

# The Contingent Effect of Specific Asset Investments on Joint Action in Manufacturer-Supplier Relationships: An Empirical Test of the Moderating Role of Reciprocal Asset Investments, Uncertainty, and Trust

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*Prior research provides evidence that manufacturer investment of specific assets dedicated to a particular supplier (manufacturer asset specificity) is an antecedent of joint action in manufacturer-supplier relationships. The authors build on prior research to identify several variables that moderate the effect of manufacturer asset specificity on joint action. Drawing from transaction cost analysis and relational exchange theory, the authors propose a conceptual model that explicates the moderating role of three contextual variables: specific asset investments by the supplier (reciprocal asset investments), manufacturer decision-making uncertainty, and manufacturer trust in the supplier. Consistent with their hypotheses, results from a survey of firms in three SIC codes show that decision-making uncertainty and trust enhance the effect of manufacturer asset specificity on joint action. Contrary to expectation, however, the moderating effect of reciprocal asset investments was not significant. Theoretical and managerial implications of the results are discussed.*

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Curtailment of opportunism is recognized to be a key purpose of transaction governance (Gundlach 1994;

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Stump and Heide 1996). Seeking to attain this goal, one party may turn to a variety of “devices, mechanisms, or tools” (Goldberg 1979) as a means of exerting social control over the other to discourage opportunistic behavior. In the context of manufacturer-supplier exchange relationships, manufacturers have traditionally used unilateral approaches—that is, either incentive-based tools such as contract bidding (market governance) or authority-based tools such as administrative fiat (hierarchical governance)—to curtail supplier opportunism (Williamson 1991:281). Over the past two decades, however, the trend in governance has been toward the adoption of bilateral tools of governance (Arndt 1979; Heide 1994) that instead allow exchange partners to curtail opportunism cooperatively. This bilateral approach to governance has been described by a variety of terms, including *value-added partnerships* (Johnston and Lawrence 1988), *long-term relationships*, *partnerships*, and *strategic alliances* (Achrol 1991; Webster 1992), *hybrids* (Williamson 1991), and *relational exchange* (Dwyer, Schurr, and Oh 1987).

Our focus in this research is on the use of a particular bilateral governance tool in manufacturer-supplier relationships: joint action (JA) arrangements. JA is a nonequity mode of governance in which both manufacturers and suppliers cooperate on certain activities that are important for both parties. For example, the parties may conduct a

value analysis in which they may (1) jointly establish and implement cost-reduction targets and/or (2) become involved in component redesign<sup>1</sup> (Heide and John 1990; Zaheer and Venkatraman 1995). In the case of the latter example, manufacturers have traditionally coped with component redesign by either putting out a competitive request for bids (i.e., market governance) or by internalizing the transaction and using administrative fiat to compel the supplier division of their organization to develop the new design (i.e., hierarchical governance). JA provides the manufacturer with the requisite control over supplier activities to effect component redesign—but without imposing potential production-cost inefficiencies associated with owning the supplier. By combining the advantages of both market governance and hierarchical governance, JA represents a novel and attractive alternative to these traditional governance forms (Leenders and Blenkorn 1988).

JA arrangements provide important benefits but also entail substantial risks (Pilling and Zhang 1992). Notable benefits from such arrangements include shortened product development cycles, reduced procurement costs (Dyer 1996), improved supplier quality (Burt 1989), and continuous cost improvements (Han, Wilson, and Dant 1993; Kalwani and Narayandas 1995). While the benefits of JA are clear, establishing JA involves substantial implementation costs in terms of time, finances, and personnel for both parties (Bradley 1995; Frazier, Spekman, and O'Neal 1988). Furthermore, the "opportunity costs" of foregoing alternative exchange partners cannot be overlooked (Balakrishnan and Wernerfelt 1986; Sheth and Parvatiyar 1995). Given this inherent cost/benefit trade-off, the task of identifying antecedents that affect the use of JA is especially salient.

Prior research in marketing has drawn extensively from transaction cost analysis (TCA) (Heide 1994; Williamson 1985, 1991) and from relational exchange theory (RET) (Granovetter 1985; Macneil 1980) to identify the antecedents of JA (Heide and John 1990; Zaheer and Venkatraman 1995). While identification of antecedents is an important first step in understanding JA, examining the interrelationships among these antecedents is an equally important second step. Research that examines only the main effects of the antecedents but overlooks the potential interactions among these antecedents may generate inefficient managerial implications. For example, consider past research that investigated asset specificity. Examination of the main effects of manufacturer asset specificity (MAS) and supplier asset specificity (SAS) has shown that both factors are positive antecedents of JA in manufacturer-supplier relationships (e.g., Heide and John 1990; Zaheer and Venkatraman 1995). It is conceivable that when the interrelationship between these two variables is considered, their intertwined impact may be quite different from

that of their individual impacts. Mutual commitment of specific assets creates an endogenous safeguard, which may attenuate the need for extraneous governance mechanisms such as JA arrangements (Klein and Leffler 1981; Telser 1980). When these two variables are treated as though they were distinct, the resultant implication for manufacturers is that they should develop JA arrangements to safeguard their own investments or, alternatively, to provide assurances to the supplier that their investments are secure. When the interrelationship between these variables is considered, however, the investment structure in the relationship itself may solve the governance problem. According to this argument, then, crafting JA when mutual investments exist in the relationship creates installation expenses without providing additional governance benefits. Consequently, it would be an unnecessary expense and an inefficient governance solution.

In sum, consideration of interrelationships among the antecedents of JA has the potential to enrich our theoretical understanding of the determinants of the phenomenon and to yield more valid managerial implications. With this aim in mind, the relationship between manufacturer investment of specific assets and JA represents the focal main effect in our conceptual framework. Three other antecedents, specific asset investments by the supplier (reciprocal investments), manufacturer decision-making uncertainty (DMU) (regarding supplier performance), and manufacturer trust in the supplier, are also considered in the conceptual framework. Recognizing the potential for interrelationships among the antecedents, the central focus of this research is to investigate whether and how the effect of MAS on JA is contingent on the other antecedents.

Since our conceptual model is grounded in TCA and RET, we begin by summarizing and integrating these frameworks, and then we develop our conceptual model. A description of the methods used to test the model and the empirical results follows. We conclude with a discussion of the original results and a post hoc analysis, along with implications, limitations, and future research ideas.

### **TCA: BASIC ARGUMENT, REFINEMENTS, AND INTEGRATION OF TRUST**

Consider the case of an automobile manufacturer wishing to install an antilock braking system in a new car model. The manufacturer can source this component from a supplier that is selected through a competitive-bidding process (market governance). Alternatively, it can secure the component from an existing source after inducing the incumbent to make product and/or production-process changes. These changes may be implemented in one of two ways. Ownership of the incumbent (hierarchical governance) enables the manufacturer to use administrative

fiat to enforce the change. Alternatively, change can also be induced within the context of a long-term program of cooperation with the incumbent (bilateral governance) (Gundlach 1994; Heide 1994; Williamson 1985).

