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Author(s): Aric Rindfleisch and Jan B. Heide

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Transaction Cost Analysis: Past, Present, and Future Applications

Over the past decade, transaction cost analysis (TCA) has received considerable attention in the marketing literature. Marketing scholars have made important contributions in extending and refining TCA's original conceptual framework. The authors provide a synthesis and integration of recent contributions to TCA by both marketers and scholars in related disciplines, an evaluation of recent critiques of TCA, and an agenda for further research on TCA.

Over the past decade, transaction cost analysis (TCA) has received an increased amount of attention from a broad range of audiences. Evidence of this attention takes many forms, the most visible being the recent Nobel award in Economics given to Ronald Coase for his early work on transaction costs (Coase 1991). Although most strongly advocated by economists such as Oliver Williamson and Paul Joskow, TCA has generated considerable interest in other academic disciplines beyond economics, including sociology (e.g., Granovetter 1985), political science (e.g., Moe 1991), organization theory (e.g., Barney and Hesterly 1996), contract law (e.g., Palay 1984), business strategy (e.g., Hennart 1988), corporate finance (e.g., Smith and Schnucker 1994), and marketing (e.g., Anderson 1985).

A particular manifestation of recent interest in TCA is a large number of empirical applications. Much of the empirical work has been conducted by marketing scholars. There are at least two reasons for this: First, TCA's substantive focus on exchange makes it relevant to a wide range of marketing phenomena, including vertical integration decisions (e.g., Anderson 1985; John and Weitz 1988), foreign market entry strategy (e.g., Anderson and Coughlan 1987; Klein, Frazier, and Roth 1990), sales force control and compensation issues (e.g., Anderson 1988; John and Weitz 1989), industrial purchasing strategy (e.g., Noordewier, John, and Nevin 1990; Stump and Heide 1996), and distribution channel management (e.g., Anderson and Weitz 1992; Heide and John 1988). Second, marketing's rich tradition in construct measurement and survey research techniques has contributed to the operationalization and testing of important parts of the TCA framework. As has been noted by several scholars, measures of TCA's central constructs often are not

available from secondary data, and valid empirical tests often require that "micro-level data" be collected at the level of the actual decision maker (Calfee and Rubin 1993; Joskow 1991; Williamson 1985).

In spite of this recent attention, insights from TCA applications still appear to be somewhat underutilized. Two particular problems exist: First, though the extant empirical research has led to important refinements of early versions of the TCA framework (e.g., Coase 1937; Williamson 1975, 1985), many of these refinements are not well known. This is evidenced by a tendency among TCA's critics to focus on its initial versions (e.g., Ghoshal and Moran 1996; Hill 1990). Many scholars view TCA as synonymous with Williamson's (1975) *Markets and Hierarchies* and ignore subsequent empirical work. Consequently, it is difficult to evaluate the merit of such critiques, and empirical refinements have a reduced impact on the development of TCA's theoretical framework.

Second, TCA's empirical research is not well integrated. Considered as a whole, the literature has identified a set of distinct antecedent conditions or governance *problems*, such as safeguarding specific assets. These are TCA's independent variables. Transaction cost analysis's dependent variables are the governance *mechanisms*, which are used to manage these problems. A variety of mechanisms have been identified in previous research, including pledges (Anderson and Weitz 1992), qualification procedures (Heide and John 1990), monitoring (Stump and Heide 1996), and contracts (Joskow 1987).

Unfortunately, the TCA literature lacks a thorough review that organizes and summarizes the empirical evidence regarding governance problems and mechanisms. As a result, it is unclear what exactly has been learned by the extant TCA research and what unresolved questions remain. Our purpose is to address this concern by providing such a review. We begin with a brief overview of TCA, its origins, underlying assumptions, and key constructs. By addressing issues of interest to marketing scholars, we then provide a review that synthesizes and integrates the findings of 45 key empirical TCA studies across a broad range of disciplines. We end with a discussion of TCA's unresolved theoretical issues and offer directions for further research.

Aric Rindfleisch is Assistant Professor of Marketing, College of Business and Public Administration, University of Arizona. At the time this work was completed, he was a doctoral candidate in Marketing, University of Wisconsin-Madison. Jan B. Heide is Associate Professor of Marketing, School of Business, University of Wisconsin-Madison. The authors thank Jack Nevin, Thani Jambulingam, Christine Moorman, Antony Santos, and three anonymous reviewers for their helpful comments on earlier versions of this article.

Transaction Cost Analysis: Origins and Overview

Transaction cost analysis belongs to the “New Institutional Economics” paradigm, which, over time, has supplanted traditional neoclassical economics. Although neoclassical economics has largely ignored the concept of the firm by viewing it strictly as a production function (Barney and Hesterly 1996), TCA explicitly views the firm as a *governance structure*. One of Coase’s (1937) initial propositions was that firms and markets are alternative governance structures that differ in their transaction costs. Specifically, Coase proposes that under certain conditions, the costs of conducting economic exchange in a market may exceed the costs of organizing the exchange within a firm. In this context, transaction costs are the “costs of running the system” and include such *ex ante* costs as drafting and negotiating contracts and such *ex post* costs as monitoring and enforcing agreements.

