed by Williamson, is: How can exchange relationships be structured to economize on transaction costs?²¹ However, as Zajac and Olsen (1993) have suggested, this may be the wrong question. Instead, *the fundamental question should be: How can exchange relations be struc-*

tured to maximize transaction value (which includes both production and transaction costs)? Our study suggests that beyond minimizing transaction costs, governance influences transaction value by influencing the transactors' set of choices regarding the level of specialized assets that will be employed. For example, a firm's promise credibility (trustworthiness) can be a source of advantage because it minimizes transaction costs. However, at least as important is the fact that trustworthiness will often result in higher levels of performance-enhancing investments in specialized assets because trustworthy transactors: (1) engage in greater information sharing which increases the probability that they will discover new ways to enhance performance through relation-specific investments, (2) have a longer payback period during which to earn a return on the investments, thereby increasing the number of relation-specific investments that make economic sense, and (3) are able to implement optimal levels of specialized assets because the costs of safeguarding the relation-specific investments are less likely to outweigh the gains. Thus, efficient governance mechanisms (i.e., trust) can simultaneously lower transaction costs and increase relation-specific investments, thereby creating competitive advantage.

However, it is important to note that Japanese procurement practices will only pay off if there are gains to be obtained from making relation-specific investments. If parts manufacture would not benefit from such investments, then U.S. practices may be more efficient. Furthermore, building trust and engaging in repeated trades is not costless. At some point Japanese transactors had to incur the 'set-up costs' associated with establishing noncontractual governance mechanisms. Moreover, the cost of building trust includes the opportunity cost of not taking advantage of one's suppliers and the loss of the opportunity to use lower-cost suppliers if they came along. Thus, Japanese procurement practices are not absolutely superior. They may be superior only in the long term, and only if relation-specific investments create economic value. Hence, Japanese procurement practices may be optimal given a rather specific set of conditions. However, when these conditions exist (as they do in the auto industry), the practices described in this paper represent a model for effective interfirm collaboration.

²¹ It is worth noting that there are a number of transaction cost scholars who do not espouse the view that optimal governance is the one that minimizes transaction costs, but that the institutional arrangement chosen is the one that maximizes the gains from trade. For example, Hennart (1993) argues that the efficient institutional arrangement is the one which results in the highest residual, a statement equivalent to saying that the optimal institution is the one which maximizes transaction value.

ACKNOWLEDGEMENT

The Reginald Jones Center for Policy and Organization at the Wharton School is gratefully acknowledged for its support of this research.