Market governance enables the manufacturer to verify the comparative production-cost structures and competencies of different suppliers while also curbing the risk of opportunism by an incumbent supplier. Opportunism by the incumbent is controlled through the credible threat of being able to switch to other readily available alternative vendors. Thus, market governance gives the manufacturer control over the supplier without imposing production (or ownership) cost inefficiencies on the manufacturer.

Another advantage of market governance is that contract bids by nature tend to be discrete. This gives the manufacturer the flexibility to pursue exchange relationships with several different suppliers concurrently and/or over time for a given component (Macneil 1980; Williamson 1985). The absence of production-cost inefficiencies, however, does not mean that market governance is costless. Other costs, that is, those related to searching for and qualifying suppliers, negotiating/re negotiating contracts, monitoring performance, and enforcing compliance, are incurred (Coase 1937; Williamson 1985:20). These costs of running the exchange have been termed *marketing* (Coase 1937:394) or *transaction costs* (Williamson 1985).

Both hierarchical and bilateral governance evoke change within a particular supplier relationship. Since both are customized to govern a particular supplier relationship, they are regarded as "specialized" forms of governance (Gundlach 1994; Heide 1994; Williamson 1985). While specialized governance is expected to reduce transaction costs by establishing relational continuity between the exchange partners, its use also entails significant costs. Hierarchical governance via vertical integration of the supplier can levy prohibitive production-cost increases on the manufacturer (Barney and Hansen 1994; Bello, Dant, and Lohtia 1997; Powell 1987). Establishing bilateral governance can also involve significant commitments of personnel, time, and monetary resources (Frazier et al. 1988; Pilling and Zhang 1992).

A critical aspect of TCA is that it identifies the circumstances under which transaction costs are expected to become so great that a move away from market governance toward specialized nonmarket forms of governance becomes economically justified. One key condition is the presence of specific assets, which is considered to be "the big locomotive to which transaction cost economics owes much of its predictive content" (Williamson 1985:56).

*Asset specificity.* Asset specificity refers to investments in physical or human assets that are dedicated to a particular supplier and whose redeployment entails considerable switching costs (Erramilli and Rao 1993; Heide 1994; Porter 1980). Examples of manufacturer-specific assets in-

clude (1) manufacturer investment in training of its own and/or the supplier's personnel and (2) manufacturer installation of tools and equipment, production, and/or logistics processes.

Asset specificity exacerbates the transaction-cost problem because it increases dependence on the focal supplier (Ganesan 1994; John and Weitz 1989). This condition creates a trading hazard, or a safeguarding problem (Williamson 1985), by making the manufacturer's investment vulnerable to opportunistic exploitation by the supplier (Klein, Crawford, and Alchian 1978). Switching vendors is now a noncredible threat, and transaction costs related to negotiating, monitoring, and enforcing the contract are incurred (Pilling, Crosby, and Jackson 1994).

The move away from market governance toward more specialized forms of governance in high asset specificity transactions is justified as the more efficient solution because specialized governance mechanisms are expected to minimize the sum of production and transaction costs (Williamson 1985).

*Reciprocal investments.* Adoption of specialized governance is not, however, the only option for the invested manufacturer. One alternative that has received widespread attention is when a manufacturer is able to extract a "hostage" from the supplier in the form of reciprocal specific asset investments (Williamson 1983:532). When this reciprocal investment occurs, a "mutual reliance relation" is created (Williamson 1985:190) as opposed to one of unilateral dependence on the supplier. When transactions are supported by bilateral "credible commitments" (Anderson and Weitz 1992; Williamson 1985) in the form of specific asset investments, the threat of opportunism by either party is mitigated for the other. Manufacturers need no longer expect suppliers to act opportunistically as such behavior would put their hostage investments at risk and vice-versa. Absent the threat of opportunism, the need for specialized governance is attenuated (Klein and Leffler 1981; Telser 1980).

*Uncertainty.* TCA contends that DMU is another key factor to consider in formulating governance decisions. Defined as the inability to predict partner behavior or changes in the external environment, uncertainty gives rise to an adaptation problem. With uncertainty, a manufacturer is expected to seek flexibility in its exchange relationships to cope with future conditions as they become known (Rubin 1990). However, the effect of uncertainty on transaction governance is considered by TCA to be conditional on asset specificity, as evidenced by Williamson's (1985) assertion that "an increase in parametric uncertainty is of little consequence in transactions that are nonspecific" (p. 59). A manufacturer that has not made specific asset investments in a supplier can manage this uncertainty by using multiple suppliers concurrently and/or by switching in and out of supplier relationships

until they locate a transparent supplier or one without an opportunistic intent. Indeed, in such situations, it is in a supplier's interest to signal transparency and trustworthiness to establish relationship continuity. However, lacking the ability to switch and the corresponding protection and flexibility afforded by competition among suppliers, an invested manufacturer is more vulnerable to supplier opportunism and thus is expected to turn to specialized governance.

Recent refinements to TCA, however, suggest that uncertainty has a stronger effect on governance than originally posited in TCA. Empirically, it has been shown that certain types of uncertainty have a main effect on choice of governance mechanisms (Heide and John 1990; Klein, Frazier, and Roth 1990; Masten, Meehan, and Snyder 1991; Stump 1995; Sutcliffe and Zaheer 1998; Zaheer and Venkatraman 1995). Furthermore, various conceptual articles (Achrol 1991, 1997; Courtney, Kirkland, and Viguerie 1997; Hammond, Obermeyer, and Raman 1994; Webster 1992) have noted that environmental turbulence has led to a shift away from market governance without regard to asset specificity.

*Trust.* From the TCA perspective, exchange relationships are nothing more than a series of discrete exchange transactions held together by a governance mechanism. Repetitive transacting, however, can create a sentiment of continuity between exchange partners (Heide and John 1990) that serves to regulate opportunism in future transactions. While such endogenous control is given passing recognition in TCA (e.g., Williamson 1985:22), critics contend that this aspect is "generally ignored" (Ring and Van de Ven 1992:484) by TCA proponents. On the other hand, RET (Dwyer et al. 1987; Macneil 1980; Ring and Van de Ven 1992) explicitly views the relationship in which transactions are embedded as an endogenous safeguard against opportunism. From this viewpoint, embeddedness mitigates the need for formal governance mechanisms (Granovetter 1985). As Larson (1992:96) notes, the relational context itself acts as a "moral control" to diminish opportunism in exchange dyads (see also Uzzi 1997). Recently, several scholars have made useful efforts to integrate one relational context variable—that is, trust—with TCA (see Barney and Hansen 1994; Chiles and McMackin 1996). In the current context, trust refers to the manufacturer's expectation that the supplier will act to benefit the manufacturer's interests regardless of the manufacturer's ability to monitor such behavior (Anderson and Narus 1990; Anderson and Weitz 1989; Mayer, Davis, and Schoorman 1995).