Over the past two decades, Williamson (1975, 1985, 1996) has added considerable precision to Coase’s general argument by identifying the types of exchanges that are more appropriately conducted within firm boundaries than within the market. He also has augmented Coase’s initial framework by suggesting that transaction costs include both the *direct costs* of managing relationships and the possible *opportunity costs* of making inferior governance decisions. Williamson’s microanalytical framework rests on the interplay between two main assumptions of human behavior (i.e., bounded rationality and opportunism) and two key dimensions of transactions (i.e., asset specificity and uncertainty). We next provide a brief description of the interaction between these behavioral assumptions and transaction dimensions.

Assumptions and Dimensions of Transaction Cost Analysis

Bounded rationality is the assumption that decision makers have constraints on their cognitive capabilities and limits on their rationality. Although decision makers often intend to act rationally, this intention may be circumscribed by their limited information processing and communication ability (Simon 1957). According to TCA, these constraints become problematic in uncertain environments, in which the circumstances surrounding an exchange cannot be specified *ex ante* (i.e., environmental uncertainty) and performance cannot be easily verified *ex post* (i.e., behavioral uncertainty).

The primary consequence of environmental uncertainty is an adaptation problem, that is, difficulties with modifying agreements to changing circumstances. For example, a manufacturer that, because of competitive entry, must modify the design of its product also may need to modify the design of the purchased components that constitute the end product. Unless a comprehensive contract can be written with its supplier, which specifies in advance the required component designs and the associated terms of trade, the manufacturer may need to assume the considerable transaction costs associated with ongoing renegotiations.

The effect of behavioral uncertainty is a performance evaluation problem, that is, difficulties in verifying whether compliance with established agreements has occurred. For

example, a manufacturer may have difficulty ascertaining whether a distributor is providing customers with necessary presales services. Alternatively, even if the relevant aspects of a distributor’s operations can be measured, the information gathering and processing costs incurred by the manufacturer may be substantial.

Opportunism is the assumption that, given the opportunity, decision makers may unscrupulously seek to serve their self-interests, and that it is difficult to know *a priori* who is trustworthy and who is not (Barney 1990). Williamson (1985, p. 47) defines opportunism as “self-interest seeking with guile,” and suggests that it includes such behaviors as lying and cheating, as well as more subtle forms of deceit, such as violating agreements. Opportunism poses a problem to the extent that a relationship is supported by specific assets whose values are limited outside of the focal relationship. For example, a manufacturer that invests in training a distributor may subsequently have difficulty replacing the distributor with a new one. The incumbent distributor can exploit the situation opportunistically by demanding various kinds of concessions from the manufacturer. Essentially, the effect of specific assets is to create a safeguarding problem, because market competition no longer serves as a restraint on opportunism.¹

In addition to the key assumptions and dimensions previously outlined, the complete TCA framework also includes *risk neutrality* as a third behavioral assumption and *transaction frequency* as a third transactional dimension. Both of these constructs are specified by Williamson (1975, 1985) but have received limited attention in the TCA literature. Chiles and McMackin (1996) provide a theoretical discussion of the validity of TCA’s assumption of risk neutrality, but there are no empirical investigations of this assumption. To date, only a few TCA studies explicitly address transaction frequency.² According to Williamson (1985, p. 60), higher levels of transaction frequency provide an incentive for firms to employ hierarchical governance, because “the cost of specialized governance structures will be easier to recover for large transactions of a recurring kind.” Because of the limited attention that previous research has given to both the assumption of risk neutrality and the dimension of transaction frequency, our review does not address these parts of the TCA framework.

¹The safeguarding problem discussed in TCA closely parallels the discussion of dependence in resource dependence and social exchange theory (e.g., Pfeffer and Salancik 1978), because specific assets give rise to “replaceability” problems. However, TCA differs from these perspectives because it focuses on governance problems and their solutions simultaneously, rather than on managing dependence *ex post*. Moreover, TCA explicitly considers the efficiency implications of a firm’s governance choices.

²To date, TCA researchers have been largely unsuccessful in confirming the hypothesized effects of frequency, in that several studies have failed to find any positive association between transaction frequency and hierarchical governance (e.g., Anderson 1985; Anderson and Schmittlein 1984; Maltz 1993, 1994). For an exception, see Klein (1989). Several other researchers consider frequency as a dichotomous phenomena (one-time versus recurring transactions) and thereby control for transaction frequency by examining only recurring exchanges (e.g. John and Weitz 1988; Klein, Frazier, and Roth 1990).