REFERENCES

- Alchian, A. A. and H. Demsetz (1972). 'Production, information costs, and economic organization', *American Economic Association*, **62**(5), pp. 777-795.
- Akerlof, G. A. (1970). 'The market for "lemons": Quality, uncertainty, and the market mechanism', *Quarterly Journal of Economics*, **84**, pp. 488-500.
- Argyle, M. (1991). *Cooperation: The Basis of Sociability*. Routledge, New York.
- Asanuma, B. (1985). 'The contractual framework for parts supply in the Japanese automotive industry' and 'The organization of parts supply in the Japanese automotive industry', *Japanese Economic Studies*, **15** (Summer 1985a,b), pp. 32-78.
- Axelrod, R. (1984). *The Evolution of Cooperation*. Basic Books, New York.
- Bradach, J. L. and R. Eccles (1989). 'Markets versus hierarchies: From ideal types to plural forms', *Annual Review of Sociology*, **15**, pp. 97-118.
- Browning, L., J. Beyer and J. Shetler (1995). 'Building cooperation in a competitive industry: Sematech and the semiconductor industry', *Academy of Management Journal*, **38**(1), pp. 113-151.
- Clark, K. B. and T. Fujimoto (1991). *Product Development Performance*. Harvard Business School Press, Boston, MA.
- Cusumano, M. A. and A. Takeishi (1991). 'Supplier relations and management: A survey of Japanese, Japanese-transplant, and U.S. auto plants', *Strategic Management Journal*, **12**(8), pp. 563-588.
- Dore, R. (1983). 'Goodwill and the spirit of market capitalism', *British Journal of Sociology*, **34**(4), pp. 459-482.
- Dyer, J. H. (1996a). 'Specialized supplier networks as a source of competitive advantage: Evidence from the auto industry', *Strategic Management Journal*, **17**(4), pp. 271-292.
- Dyer, J. H. (1996b). 'Does governance matter? Keiretsu alliances and asset specificity as sources of Japanese competitive advantage', *Organization Science*, **7**(6), pp. 649-666.
- Dyer, J. H. (1996c). 'How Chrysler created an American keiretsu', *Harvard Business Review*, **74**(4), pp. 42-56.
- Dyer, J. H. and W. G. Ouchi (1993). 'Japanese style business partnerships: Giving companies a competitive edge', *Sloan Management Review*, **35**(1), pp. 51-63.
- Gerlach, M. L. (1992). *Alliance Capitalism*. University of California Press, Berkeley, CA.
- Glaser, B. and A. Strauss (1967). *The Discovery of Grounded Theory*. Aldine, Chicago, IL.
- Heide, J. B. and A. Miner (1992). 'The shadow of the future: Effects of anticipated interaction and frequency of contact on buyer-seller cooperation', *Academy of Management Journal*, **35**(2), pp. 265-291.
- Helper, S. (1991). 'How much has really changed between U.S. automakers and their suppliers', *Sloan Management Review*, Summer, pp. 15-28.
- Helper, S. and D. Levine (1992). 'Long term supplier relations and product-market structure', *Journal of Law, Economics, and Organization*, **8**, pp. 561-581.
- Hennart, J.-F. (1993). 'Explaining the swollen middle: Why most transactions are a mix of "Market" and "Hierarchy"', *Organization Science*, **4**(4), pp. 529-547.
- Hill, C. W. L. (1995). 'National institutional structures, transaction cost economizing, and competitive advantage: The case of Japan', *Organization Science*, **6**(2), pp. 119-131.
- Kamath, R. R. and J. K. Liker (1994). 'A second look at Japanese product development', *Harvard Business Review*, **72**(6), pp. 154-170.
- Klein, B. (1980). 'Transaction cost determinants of "unfair" contractual arrangements', *American Economic Review*, **70**(2), pp. 356-362.
- Klein, B., R. G. Crawford and A. A. Alchian (1978). 'Vertical integration, appropriable rents, and the competitive contracting process', *Journal of Law and Economics*, **21**, pp. 297-326.
- Kogut, B. (1989). 'The stability of joint ventures: Reciprocity and competitive rivalry', *Journal of Industrial Economics*, **38**, pp. 183-197.
- Kreps, D. and R. Wilson (1982). 'Reputation and imperfect information', *Journal of Economic Theory*, **27**, pp. 253-279.
- Lyons, B. R. (1994). 'Contracts and specific investment: An empirical test of transaction cost theory', *Journal of Economic and Management Strategy*, **3**, pp. 257-278.
- Macneil, I. R. (1978). 'Contracts: Adjustment of long-term economic relations under classical and neo-classical, and relational contract law', *Northwestern University Law Review*, **72**, pp. 854-905.
- Mahoney, J. T. (1992). 'The choice of organizational form: Vertical financial ownership versus other methods of vertical integration', *Strategic Management Journal*, **13**(8), pp. 559-584.
- Masten, S. E. (1984). 'The organization of production: Evidence from the aerospace industry', *Journal of Law and Economics*, **27**, pp. 403-417.
- Monteverde, K. and D. J. Teece (1982). 'Supplier switching costs and vertical integration in the automobile industry', *Bell Journal of Economics*, **13**, pp. 206-213.
- Nishiguchi, T. (1993). 'Governing competitive supplier relations: New auto-industry evidence', MIT/IMVP Annual Sponsors' Briefing Meeting, Cape Cod, MA.
- Nishiguchi, T. (1994). *Strategic Industrial Sourcing*. Oxford University Press, New York.
- North, D. C. (1990). *Institutions, Institutional Change and Economic Performance*. Cambridge University Press, Cambridge, UK.
- Ouchi, W. G. (1984). *The M-Form Society*. Avon Books, New York.