TCA operates on the assumption that exchange partners are potentially opportunistic, such that exchange partners will engage in behaviors such as lying, stealing, cheating, and other more subtle deceitful behaviors to pursue their self-interest (Williamson 1985:47). This

assumption has come under much empirical scrutiny (e.g., Gassenheimer, Baucus, and Baucus 1996; Heide and John 1992; John 1984; Joshi and Stump 1996) and theoretical criticism (Ghoshal and Moran 1996; Larson 1992; Uzzi 1997). Until recently, however, the impact of these criticisms has been limited because they have not been developed into an alternative theory from which refutable predictions can be derived. Recent theoretical developments (Barney and Hansen 1994; Chiles and McMackin 1996; Heide and John 1992) suggest that substituting the assumption that exchange partners will be trustworthy as opposed to opportunistic does not invalidate TCA. Instead, it is expected that "inclusion of the social-context variable of trust in the TCE<sup>2</sup> framework will yield a model with greater predictive validity" (Chiles and McMackin 1996:88).

In summary, TCA argues that MAS will lead to the emergence of specialized governance in manufacturer-supplier relationships. Drawing from recent developments in the TCA and related literatures, we propose the following three qualifications to this focal main effect. The focal main effect is expected to be (1) attenuated given the presence of reciprocal specific asset investments, (2) enhanced given the presence of uncertainty, and (3) enhanced given the presence of trust. The arguments for these qualifications are developed in the discussion below.

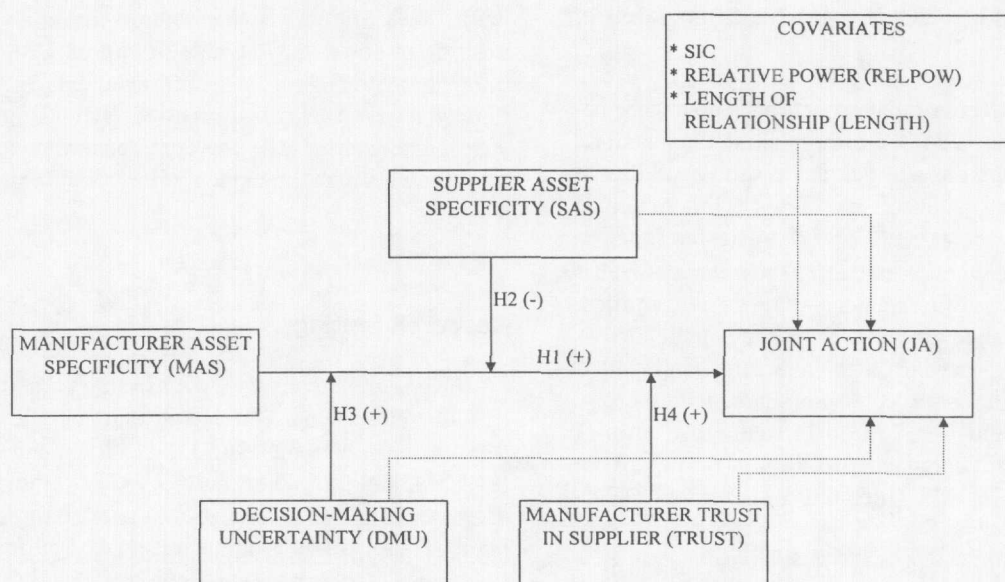
## CONCEPTUAL MODEL

JA is the dependent variable in our conceptual model (see Figure 1). The hypothesized effects—that is, the main effect of MAS and the moderating effects of (1) SAS, (2) DMU, and (3) trust—are represented by solid lines. The main effects of the moderator variables and the main effects of the control variables are characterized by dotted lines.

### Main Effect of MAS on JA

Using efficiency as the criterion, TCA argues that despite the costs associated with establishing specialized governance in exchange relationships, this form of governance minimizes the sum of production and transaction costs when asset specificity intrudes (Williamson 1985). Recognizing that specific assets impose switching costs, manufacturers are motivated to install a safeguarding mechanism to prevent these investments from being opportunistically exploited by the supplier. This general argument has received widespread support in the empirical literature in the context of sales-force governance decisions (Anderson 1985, 1988; John and Weitz 1989), international distributor governance decisions (Anderson and Coughlan 1987; Gatignon and Anderson 1988; Klein et al. 1990), and industrial supplier governance decisions

**FIGURE 1**  
**Conceptual Model**



(Heide and John 1990; Monteverde and Teece 1982; Walker and Weber 1984). Within manufacturer-supplier relationships, JA is one type of governance mechanism that can be used by manufacturers to safeguard their specific asset investments. This arrangement provides shared operational control over assets, thus curbing a supplier's ability to act opportunistically (Heide and John 1990). Thus, our initial hypothesis replicates a central hypothesis found in the Heide and John (1990) study:

*Hypothesis 1:* MAS is positively related to JA.

### The Moderating Role of SAS, DMU, and Trust

**SAS.** TCA contends that concurrent investment in specific assets sets up a mutual reliance relation (Williamson 1985) or a self-enforcing contract (Klein and Leffler 1981; Telser 1980). Opportunism is expected to be curtailed due to the credible threat (Williamson 1983) of forfeiture of the hostages (Anderson and Weitz 1992). This argument has received indirect<sup>3</sup> support in the empirical literature. Kumar, Scheer, and Steenkamp (1995) show that when interdependence is symmetrical, conflict in a marketing exchange relationship is reduced. Relatedly, Heide (1994) provides evidence that flexible adjustment processes prevail in relationships characterized by symmetric high dependence. Given such endogenous control of opportunist-

ism, the general need for other specialized safeguards is attenuated. Applying this rationale to JA arrangements, we propose the following:

*Hypothesis 2:* The positive relationship between MAS and JA will be attenuated with increasing levels of specific asset investments by suppliers.

**DMU.** A manufacturer experiences DMU about its supplier when the manufacturer is unable to predict supplier performance on key variables like price, delivery, and adaptability (Achrol and Stern 1988; Noordewier, John, and Nevin 1990; Sutcliffe and Zaheer 1998; Zaheer and Venkatraman 1995). Drawing from recent developments in the governance literature (e.g., Courtney et al. 1997; Hammond et al. 1994; Sutcliffe and Zaheer 1998), we turn the TCA argument on its head to instead posit that uncertainty moderates the effect of asset specificity on JA.