The Logic of Transaction Cost Analysis

The basic premise of TCA is that if adaptation, performance evaluation, and safeguarding costs are absent or low, economic actors will favor market governance. If these costs are high enough to exceed the production cost advantages of the market, firms will favor internal organization. The logic behind this argument is based on certain *a priori* assumptions about the properties of internal organization and its ability to minimize transaction costs. Three specific aspects of organizations are relevant in this respect. First, organizations have more powerful control and monitoring mechanisms available than do markets because of their ability to measure and reward behavior as well as output (Eisenhardt 1985; Oliver and Anderson 1987). As a result, the firm's ability to detect opportunism and facilitate adaptation is enhanced. Second, organizations are able to provide rewards that are long term in nature, such as promotion opportunities. The effect of such rewards is to reduce the payoff from opportunistic behavior. Third, Williamson (1975) acknowledges the possible effects of the organizational atmosphere, in which organizational culture and socialization processes may create convergent goals between parties and reduce opportunism *ex ante*.

Although TCA's original framework poses the governance question as a discrete choice between market exchange and internal organization, the current version of the theory explicitly acknowledges that features of internal organization can be achieved without ownership or complete vertical integration. A variety of hybrid mechanisms have been identified in the literature, ranging from formal mechanisms, such as contractual provisions and equity arrangements (Joskow 1987; Osborn and Baughn 1990), to more informal mechanisms, such as information sharing and joint planning (Noordewier, John, and Nevin 1990, Palay 1984).

Transaction Cost Analysis: Empirical Research

This review provides an integration and synthesis of 45 empirical TCA articles published from 1982 to 1996 in a variety of academic journals in marketing, management, strategy, law, and economics. To identify articles for potential inclusion in this review, we conducted a comprehensive literature search using electronic databases in business and social science (e.g., ABI/Inform, PsycLit), indices of key academic journals (e.g., *Journal of Marketing*, *Journal of Law, Economics, and Organization*), and bibliographies from conceptual and empirical TCA articles. Our literature search produced over 150 citations.³ In aggregate, we

³Because our objective is to provide a review of TCA articles that address issues of interest to marketing scholars, studies that are concerned mainly with social (e.g., Treas 1993) or political institutions (e.g., Hennart and Anderson 1993), as well as those that focus on intraorganizational governance (e.g., Balakrishnan and Fox 1993), are not included here. Moreover, studies that draw on TCA reasoning but do not directly test TCA's framework (e.g., Dwyer and Oh 1988; Phillips 1982,) are not included. Finally, we omit case studies (e.g., Goldberg and Erickson 1987), as well as extensions of prior work that do not add new theory or data (e.g., Joskow 1990).

believe that our selection of articles provides a representative, though not exhaustive, selection of empirical work on TCA that is of interest to marketing scholars.⁴ A summary of the sample, focal variables, and key findings of these studies is provided in Table 1. Our review centers around a set of three specific questions: (1) In what context has TCA been applied? (2) What methods have been used to investigate TCA? and (3) How valid is TCA's conceptual framework?

In What Contexts Has Transaction Cost Analysis Been Applied?

Drawing from its interdisciplinary origins in law, economics, and organization, TCA explains a variety of problems of economic organization, ranging from marriage (e.g., Treas 1993) to international trade (e.g., Hennart and Anderson 1993). As Williamson (1985, p. ix) notes, "Any problem that can be formulated, directly, or indirectly, as a contracting problem can be investigated to advantage in transaction cost terms." Transaction cost analysis's analytical diversity is clearly evident among the studies in our review, because scholars in marketing and related disciplines have employed TCA to investigate a broad range of exchange-related issues. Specifically, these studies can be classified within one of four main contextual domains: (1) vertical integration, (2) vertical interorganizational relationships, (3) horizontal interorganizational relationships, and (4) tests of TCA's assumptions.

Vertical integration. The earliest (and most common) applications of TCA focus on the vertical integration decision. These studies typically focus on a manufacturing firm's decision to backward integrate into the supply of materials or components or forward integrate into distribution and sales. Monteverde and Teece (1982a) provide the seminal study in the context of backward integration by applying TCA to examine the make-or-buy decision for assembly components for two firms in the U.S. automobile industry. Masten, Meehan, and Snyder (1989) and Walker and Weber (1984, 1987) also provide studies of component sourcing among U.S. automobile manufacturers. This make-or-buy issue for production inputs has also been examined by Balakrishnan and Wernerfelt (1986), Levy (1985), Lieberman (1991), Masten (1984), and Masten, Meehan, and Snyder (1991). Maltz extends the make-or-buy approach by using TCA to examine the conditions under which a manufacturer would select in-house versus outsourced shipping (Maltz 1993) and warehousing functions (Maltz 1994).