- Parkhe, A. (1993). 'Strategic alliance structuring: A game theoretic and transaction cost examination of interfirm cooperation', *Academy of Management Journal*, **36**(4), pp. 794-829.
- Perry, M. K. (1989). 'Vertical integration'. In R. Schmalensee and R. Willig (eds.), *Handbook of Industrial Organization*. North-Holland, Amsterdam, pp. 185-255.
- Sako, M. (1991). 'The role of "Trust" in Japanese buyer-supplier relationships', *Ricerche Economiche*, **45**(2-3), pp. 449-474.
- Sako, M. (1992). *Prices, Quality, and Trust*. Cambridge University Press, Cambridge, U.K.
- Schelling, T. C. (1978). *Micromotives and Macrobehavior*. Norton, New York.
- Smith, A. D. and H. E. Aldrich (1991). 'The role of trust in the transaction cost economics framework: Transaction contexts and governance structures in U.S. manufacturer-supplier relations'. Academy of Management Meetings, Miami, FL.
- Sohn, J. H. D. (1994). 'Social knowledge as a control system: A proposition and evidence from the Japanese FDI behavior', *Journal of International Business Studies*, Second Quarter, pp. 295-324.
- Strauss, A. and J. Corbin (1990). *Basics of Qualitative Research*. Sage, Newbury Park, CA.
- Telser, L. G. (1980). 'A theory of self-enforcing agreements', *Journal of Business*, **53**(1), pp. 27-44.
- Walker, G. and D. Weber (1984). 'A transaction cost approach to make-or-buy', *Administrative Science Quarterly*, **29**, pp. 373-391.
- Weigelt, K. and C. Camerer (1988). 'Reputation and corporate strategy: A review of recent theory and applications', *Strategic Management Journal*, **9**(5), pp. 443-454.
- Williamson, O. E. (1983). 'Credible commitments: Using hostages to support exchange', *American Economic Review*, **73**(4), pp. 519-535.
- Williamson, O. E. (1985). *The Economic Institutions of Capitalism*. Free Press, New York.
- Williamson, O. E. (1991a). 'Comparative economic organization: The analysis of discrete structural alternatives', *Administrative Science Quarterly*, **36**, pp. 269-296.
- Womack, J. P., D. T. Jones and D. Roos (1990). *The Machine that Changed the World*. Harper Perennial, New York.
- Zajac, E. J. and C. P. Olsen (1993). 'From transaction cost to transactional value analysis: Implications for the study of interorganizational strategies', *Journal of Management Studies*, **30**(1), pp. 131-145.

APPENDIX 1: EXPLORATORY INTERVIEW QUESTIONS

Automaker purchasing personnel

1. Given your size and relative bargaining power, what prevents you from taking advantage of suppliers?
2. What, if anything, increases (or decreases) the costs associated with selecting suppliers to work with?
3. What, if anything, increases (or decreases) your costs of bargaining and contracting with suppliers?
4. What, if anything, increases (or decreases) your costs with regard to monitoring suppliers' performance, to ensure that they are living up to the original agreement?
5. How do you resolve disputes with this supplier? (i.e., if either you or the supplier believe that the other party has not lived up to the original agreement?)

Supplier sales/engineering personnel

1. What prevents you from giving inaccurate cost estimates to this particular automaker? What prevents you from giving any other types of inaccurate information to this particular automaker?