JA offers the following benefits: (1) it safeguards existing specific asset investments by giving the invested manufacturer operational control over the supplier, and (2) it fosters endogenous adaptations so that the manufacturer does not have to seek out a new supplier every time revisions to component specifications occur. When specific asset investments are coupled with DMU about the supplier, JA provides both safeguarding and adaptability benefits to the manufacturer. Accordingly, we expect that preference for JA will increase as invested manufacturers

experience supplier uncertainty. Thus, we propose the following:

*Hypothesis 3:* The positive relationship between MAS and JA will be enhanced with increasing levels of DMU.

*Trust.* A manufacturer that expects a supplier to be benevolent (Ganesan 1994)—that is, to act in the manufacturer's interest regardless of the manufacturer's ability to monitor behavior (Anderson and Narus 1990; Anderson and Weitz 1989; Mayer et al. 1995)—trusts that supplier.

Recall that two types of specialized governance mechanisms—bilateral and hierarchical—have been identified. Under hierarchical governance, control of supplier activities is unilaterally vested in the manufacturer. Under bilateral governance, however, control is shared with the supplier (Erramilli and Rao 1993). Relatedly, the costs of installing bilateral governance, while significant, are not as great as those levied by hierarchical governance (Barney and Hansen 1994).

As Chiles and McMackin (1996:88) note, inclusion of trust in the TCA model reduces the perception of opportunism and its associated transaction costs for any given level of asset specificity. As originally depicted by TCA, specialized governance is necessary for high asset specificity transactions because of the presumed threat of opportunism. However, if the level of opportunism and associated transaction costs are low, then a less specialized mechanism should be sufficient to provide efficient governance of high asset specificity transactions. In the absence of trust in the supplier, Chiles and McMackin contend that an invested manufacturer is likely to develop hierarchical governance to safeguard its investment. When trust exists, the need for the manufacturer to have unilateral control over the supplier is less pronounced. Consequently, an invested manufacturer is likely to be more prone to adopt JA as a less expensive bilateral governance option. Therefore, we propose the following:

*Hypothesis 4:* The positive relationship between MAS and JA will be enhanced with increasing levels of trust.

### Control Variables

Along with our substantive variables, we control for the effects of (1) industry (based on the standard industrial classification [SIC] code of the responding organization), (2) the relative power of the manufacturer over the supplier, and (3) the length of the manufacturer-supplier relationship in our model. While our theoretical framework does not explicitly account for these variables, these variables do represent meaningful alternative explanations for the emergence of JA in the manufacturer-supplier

relationship. For example, the automobile industry (primarily SIC 37) has a well-developed tradition of JA. Thus, it is conceivable that manufacturers in this industry are more likely to adopt JA because of industry norms (Eisenhardt 1989). Similarly, manufacturers that enjoy a relative position of power may be able to impose JA on the supplier, thereby making such arrangements more likely. Finally, a well-established supplier relationship may provide manufacturers with the confidence to enter into JA arrangements with the supplier (Heide and John 1990).

## METHOD

### Research Setting

The research hypotheses were examined in the context of Canadian original equipment manufacturers (OEMs) from the nonelectronic (SIC 35), electrical and electronic (SIC 36), and transportation (SIC 37) equipment industries and their exchange relationships with upstream suppliers. These particular industries were used for two reasons. First, preliminary interviews revealed that sufficient variation on the focal variables exists across these industries to make model testing feasible. Second, this setting has been used in prior research on bilateral governance arrangements such as JA and demonstrated to be a valid context for research on buyer-supplier relationships (Heide and John 1990; Young, Gilbert, and McIntyre 1996).

### Measure Development and Pilot Study

Measures of the focal theoretical variables and of the demographic factors were developed based on prior research. These measures were then refined through interviews with 10 purchasing managers who work in the research setting. The resulting questionnaire was then mailed out to 100 other purchasing managers who work in the research setting. The pilot study did not reveal any significant problems with the measures or response formats.

### Measures

In responding to the measures of the focal variables, the informants were requested to respond on a particular direct-supplier relationship and the procurement of a single component or a series of related components used as production inputs. The last fiscal year was used as the time frame. For decentralized firms, informants reported on their particular location or division. Descriptive information about the sample is provided in Table 1.

*MAS and SAS.* These two scales describe the specific asset investments in resources, procedures, and people made by the OEM (supplier) in their relationship with the

**TABLE 1**  
**Sample Characteristics and Analysis of Nonresponse Bias**

<i>Characteristic</i>	<i>Early Respondent</i>	<i>Late Respondent</i>	<i>Total Sample (N = 184)</i>
Annual sales volume (\$ in millions—approximate)	32.5	35.5	34.5
Number of employees (approximate)	221	274	233
Annual dollar value of component purchases from this supplier	632,387	656,153	661,681
Number of suppliers for this component	2.8	2.1	2.9
Proportion of purchases from supplier (%)	63	60	64
Length of relationship (months)	96	101	103
Components purchased (% of firms)			
Raw materials	26	32	31
Finished components (motors, power units)	24	20	19
Electronic subassembly	19	16	17
Fabricated metal parts (e.g., castings)	16	23	21
Other	9	11	12
Job titles (%)			
Director of purchasing	10	14	12
Purchasing manager	51	44	46
Purchasing agent	37	32	33
Other (e.g., operations manager, general manager)	5	8	9
Tenure of respondent in firm (months)	106	110	108

NOTE: Early respondents were the first one third of the sample, and late respondents were the last one third of the sample. None of the differences between the early and late respondents was significant ( $p > .20$  in all cases).

focal supplier (OEM). Items were drawn from Heide (1987) to construct both scales.

*DMU.* The DMU scale captures the degree of predictability of supplier behavior for the OEM. Purchasing managers responded to measures of the predictability of supplier performance over the next procurement cycle with regard to price, delivery, and adaptability. The items in this scale were reverse coded to reflect DMU. Items were drawn from Noordewier et al. (1990) and Zaheer and Venkatraman (1995) to construct this scale.

*Trust (TRUST).* The trust scale measures manufacturer trust in the focal supplier as reflected in perceptions of the motives and intentions of this supplier. Items were drawn from Ganesan (1994) and Morgan and Hunt (1994) to construct this scale.

*JA.* This scale captures the extent to which manufacturers and suppliers are involved in each other's operations. Based on field interviews and accounts in the trade press, we decided to measure JA on specific issues as well as at a general level. The JA scale measures JA over specific issues such as cost cutting, product redesign, new product development, as well as measuring a global perception of the level of JA in the relationship. Items were drawn from Heide and John (1990) and Zaheer and Venkatraman (1995) to construct this scale.