In terms of forward vertical integration, TCA studies focus on the integration by manufacturers into distribution in both domestic and international contexts. For example, John and Weitz (1988) use TCA to examine forward integration into distribution and explore manufacturers' use of direct (i.e., through employees) versus indirect (i.e., through commission agents) channels of distribution. In a

⁴Although we provide the most comprehensive review of the TCA framework as applied in a marketing context, several other reviews are available in the literature (e.g., Anderson 1996; Day and Klein 1987; Joskow 1988; Lohtia, Brooks, and Krapfel 1994; Rangan, Corey, and Cespedes 1993; Shelanski and Klein 1995).

TABLE 1
Summary of Selected Transaction Cost Analysis Studies

Author(s)	Sample	Independent Variable(s)	Dependent Variable(s)	Key Findings
Anderson (1985)	159 sales managers in the electronic components industry	Asset specificity; Behavioral uncertainty; Environmental uncertainty; Interaction of asset specificity \times environmental uncertainty; Transaction frequency	Use of direct sales force versus manufacturers' representatives	Behavioral uncertainty and the interaction of asset specificity and environmental uncertainty are positively related to the use of an in-house sales force. Two of seven measures of asset specificity have a significant positive effect on sales force integration.
Anderson (1988)	169 sales managers in the electronic components industry	Asset specificity; Environmental uncertainty; Behavioral uncertainty	Level of salesperson opportunism	Higher levels of asset specificity and behavioral uncertainty are positively related to salesperson opportunism.
		Type of sales force; Degree of salesperson goal congruence; Monitoring by sales manager	Level of salesperson opportunism	In-house salespersons display less opportunism than do manufacturer representatives. Goal congruence is negatively related to salesperson opportunism.
Anderson & Coughlan (1987)	94 foreign market entry ventures by 36 U.S. semiconductor firms	Asset specificity	Use of integrated or independent channel for foreign market entry	Asset specificity is positively related to the use of an integrated channel.
Anderson & Schmittlein (1984)	145 sales managers in the electronic components industry	Asset specificity; Environmental uncertainty; Behavioral uncertainty; Interaction of asset specificity \times environmental uncertainty; Interaction of asset specificity \times behavioral uncertainty; Transaction frequency	Use of direct sales force versus manufacturers' representatives	Behavioral uncertainty and asset specificity are positively related to the use of an in-house sales force.
Anderson & Weitz (1992)	378 manufacturer-distributor dyads among five Fortune 500 companies	Manufacturer idiosyncratic investments; Distributor idiosyncratic investments; Perceptions of manufacturer idiosyncratic investments; Perceptions of distributor idiosyncratic investments	Levels of manufacturer and distributor commitment to the relationship	Idiosyncratic investments are positively related to both manufacturer and distributor commitment. Manufacturer and distributor perceptions of the other party's level of commitment are positively related to perceived idiosyncratic investments.

Author(s)	Sample	Independent Variable(s)	Dependent Variable(s)	Key Findings
Balakrishnan & Wernerfelt (1986)	93 manufacturing industries	Technological uncertainty (i.e., obsolescence)	Degree of vertical integration	Technological obsolescence has a negative impact on vertical integration.
Bucklin & Sen-gupta (1993)	98 co-marketing alliances	Expected asset specificity; Behavioral uncertainty; Transaction frequency	Level of power imbalance between focal and partner firm	Expected transaction-specific investments and expected frequency of interaction are positively associated with power imbalance.
Dutta & John (1995)	120 student subjects playing the role of electrical transformer suppliers	Number of suppliers	Supplier's selling price	Sellers in a monopoly condition extract higher prices than sellers in a duopoly condition.
	2444 semiconductor devices	Level of buyers' specific investments	Single or multiple vendor	Devices that require high levels of specific investments by buyers are more likely to be supplied by multiple vendors.
Dutta and colleagues (1995)	199 representative agencies in the electrical and mechanical industries	Manufacturer lock-in; Performance ambiguity	Single (i.e., representative only) versus dual channel (i.e., representative and house account) distribution systems	Both lock-in and performance ambiguity increase the probability that a manufacturer will use a dual channel.
Erramilli & Rao (1993)	381 foreign market entry decisions of 175 U.S. service firms	Asset specificity (i.e., idiosyncratic services)	Shared versus full-control modes of market entry	Service firms favor shared control when asset specificity is low. This tendency is moderated by country risk, firm size, and degree of separability of production and consumption.
Gates (1989)	52 semiconductor firms across North America, Europe, and Japan	Firm's product/market strategy	Perceived transaction costs	Product/market strategy costs influence managerial perceptions of selected types of transaction costs.
Gatignon & Anderson (1988)	1267 foreign subsidiaries of 180 U.S. multinational corporations	Asset specificity; Environmental uncertainty; Behavioral uncertainty; Interaction of asset specificity \times environmental uncertainty	Percent equity ownership of foreign subsidiary	Behavioral uncertainty is positively related to the percent of equity ownership.
			Total versus partial ownership of foreign subsidiary	Environmental uncertainty is negatively related to the percent of equity ownership. Total ownership is more likely under conditions of high asset specificity, high behavioral uncertainty, and low environmental uncertainty.