2. What, if anything, increases (or decreases) your costs of bargaining and contracting with this particular automaker?
3. What, if anything, increases (or decreases) your costs with regard to monitoring this automaker's performance, to ensure that the automaker is living up to the original agreement?
4. How do you resolve disputes with this automaker? (i.e., if either you or the automaker believe that the other party has not lived up to the original agreement?) For example, what if the automaker's projected unit volume (on which you base your unit price) does not materialize?

APPENDIX 2: SUPPLIER SURVEY QUESTIONS FOR TABLES 4-6

Table 4

1. In your experience, what percent of the time do you win business from one model to the next when a model change is made by Chrysler (stated another way, in the past when you have been awarded the contract from Chrysler for a specific model, what percentage of the time do you re-win the business when a model change is made)?
_____ percent of the time a supplier will re-win the business.

2. In your experience, what percent of the time does Chrysler rebid your business to other suppliers during the life of a model? (e.g., between one model change and the next) _____ percent of time automaker rebids your business before model change.
3. a. Approximate total 1991 automotive sales? _____
 b. Approximate percent of total automotive sales to Chrysler? _____
4. Approximately how many different types of production part numbers (*not including service parts*) do you currently supply to Chrysler? _____ production part numbers

Table 5

Information sharing

1. To what extent do you trust that confidential/proprietary information shared with Chrysler will be kept strictly confidential by Chrysler's buyers and engineers?

<i>Not at All</i>								
<i>Very Great Extent</i>								
<i>To Some Extent</i>								
1	2	3	4	5	6	7		

2. To what extent have you provided recent detailed cost data to Chrysler (e.g., a breakdown of your cost structure which estimates exactly what it will cost you to manufacture a specific component)?

<i>Not at All</i>								
<i>Very Great Extent</i>								
<i>To Some Extent</i>								
1	2	3	4	5	6	7		

3. To what extent do you share information with Chrysler on your long-term production plans, capital investments, and capacity utilization?

<i>Not at All</i>								
<i>Very Great Extent</i>								
<i>To Some Extent</i>								
1	2	3	4	5	6	7		

4. To what extent has Chrysler provided technical, engineering, or other assistance in the past which has allowed you to make changes in your manufacturing processes (e.g., plant lay-

out, new machines or technologies, value analysis/value engineering, etc.) which have allowed you to lower manufacturing costs?

<i>Not at All</i>								
<i>Very Great Extent</i>								
<i>To Some Extent</i>								
1	2	3	4	5	6	7		

5. To what extent has Chrysler provided assistance to help you reduce defects and increase the overall reliability and quality of the products you sell to Chrysler?

<i>Not at All</i>								
<i>Very Great Extent</i>								
<i>To Some Extent</i>								
1	2	3	4	5	6	7		

6. To what extent has Chrysler provided assistance in developing a 'Just-In-Time' inventory management system designed to lower inventory costs and/or make delivery more efficient.

<i>Not at All</i>								
<i>Very Great Extent</i>								
<i>To Some Extent</i>								
1	2	3	4	5	6	7		

Table 6

Self-enforcing safeguards

1. To what extent do you trust Chrysler personnel to deal with you fairly?

<i>Not at All</i>								
<i>Very Great Extent</i>								
<i>To Some Extent</i>								
1	2	3	4	5	6	7		

2. If given the chance, to what extent will this customer take unfair advantage of your business unit?

<i>Not at All</i>								
<i>Very Great Extent</i>								
<i>To Some Extent</i>								
1	2	3	4	5	6	7		

3. To what extent has Chrysler developed a reputation for fairness and trustworthiness among the supplier community?

<i>Not at All</i>			<i>To Some Extent</i>		<i>Very Great Extent</i>	
1	2	3	4	5	6	7

(If yes)
b. What percent of your stock is owned by Chrysler? _____

4. a. Does Chrysler own any stock in your company? Yes _____ No _____

Note: Each supplier was given a questionnaire which focused on a particular automaker (the example questions above are from the questionnaire to Chrysler suppliers).