*Control variables.* Our database contained information on the SIC codes to which each responding organization belonged. Relative Power (RELPOW) measures manufacturer perception of the previous year's sales volume of

their firm relative to the supplier. Finally, length of the relationship (LENGTH) measures the duration of association with the supplier firm.

### Data Collection

We obtained a mailing list of manufacturers in SIC codes 35, 36, and 37 from a commercial list broker. Included in the mailing list were company-specific demographic information and the names of purchasing managers. From this sampling frame, we randomly drew 1,200 names to construct our sample. We then attempted to make telephone contact with each of the 1,200 names. The purpose of this initial contact was twofold: (1) to solicit the participation of the individual in our survey and (2) to ascertain that they had the requisite knowledge of a supplier relationship to serve as key informants in our study.

Although there have been questions in the literature about the validity of data derived from a single key informant when organizational or relationship (as opposed to individual) properties are being measured (e.g., Anderson and Narus 1990; Phillips 1981), we used this approach since our data collection incorporated the procedures recommended by Heide and John (1990), John and Reve (1982), and Kumar, Stern, and Anderson (1993). Key informants were prescreened during the phone contact, participants were explicitly instructed to focus on a single and highly familiar supplier relationship, measures based on previously validated scales were used, and post hoc assessments of informant quality (knowledgeability, involvement, and confidence in the accuracy of responses) were conducted.

Of the 1,200 purchasing managers whom we attempted to reach, we were able to make telephone contact (after three attempts) with 632 individuals (21 of those contacted were dropped because they had not had direct and extensive dealings with their suppliers for a period of time or were not willing to participate in the study). We then mailed out the questionnaire to the 611 potential participants. Enclosed with each questionnaire was a letter endorsing the aims of the research and encouraging participation from the vice president of research of the national professional development association for purchasing managers. Three weeks after mailing, we received 187 completed surveys, thus yielding a response rate of 30.6 percent. This response rate is within the range of those reported by the majority of studies in this research area. Based on our post hoc checks, we eliminated 3 respondents from subsequent analyses. The results, therefore, are based on a sample of 184 completed responses.

We assessed nonresponse bias following the procedures developed by Armstrong and Overton (1977). Early respondents were defined as the first one third of all respondents in the data set, whereas late respondents were the last one third of all respondents in the data set. The early and late respondents were compared on a number of different characteristics, and no significant differences were found (see Table 1). Based on these nonsignificant results, we concluded that nonresponse bias was not a problem.

## ANALYSES AND RESULTS

### Measurement Model

We conducted a preliminary examination of the validity of our measures by examining the item-to-total correlations for the set of items corresponding to each of the theoretical constructs in the model. Items exhibiting low item-to-total correlations were dropped from subsequent analyses. Following this, we performed an exploratory factor analysis to identify and delete those items that had high cross loadings (Churchill 1979) (see the appendix for details).

Subsequent to these preliminary procedures, a confirmatory factor analysis (CFA) was performed on a measurement model wherein each item was restricted to load on its prespecified factor, with the factors themselves being left free to correlate (Gerbing and Anderson 1988). Elliptical reweighted least squares (ERLS) estimation (Sharma, Durvasula, and Dillon 1989) in EQS provides evidence for model fit. Although the chi-square of the model is significant (chi-square = 454.15,  $df = 110$ ,  $p < .001$ ), the other fit indices (average off-diagonal standardized residual [AOSR] = .08; Comparative Fit Index [CFI] = .90) suggest a reasonable fit of the model to the data.

**TABLE 2**  
Measurement Model Results

Factor	Items	Standardized	
		Factor Loading	t Value
Manufacturer asset specificity	MAS1	.78	12.16
	MAS2	.78	12.15
	MAS3	.79	12.34
Supplier asset specificity	SAS1	.76	11.74
	SAS2	.81	12.87
	SAS3	.79	12.41
Decision-making uncertainty	DMU1	.79	12.77
	DMU2	.99	19.08
	DMU3	.68	10.49
Trust in supplier	TRUST1	.70	10.76
	TRUST2	.83	13.73
	TRUST3	.98	18.36
Joint action	JA1	.79	12.42
	JA2	.69	10.11
	JA3	.78	12.09
	JA4	.62	8.86

NOTE: Fit statistics for measurement model of 16 indicators and five constructs: chi-square = 454.15,  $df = 110$ ,  $p < .001$ ; average off-diagonal standardized residual (AOSR) = .08; Normed Fit Index = .87; Non-normed Fit Index = .89; Comparative Fit Index = .90. Item error variances were constrained to values determined in initial runs.

Examination of the individual item loadings showed that each of the loadings was large and significant (see Table 2). These results provide evidence for the convergent validity of each of the measures. Examination of scale reliabilities showed that the construct reliability associated with each scale was greater than .80 (Hair, Anderson, Tatham, and Black 1995:665).

To assess the discriminant validity of the measures, we compared the results of the above-reported measurement model with a series of 10 different revised measurement models, in which the correlation between each pairwise combination of constructs was constrained to unity. All of the chi-square difference tests were significant (change in chi-square > 100,  $df = 1$ ,  $p < .001$ , was the weakest result), thereby providing evidence of the discriminant validity of the measures (Bagozzi, Yi, and Phillips 1991). Based on the above set of results, we concluded that the scales used in this research have satisfactory measurement properties.

### Theoretical Model

The hypotheses were tested by estimating the following equation using ordinary least squares regression and composite indexes of our construct scales:

$$JA = b1D1 + b1D2 + b2RELPOW + b3LENGTH + b4MAS + b5SAS + b6DMU + b7TRUST + b8MAS \times SAS + b9MAS \times DMU + b10MAS \times TRUST + e1.$$

JA is the dependent variable in our model. Since the sample comprised data from three SIC codes, this control

**TABLE 3**  
**Correlation Matrix of Variables<sup>a</sup> and Reliability Estimates**

	1	2	3	4	5	6	7	8
1. Manufacturer asset specificity (MAS)	1.00							
2. Supplier asset specificity (SAS)	.57	1.00						
3. Decision-making uncertainty (DMU)	-.12	-.37	1.00					
4. Trust in supplier (TRUST)	-.01	.35	-.75	1.00				
5. MAS × SAS <sup>b</sup>	-.00	-.00	-.00	-.16	1.00			
6. MAS × DMU <sup>b</sup>	.00	-.17	.00	.10	-.20	1.00		
7. MAS × TRUST <sup>b</sup>	-.01	.16	.07	-.01	.07	-.71	1.00	
8. Joint action (JA)	.38	.53	-.40	.42	-.09	.14	.00	1.00
Means	3.82	3.56	4.71	4.10				4.24
Standard deviation	1.67	1.58	1.71	1.65				1.46
Construct reliability	.83	.83	.87	.88				.81

a.  $r > .16$  are significant at  $p < .01$  (one-tailed) for  $n = 184$ .

b. Residual interaction terms.

variable is therefore coded using two dummy variables (D1 and D2). RELPOW and LENGTH are the other control variables. MAS, SAS, DMU, and TRUST are the theory-based variables in the model.