Author(s)	Sample	Independent Variable(s)	Dependent Variable(s)	Key Findings
Heide and John (1988)	199 manufacturers' agents in the electrical and process equipment industries	Asset specificity (invested by agency)	Level of offsetting investments by agency Replaceability of the principal	Investment in specific assets by agents is positively related to their degree of offsetting investments, and negatively related to their replaceability of the principal
Heide & John (1990)	155 manufacturing firms across several industries	Asset specificity	Extent of joint action between buyers and suppliers	Both manufacturer's and supplier's specific investments are positively related to the extent of joint action.
		Asset specificity; Environmental uncertainty (i.e., volume and technological unpredictability)	Degree of expectations of relationship continuity	Supplier's specific investments are positively related to expectations of continuity, whereas technological unpredictability is negatively related to expectations of continuity.
		Asset specificity; Behavioral uncertainty	Level of supplier verification efforts	Manufacturer's specific investments and behavioral uncertainty are positively related to verification efforts.
Heide & John (1992)	155 manufacturing firms and 60 supplier firms across several industries	Asset specificity; Relational norms	Level of buyer's control over supplier decisions	Investments in specific assets by buyers are positively related to control over supplier decisions when both parties share relational norms. In the absence of these norms, specific assets are negatively related to control over supplier decisions.
Hu & Chen (1993)	1456 Chinese joint ventures	Environmental uncertainty (i.e., sociocultural distance)	Percentage of foreign ownership of Chinese joint venture	Under conditions of high sociocultural distance, firm will seek lower percentages of joint venture ownership.
John (1984)	151 franchised dealers of a major oil company	Degree of power employed by franchisor (five different types specified); Degree of bureaucratic structuring (three different dimensions specified)	Degree of opportunism displayed by franchised dealers	Franchisee opportunism is positively related to franchisor's use of coercive power and negatively related to franchisor's use of referent power.
				Franchisee opportunism is positively related to perceptions that franchisor employs a bureaucratic mode of governance.

Author(s)	Sample	Independent Variable(s)	Dependent Variable(s)	Key Findings
John & Weitz (1988)	88 manufacturers of industrial products	Asset specificity; Environmental uncertainty; Behavioral uncertainty	Percentage of manufacturer's sales through direct distribution channels	Asset specificity, environmental uncertainty, and behavioral uncertainty are positively related to manufacturer's degree of forward vertical integration into distribution.
John & Weitz (1989)	161 manufacturers of industrial products	Salesperson replaceability; Environmental uncertainty; Behavioral uncertainty; Interaction of ability to salesperson replaceability \times environmental uncertainty	Percentage of salesperson compensation paid in salary	Behavioral uncertainty and salesperson replaceability and/or its interaction with environmental uncertainty are positively related to the percentage of salary compensation.
Joskow (1987)	277 contracts between coal suppliers and electric utilities	Asset specificity	Length of contract duration	The length of contract duration is positively related to asset specificity.
Klein (1989)	338 Canadian exporters	Asset specificity; Environmental uncertainty; Transaction frequency	Degree of vertical control of export channel	Exporters faced with high levels of asset specificity, uncertainty/complexity, and transaction frequency exert higher levels of control in international markets.
Klein & Roth (1990)	477 Canadian exporters	Asset specificity	Type of entry in foreign markets	Asset specificity moderates the impact of experience and psychic distance on the type of entry in foreign markets.
Klein & Roth (1993)	329 Canadian exporters	Environmental uncertainty; Ability to monitor channel	Level of firm's satisfaction with existing channel	Lower levels of uncertainty and higher ability to monitor are associated with higher levels of channel satisfaction.
Klein, Frazier, & Roth (1990)	375 Canadian exporters	Asset specificity; Environmental uncertainty	Level of channel integration in foreign markets	Asset specificity is positively related to the level of channel integration, whereas environmental uncertainty has mixed results on the level of channel integration.
Leffler & Rucker (1991)	153 timber harvesting contracts	Buyer's presale measurement costs; seller's monitoring costs	Lump-sum versus per-unit payment	When presale measurement costs are low, lump-sum contracts are used; when postsale monitoring costs are low, per-unit contracts are used.
Levy (1985)	69 manufacturing firms in 37 industries	Asset specificity; Environmental uncertainty	Degree of vertical integration	Firms with higher levels of specific assets and environmental uncertainty are more vertically integrated.