In models wherein both the main and interaction effects are simultaneously estimated, the presence of multicollinearity is likely (Cronbach 1987). Examination of the correlation matrix showed that a number of correlations between variables and the interaction terms of which they were part were exceedingly high ( $r > .90$ ), thus indicating multicollinearity. Calculation of the variance inflation factors (VIFs) showed that the value of many of these factors exceeded the cutoff value of 10, thus confirming the presence of multicollinearity in the data (Neter, Wasserman, and Kutner 1990). To overcome the multicollinearity problem, we adopted the residual-centering procedure as detailed by Lance (1988). As evidenced from the correlation matrix reported in Table 3, using the residuals of the interaction terms, as opposed to the interaction terms themselves, eliminates the correlation between the variables and their interaction terms. Examination of the VIFs for each of the main effect and residual interaction terms showed that none exceeded the value of two, which is well below Neter et al.'s (1990) recommended cut-off value that would indicate multicollinearity.

We used a hierarchical regression procedure to estimate the above equation. In Step 1, only the control variables were entered. The explained variance of the control variables entered as a block is marginally significant ( $r^2 = .02$ ,  $F = 2.14$ ,  $p < .10$ ). In Step 2, the main effect of manufacturer-specific assets along with the main effects of the three moderator variables were entered. The explained variance of these main effects entered as a block is significant (change in  $r^2 = .42$ ,  $F = 34.63$ ,  $p < .01$ ). Finally, the interaction effects were entered as a block, and their additional contribution to the explained variance of the dependent variable is also significant (change in  $r^2 = .05$ ,  $F = 5.56$ ,  $p < .01$ ). The variance explained (adjusted  $r^2$ ) by

our total model is .48 (see Table 4), which compares favorably with prior research on JA (Heide and John 1990; Zaheer and Venkatraman 1995).

The findings from the test of hypotheses follow:

*Hypothesis 1:* Our expectation of a positive main effect of MAS on JA was supported ( $b = .20$ ,  $t = 2.81$ ,  $p < .01$ ).

*Hypothesis 2:* We predicted a negative coefficient on the interaction term between manufacturer and SAS. Although in the expected direction, the result was nonsignificant and thus did not support our hypothesis ( $b = -.08$ ,  $t = -1.35$ ,  $p > .10$ ).

*Hypothesis 3:* We predicted a positive coefficient on the interaction term between MAS and DMU. Consistent with this ( $b = .29$ ,  $t = 3.41$ ,  $p < .01$ ), results showed that the positive relationship between MAS and JA is enhanced with increasing levels of DMU.

*Hypothesis 4:* We predicted a positive coefficient on the interaction term between MAS and trust. Consistent with this expectation ( $b = .18$ ,  $t = 2.22$ ,  $p < .01$ ), results showed that the positive relationship between MAS and JA is enhanced with increasing levels of manufacturer trust in the supplier.

## Other Results

Consideration of the main effects of the moderator and control variables provides useful additional insights into the determinants of JA. As for the main effects of the moderators, consistent with prior research (Heide and John 1990), there was a positive main effect of SAS on JA ( $b = .34$ ,  $t = 4.44$ ,  $p < .01$ ). While prior research on JA (Heide and John 1990; Zaheer and Venkatraman 1995) has examined the indirect influence of uncertainty on JA, we examined the direct relationship between these two constructs. Consistent with TCA reasoning and the results from these prior empirical studies, uncertainty had a negative main effect on JA ( $b = -.16$ ,  $t = -1.76$ ,  $p < .05$ ). Finally, consistent with prior research (Zaheer and Venkatraman 1995), trust had a positive main effect on JA ( $b = .24$ ,  $t = 2.39$ ,  $p < .01$ ).

**TABLE 4**  
**Estimated Model**

Independent Variables	Dependent Variable	
	Joint Action (JA)	Standardized Coefficient (t value)
Constant	.00	(2.37)*
D1 <sup>a</sup>	.11	(1.47)
D2 <sup>a</sup>	-.07	(-0.94)
Relative power (RELPOW)	.25	(4.60)*
Length of relationship (LENGTH)	-.11	(-1.79)**
Manufacturer asset specificity (MAS)	.20	(2.81)*
Supplier asset specificity (SAS)	.34	(4.44)*
Decision-making uncertainty (DMU)	-.16	(-1.76)**
Trust in supplier (TRUST)	.24	(2.39)*
MAS × SAS	-.08	(-1.35)
MAS × DMU	.29	(3.41)*
MAS × TRUST	.18	(2.22)*
R <sub>2</sub> adj	.48	
F (n, m)	(11,172) = 16.56*	

a. The three SIC codes (SIC 35, 36, and 37) were represented by two dummy variables.

\* Significant at  $p < .01$  (one-tailed). \*\* Significant at  $p < .05$  (one-tailed).

With respect to the control variables, the effects of SIC on JA were not significant. However, consistent with our speculation that the powerful party can impose JA on their partner, relative power was positively related to JA ( $b = .25$ ,  $t = 4.60$ ,  $p < .01$ ). Contrary to our expectation and to the results from prior research (Heide and John 1990), the effect of relationship length on JA was negative ( $b = -.11$ ,  $t = -1.79$ ,  $p = .05$ ). This negative effect suggests that rather than build confidence in each other, relationship length may foster inertia, which impedes the development of new governance mechanisms such as JA.

## DISCUSSION

Our focus in this research is on moderators of the relationship between MAS and JA in the manufacturer-supplier relationship. Consistent with prior research (Heide and John 1990; Zaheer and Venkatraman 1995), we found support for a positive main effect between MAS and JA. Furthermore, we found that the interaction terms involving MAS with SAS, DMU, and trust, when entered as a block, significantly increased the explained variance in JA. This confirms our general argument that there exist boundary conditions that enhance the main effect between MAS and JA in the manufacturer-supplier relationship.

Examining the moderator effects individually, we found that both DMU and trust moderated the focal main effect significantly and in the proposed positive direction. With respect to uncertainty, we found that the main effect of MAS on JA was strengthened under conditions of high uncertainty. This supports our revised TCA argument of

uncertainty as a moderator of the relationship between asset specificity and JA. JA not only provides safeguarding protection but also fosters flexibility. Thus, when both MAS and DMU are high, the latter reinforces the impetus to turn to JA.