Author(s)	Sample	Independent Variable(s)	Dependent Variable(s)	Key Findings
Lieberman (1991)	203 U.S. producers of 34 chemical products	Supplier concentration; Asset specificity; Cost of an upstream input	Backward integration versus contractual arrangement for obtaining chemical products	Firms seek downstream integration to avoid lock-in due to specific assets; the higher the cost input, the higher the probability of backward integration.
Maltz (1993)	138 shippers in a variety of industries	Asset specificity; Environmental uncertainty; Behavioral uncertainty; Transaction frequency	Percentage of shipments delivered by private fleet	Only human specific assets are positively related to level of private fleet use.
Maltz (1994)	147 firms in a variety of manufacturing industries	Asset specificity; Transaction frequency	Probability of outsourcing warehousing function	Specific assets are negatively related to outsourcing, whereas frequency is positively related to outsourcing.
Masten (1984)	1887 components of an aerospace system	Asset specificity; Environmental Uncertainty (i.e., complexity)	Internal versus external procurement of components	Components requiring high amounts of specificity and uncertainty are more likely to be internally produced. Asset specificity and uncertainty interact to have a multiplicative effect on the tendency to produce a component internally.
Masten, Meehan, & Snyder (1989)	118 automotive components	Asset specificity	Percentage of component needs produced within the firm	Only human-specific assets are positively related to the percentage of components produced within the firm.
Masten, Meehan, & Snyder (1991)	74 components for a naval ship building project	Asset specificity; Environmental uncertainty	Internal versus external procurement of components; Cost of internal organization	Asset specificity and environmental uncertainty are positively related to internal production of components, but this effect is mainly due to a reduction in the cost of internal organization.
Monteverde & Teece (1982a)	133 automotive components	Asset specificity	Internal versus external procurement of component	Asset specificity is positively related to automobile manufacturers' internal production of components.
Monteverde & Teece (1982b)	28 components of a major U.S. automotive supplier	Value of appropriable quasi rents	Presence or absence of quasi-vertical integration	The value of appropriable quasi rents is positively related to quasi-vertical integration.
Noordewier, John, & Nevin (1990)	140 manufacturing firms who purchase ball and roller bearings	Environmental uncertainty	Level of possession and acquisition cost	Acquisition cost is lowered under conditions of uncertainty when buyers and sellers share high levels of relational governance.

Author(s)	Sample	Independent Variable(s)	Dependent Variable(s)	Key Findings
Osborn & Baughn (1990)	153 U.S.–Japan alliances	Environmental uncertainty; Intent to conduct joint Research and Development	Joint venture versus contractual agreement	Under conditions of high environmental uncertainty, alliances are likely to be governed by contractual agreements. Intention to conduct joint Research and Development is positively related to joint venture formation.
Palay (1984)	51 transactions between rail carriers and shippers	Asset specificity (i.e., idiosyncratic investment)	Five elements of governance structure	Transactions with idiosyncratic investments are likely to be governed bilaterally among the exchange partners.
Parkhe (1993)	111 manufacturing firms across a variety of industries	Perceptions of opportunistic behavior	Performance of strategic alliance; Level of specific investments; Level of contractual safeguards	Perceptions of opportunistic behavior are negatively related to alliance performance and the level of specific investments and contractual safeguards.
		History of cooperation between alliance partners	Perceptions of opportunistic behavior	A history of cooperation is negatively related to perceptions of opportunism.
		Length of time horizon; Alliance performance	Level of specific investment	Level of specific investments is positively related to length of time horizon and alliance performance.
		Payoffs from unilateral cooperation; Length of time horizon	Extent of contractual safeguards	Extent of contractual safeguards is negatively related to both payoffs from unilateral cooperation and length of time horizon.
Pilling, Crosby, & Jackson (1994)	229 purchasing personnel from aerospace, electronics, and defense firms	Asset specificity; Environmental uncertainty; Transaction frequency	Level of ex ante and ex post transaction costs	Asset specificity is positively related to both ex ante and ex post costs, environmental uncertainty is related to ex ante costs, and frequency is related to neither cost.
		Level of ex ante and ex post transaction costs	Relational closeness (six separate indicants)	Transaction costs appear to mediate the relationship between TCA dimensions and relational closeness.
Sriram, Krapfel, & Spekman (1992)	65 purchasing managers in a large manufacturing firm	Asset specificity	Perceived buyer dependence	Supplier-specific investments are negatively related to perceived buyer dependence.
		Perceived transaction costs	Propensity to collaborate	Perceived transaction costs are positively related to propensity to collaborate.