Trust also strengthens the focal main effect, thereby supporting prior conceptual arguments that the presence of trust in transactions enhances the capability of governance mechanisms (Barney and Hansen 1994; Chiles and McMackin 1996). High asset specificity transactions that would conventionally be assigned to hierarchical governance are now assigned to JA (which is a less specialized governance form) given high trust. While both of these moderator relationships have been discussed at a conceptual level, to the best of our knowledge, we are among the first researchers to empirically validate these arguments in the context of JA in manufacturer-supplier relationships.

The proposed moderator effect of SAS on the focal main effect did not materialize. Given the strong theoretical basis for this hypothesis in TCA and indirect but strong empirical support, this null result is worthy of further exploration. In this research, we first described JA as a governance mechanism whose function it is to safeguard existing specific asset investments in the manufacturer-supplier relationship. Viewed in this fashion, JA is a reactive phenomenon; that is, it arises in response to certain transaction characteristics (namely, the presence of specific asset investments by either party). When both parties make these investments, a self-enforcing agreement exists (Telser 1980) that should make the installation of an additional governance mechanism a redundant safeguard. In effect, the efficiency goal of TCA would be compromised.

However, when both parties are mutually invested in the relationship, this means that neither party is able to turn to other exchange relationships to preserve their decision-making flexibility. Since extradyadic means to maintain flexibility are foreclosed, an intradyadic alternative must be sought. JA, by virtue of the adaptation role it also plays, is a feasible governance solution in the present transaction. From this perspective, JA can be viewed as a proactive governance mechanism, one that gives both parties the assurance of a coordinated response to future changes in the external environment. Moreover, JA can also be thought of as being an evolving governance mechanism. During earlier transactions, the manufacturer-supplier dyad may have begun by engaging in JA over a limited set of issues. Successful outcomes could propel the partners to seek similar governance over an increasingly wider range of issues in future transactions (Dwyer et al. 1987; Ring and Van de Ven 1992). In this evolutionary sense, the proactivity extends over multiple transactions.

Thus, one possible explanation for the null result for the interaction between MAS and SAS on JA is that manufacturer perceptions of the proactive and reactive properties

of JA cancel each other out. However, this is not an entirely satisfactory explanation.

The extent to which the manufacturer trusts the supplier may explain whether it is the reactive or proactive view of JA that prevails. In a low-trust environment, the manufacturer's primary objective is to safeguard their investment in the present transaction. JA is apt to be viewed as an expense in this low-trust context. Since reciprocal investments are hostages, the safeguarding problem is virtually eliminated. Consequently, the need to provide additional safeguarding protection by establishing JA would be an inefficient and redundant governance solution. However, when the manufacturer trusts the supplier, the manufacturer's primary objective is likely to be focused on *developing/sustaining the ongoing exchange relationship* more so than the present transaction. JA, in this high-trust context, would be seen as a long-term investment. These conjectures suggest that the proposed moderator effect of SAS on the focal main effect may itself be moderated by the third variable, manufacturer trust in the supplier. Specifically, we speculate on the possibility of a three-way interaction between MAS, SAS, and manufacturer trust in the supplier. The reactive explanation (SAS attenuates the relationship between MAS and JA) should hold under conditions of low trust, while the proactive explanation (SAS enhances the relationship between MAS and JA) should be present when a high degree of trust exists.

To explore the proposition of a three-way interaction between MAS, SAS, and manufacturer trust in the supplier, we reanalyzed our data by including the three-way interaction term in the model (change in  $r^2 = .05$ ,  $F = 18.78$ ,  $p < .01$ ) and found the result to be significant ( $b = .56$ ,  $t = 4.34$ ,  $p < .01$ ). To facilitate interpretation of the results, we performed a median split on trust and examined the coefficient of the two-way manufacturer asset specificity MAS  $\times$  SAS interaction term in each of the two subgroups (Aiken and West 1991:53). Consistent with the reactive perspective discussed above, in the low-trust condition, the two-way interaction term had a significant and negative coefficient ( $b = -.32$ ,  $t = -3.16$ ,  $p < .01$ ). Under high trust, although not resulting in a statistically significant effect, the coefficient on the interaction term changed signs from negative to positive ( $b = .03$ ,  $t = 0.26$ ,  $p > .10$ ), thereby providing weak support for the proactive explanation. In short, these results are consistent with our speculation about the manner by which manufacturer trust in the supplier moderates the moderator relationship of SAS on the relationship between MAS and JA.

### Theoretical Implications

The post hoc and speculative nature of the discussion of the three-way interaction must be stressed. Thus, empirical replication across different contexts is necessary to add credence to this discussion. Despite this qualification, the

results for the three-way interaction provide tantalizing empirical support for the notion that the TCA (MAS, SAS) and RET (trust) variables are interrelated. In our estimation, this three-way interaction variable represents a novel construct, *relational interspecificity*. The *interspecificity* component of the construct refers to the specific asset investments of both exchange partners, while the *relational* adjective incorporates the social context of the exchange relationship.

Prior research has integrated insights from both TCA and RET to develop models that explain JA (Heide and John 1990; Zaheer and Venkatraman 1995). However, the type of theoretical integration that we propose is significantly different from that developed in these prior studies. In both the Heide and John (1990) and Zaheer and Venkatraman (1995) models, the TCA and RET variables remain distinct from each other since only main effects were tested. In contrast, the relational interspecificity construct we propose represents the interrelationship or intertwining of the TCA and RET variables.

TCA and RET are distinctive theoretical lenses through which transactions can be viewed. Each lens focuses our attention on different aspects of a transaction and the exchange relationship in which it is embedded. Asset specificity from TCA concentrates on the internal structure of the transaction, whereas trust from RET exemplifies the dyad's relational climate. While the conceptual distinction between these TCA and RET variables is a function of these lenses, the interrelationship among these variables is also a characteristic of exchange relationships, as depicted by the political economy framework (Achrol, Reve, and Stern 1983). Thus, these TCA and RET variables are intertwined aspects of the dyad's internal economy and polity that can be tested more rigorously through the creation of the multiplicative variable, relational interspecificity. While being psychometrically "messy," the development of multiplicative variables such as this can further our understanding of exchange phenomena by fostering conceptual models that are both comprehensive in the identification of the different facets of transactions and complex in terms of examining the interrelationships of these facets.

### Managerial Implications

While researchers have noted the explosion in the establishment of JA arrangements over the past two decades (Han et al. 1993; Powell 1987; Webster 1992), their success rate has been alarmingly low, that is, in the vicinity of 30 percent (Geringer and Hebert 1991; Parkhe 1993). Given the risks of entering JA arrangements—that is, the time, personnel, and resources that must be committed, as well as the opportunity costs of foregone exchange relationships (Sheth and Parvatiyar 1995)—a manufacturer's decision to enter into such arrangements must be a

carefully calculated one (Leenders and Blenkhorn 1988; Pilling and Zhang 1992). Furthermore, given these risks and costs, it is important that the prevailing wisdom on the conditions under which JA is most suitable be put to the test. While these risks and costs were not explicitly measured in this research, our conceptual model has an implicit normative foundation in that it is predicated on the premise that the predicted actions have positive performance implications. Given this normative (albeit implicit) foundation, our research results yield potentially significant managerial implications.

Prior research has shown that JA is appropriate when specific assets are at stake. Manufacturers that have invested specific assets in a supplier are advised to adopt JA with this supplier (Heide and John 1990:34). Our research supports this argument but adds two important qualifiers. First, we found that the main effect of MAS on JA was strengthened under conditions of high DMU. Invested manufacturers that were uncertain about supplier behavior were especially likely to form JA arrangements with these suppliers. Given this combination of conditions, JA is more efficient than other forms of nonmarket governance; it not only safeguards a manufacturer's investments but also reduces uncertainty by virtue of the added control and increased ability to verify the supplier's actions inherently present with this type of governance. Second, we found that the combination of specific asset investments and trust in the supplier made JA especially likely. Specific asset investments create an economic motivation for manufacturers to establish JA; trust, on the other hand, provides them with the psychological motivation to make the resource commitments necessary to establish this nonmarket mode of governance. The absence of this psychological motivation significantly reduces the transformation of economic motivation into JA. Our post hoc finding of a significant three-way interaction among manufacturer- and supplier-specific assets and trust also suggests that the level of trust that the manufacturer holds in the supplier serves to frame whether JA will be viewed reactively or proactively. Accordingly, it is essential that manufacturers focus not just on the respective levels of specific asset investments when making governance decisions. They must also take into account the extent of trust that they feel toward the supplier.

### Limitations and Directions for Future Research

We offer our research findings with the caveat that they are subject to some methodological limitations. While our study deals with manufacturer-supplier dyads, data are collected from only one partner in the dyad. What we have in this research, for example, are manufacturer perceptions of specific asset investments made by the supplier and manufacturer perception of the extent of JA that takes

place in the relationship. It would be beneficial to have these perceptions validated by data from the supplier's perspective.

We make causal arguments in this research and yet offer only a cross-sectional test for these arguments. A cross-sectional study provides correlational data; causal inferences cannot be made from such data. A longitudinal methodology whereby the evolution of a manufacturer-supplier relationship is measured would be the optimal design to support causal arguments. Finally, consistent with TCA, the relationships in our conceptual model are motivated in significant part by normative transaction-cost-minimizing reasoning. Despite this, however, we do not measure the performance implications of crafting JA in response to particular antecedents. Future research should remedy this deficiency, thereby offering a more comprehensive test for the normative arguments.

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### APPENDIX

#### Scales Used to Measure the Theoretical Constructs

- A. Manufacturer Asset Specificity
- MAS1. We have made significant investments in resources dedicated to our relationship with this supplier.
  - MAS2. Our operating process has been tailored to meet the requirements of dealing with this supplier.
  - MAS3. Training and qualifying this supplier has involved substantial commitments of time and money.
  - MAS4. This supplier has some unusual technological norms and standards that have required extensive adaptation on our part.<sup>a</sup>
- Format: 1 = *strongly disagree* to 7 = *strongly agree*.
- B. Supplier Asset Specificity
- SAS1. This supplier has made significant investments in resources dedicated to their relationship with us.
  - SAS2. This supplier's operating process has been tailored to meet the requirements of our organization.
  - SAS3. Training our people has involved substantial commitments of time and money for this supplier.
  - SAS4. Our company has some unusual technological norms and standards that have required extensive adaptation by this supplier.<sup>a</sup>
- Format: 1 = *strongly disagree* to 7 = *strongly agree*.
- C. Decision-Making Uncertainty (reverse coded)
- DMU1. We can accurately predict the prices for the input component that will be charged by this supplier in our next procurement cycle.

DMU2. We can accurately predict the delivery performance (% of on-time deliveries) of this supplier for our next procurement cycle.

DMU3. We know that this supplier will adapt quickly, should we have to change our order specifications at short notice.

Format: 1 = *strongly disagree* to 7 = *strongly agree*.

#### D. Trust

TRUST1. If problems such as shipment delays arise, this supplier is honest about the problems.

TRUST2. When making important decisions, this supplier is concerned about our welfare.

TRUST3. When it comes to things that are important to us, we can depend on this supplier's support.

TRUST4. In times of shortage, this supplier goes out on a limb for us.<sup>b</sup>

Format: 1 = *strongly disagree* to 7 = *strongly agree*.

#### E. Joint Action

JA1. We work jointly with this supplier on all product modification issues that may affect this supplier.

JA2. We work jointly with this supplier on all cost-cutting issues that may affect this supplier.

JA3. Our long-range plans are formed jointly with this supplier.

JA4. We have developed a work environment wherein both we and this supplier feel part of each other's organization.

JA5. We work jointly with the supplier in training their people.<sup>b</sup>

JA6. We work jointly with the supplier in training our people.<sup>b</sup>

Format: 1 = *strongly disagree* to 7 = *strongly agree*.

#### F. Standard Industrial Classification (SIC)

1. SIC 35

2. SIC 36

3. SIC 37

#### G. Relative Power

RELPOW 1. With respect to sales volume last year, how large is your firm relative to this supplier?

Format: 1 = *much smaller* to 7 = *much larger*.

#### H. Length of the Relationship

LENGTH 1. How long has your company been buying these or any other items from this supplier? \_\_\_\_\_ months

a. Item dropped due to low item-to-total correlation.

b. Item dropped due to cross loading. TRUST4 cross loaded on decision-making uncertainty, JA5 cross loaded on manufacturer asset specificity, and JA6 cross loaded on supplier asset specificity.

## NOTES

1. Value analysis is a process whereby manufacturers jointly engage with their suppliers to systematically evaluate the input components that go into the making of the manufacturer's end product. The objectives of this process are (1) to identify the value that each input component adds to the final product and (2) to discern synergistic links among the input components. As a result of this process, input components may be redesigned to enhance their value and/or to establish synergistic links with other input components to the product (Leenders and Blenkhorn 1988).

2. TCE refers to transaction cost economics. Williamson's framework is typically referred to as TCE in the management literature and as TCA in the marketing literature.

3. We say "indirect" because it is not asset specificity but partner replaceability that is operationalized in both the Kumar, Scheer, and Steenkamp (1995) and Heide (1994) studies. However, since asset speci-

ficity, like replaceability, is a measure of dependence (Frazier, Gill, and Kale 1989; Heide and John 1988), we believe that results from these prior studies are relevant.

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