Author(s)	Sample	Independent Variable(s)	Dependent Variable(s)	Key Findings
Stump & Heide (1996)	165 chemical manufacturers	Asset specificity	Partner qualification, incentive design, and monitoring	Buyers protect specific investments through partner selection and supplier-specific investments.
		Technological uncertainty	Level of supplier-specific investments	Higher levels of uncertainty are negatively related to supplier specific investments.
		Partner qualification	Degree of monitoring	More extensive supplier qualification reduces buyer monitoring.
Walker & Poppo (1991)	99 supply relationships of a large U.S. manufacturer	Asset specificity; Level of market competition	Comparative transaction costs (supplied in-house or externally)	Asset specificity is associated with lower transaction costs within a firm than across firms.
Walker & Weber (1984)	60 make-or-buy decisions in a large U.S. automobile manufacturer	Level of market competition; Environmental uncertainty (i.e., technological and volume uncertainty)	Whether component was bought or made in-house	Make-or-buy decisions are affected significantly by market competition and volume uncertainty.
Walker & Weber (1987)	60 make-or-buy decisions in a large U.S. automobile manufacturer	Level of market competition; Environmental uncertainty (i.e., technological and volume uncertainty)	Whether component was bought or made in-house	Make-or-buy decisions are affected significantly by the interaction of market competition and volume uncertainty.
Weiss & Anderson (1992)	243 sales managers of electronic component manufacturers	Asset specificity (i.e., idiosyncratic investments); Behavioral uncertainty	Degree of manufacturer dissatisfaction with the representative	Idiosyncratic investments by representatives reduces manufacturer dissatisfaction.
			Manufacturer's likelihood of converting to a direct sales force	Behavioral uncertainty is positively related to manufacturer's intention to convert to a direct sales force.

series of studies, Anderson and colleagues (Anderson 1985; Anderson and Schmittlein 1984; Weiss and Anderson 1992) use TCA to understand the factors leading manufacturing firms to select integrated (i.e., house accounts) versus independent (i.e., manufacturers' representatives) sales forces. Dutta and colleagues (1995) provide an extension to Anderson's work by examining how TCA influences firms to employ simultaneously both house accounts and manufacturers' representatives.

A related stream of TCA research in forward vertical integration focuses on foreign market entry. For example, Anderson and Coughlan (1987) draw on TCA to examine the use of integrated versus independent distribution channels in foreign market entry ventures by U.S. semiconductor firms. Similarly, Gatignon and Anderson (1988) employ TCA to investigate the degree of control multinational cor-

porations exert over foreign subsidiaries in terms of level of integration. Klein and colleagues (Klein 1989; Klein, Frazier, and Roth 1990; Klein and Roth 1990, 1993) present a series of TCA studies that explore the vertical control strategies of Canadian exporters. In their 1993 study, Klein and Roth make an important contribution by employing TCA to understand the factors leading to a firm's satisfaction with its international marketing channels. Other innovative TCA studies in this context have investigated joint ventures in communist China (Hu and Chen 1993) and the foreign market entry of service firms (Erramilli and Rao 1993).

Vertical interorganizational relationships. Closely related to the studies of vertical integration is a diverse stream of TCA research that focuses on how governance problems can be managed without common ownership (i.e.,

complete integration). In one of the initial studies of "hybrid" governance mechanisms, Monteverde and Teece (1982b) examine the antecedents of quasi-vertical integration (i.e., the supplier makes the parts but the manufacturer owns the tools) in the U.S. automobile industry. Subsequently, Heide and John (1988) suggest that manufacturers' representatives safeguard the assets they invest in their manufacturers by balancing their dependence through the establishment of offsetting investments in their customer relationships. In their study of relationships between manufacturers and suppliers in the chemical industry, Stump and Heide (1996) investigate a variety of alternative governance mechanisms, including partner selection, incentive design, and monitoring.

By far, the most frequently investigated hybrid form of governance in the TCA literature is the development of close and enduring interorganizational ties (Macneil 1981). Heide and John (1990) use TCA to examine how buyers and suppliers use close relationships as a means of safeguarding specific investments and adapting to uncertainty. In a related study, Heide and John (1992) explore the role of relational norms as a moderator of the relationship between specific assets and vertical control in buyer-supplier relations. The utility of relational ties as a governance structure also has been investigated by Pilling, Crosby, and Jackson (1994), Noordewier, John, and Nevin (1990), Sriram, Krapfel, and Spekman (1992), and Walker and Poppo (1991). In addition, Anderson and Weitz (1992) explore the role of pledges in building commitment within manufacturer-distributor relationships.

As a final element of the vertical interorganizational relationship context, economists and legal scholars have developed a rich stream of research exploring the use of contractual arrangements. Although these studies fall outside the marketing literature, they provide important applications of TCA by investigating long-term, bilateral exchange relationships. In one of the best-known studies in this domain, Joskow (1987) investigates the role of asset specificity in determining the length of contracts between coal suppliers and electric utilities. Other important contractual-based TCA studies include Leffler and Rucker (1991) and Palay (1984).

Horizontal interorganizational relationships. Although TCA scholars have traditionally focused on vertical relationships, a growing number of studies have used TCA to understand and explain a variety of relationships between firms at the same point in the value chain. Gates (1989) contributed the first TCA study in the horizontal interorganizational relationship context with his analysis of technological cooperation in the semiconductor industry. Specifically, he examines the extent to which a firm's strategic orientation alters a manager's perceptions of the transaction costs associated with interfirm cooperation. In a later but better-known study, Bucklin and Sengupta (1993) explore the role of asset specificity, uncertainty, and frequency on power imbalances in co-marketing alliances. Other studies in this domain include Osborn and Baughn (1990) and Parkhe (1993).

Tests of transaction cost analysis's assumptions. As a final context, our review includes a few studies that have

investigated the validity of TCA's assumption. Specifically, John (1984) views opportunism as an endogenous variable in need of explanation and investigates the degree of opportunistic behavior that is displayed by the franchised dealers of a major oil company as a result of a power and bureaucratic structure. Likewise, Anderson (1988) studies the antecedents of opportunistic behavior among salespeople in the electronic components industry.⁵

What Methods Have Been Used to Investigate Transaction Cost Analysis?

In addition to its contextual diversity, the TCA literature also displays a substantial degree of methodological diversity. We highlight important methodological issues and summarize the data collection and measurement approaches employed in the TCA literature.

Data collection. Among the studies in our review, the most common means of data collection are mail surveys. These surveys are usually directed to midlevel executives at large U.S. manufacturing firms or to their channel partners. These key informants usually have a functional responsibility for some element of channel operations, either as purchasing managers (e.g., Heide and John 1990, 1992; Noordewier, John, and Nevin 1990), sales managers (e.g., Anderson 1985, 1988; John and Weitz 1988, 1989), or manufacturers' agents (e.g., Dutta et al. 1995; Heide and John 1988).

Although survey research appears to be the data collection mode of choice, a sizable number of TCA studies (especially those outside of marketing) use secondary data collection techniques. For example, Gatignon and Anderson (1988) obtained secondary data on 1267 foreign subsidiaries of 180 U.S. multinational corporations through the Harvard Multinational Enterprise Project. Similarly, Hu and Chen (1993) gathered data on the ownership structures of 1456 Chinese joint ventures from *The Chinese Investment Guide*. Other secondary data sources used by TCA researchers include the *Census of Manufacturers* (Levy 1985), the *Asian Wall Street Journal* (Osborn and Baughn 1990), industry trade publications (Lieberman 1991), and archival data from the National Science Foundation (Anderson and Coughlan 1987). Compared to survey data, these secondary data publications typically provide much larger sample sizes.

In addition to these secondary publications, another rich source of secondary data frequently employed by economists and legal scholars comes from contractual agreements between exchange partners. For example, Leffler and Rucker (1991) collect information from 188 timber harvesting contracts through interviews with key informants in the timber industry. Palay (1984) employs a similar method in his study of contractual transactions between rail freight carriers and shippers. In contrast to these two studies, Joskow (1987) uses a database of actual contracts between coal suppliers and electrical utilities. To facilitate this type of research, a depository of interorganizational contracts, the

⁵Some interesting recent work has also begun to explore the antecedents of TCA's other variables, such as asset specificity (e.g., Bensaou and Anderson 1997).

Center for Contracts and the Structure of Enterprise at the University of Pittsburgh, has been established and is available for public use. Along with secondary publications, these contractual records provide an excellent means of gathering data for historical TCA-related research.

The most recent data collection innovation in TCA research is the use of experimental methodology. For example, Pilling, Crosby, and Jackson (1994) employ a $2 \times 2 \times 2$ between-groups factorial design in which they manipulate two levels of asset specificity, uncertainty, and frequency by using a role-playing scenario. They then assess the impact of these manipulated factors on perceived transaction costs among a group of 229 purchasing managers. In a related experimental investigation, Dutta and John (1995) use student subjects to assess the degree to which technology licensing by suppliers acts as a safeguard for buyers' specific investments by restraining their trading partner's opportunistic behavior (i.e., price hikes). In addition to their experimental investigation, Dutta and John also collect secondary data on actual firm behavior. This type of multimethod approach is promising for future TCA investigations.

Measurement. Because of its contextual and methodological diversity, the empirical TCA literature presents a host of measurement-related issues for potential analysis. We focus our discussion on issues related to the *operationalization* of TCA constructs. These issues are especially important for future TCA investigators, because many of the studies in our review have faced measurement-related difficulties. Specifically, our discussion addresses the operationalization of TCA's key dependent (i.e., governance structure) and independent (asset specificity, environmental uncertainty, and behavioral uncertainty) constructs.

1. Governance structures. As was noted previously, TCA researchers have conceptualized three general types of governance structures: market, hierarchy, and various hybrid or intermediate mechanisms. In general, the studies in our review that attempt to measure markets versus hierarchies employ empirical operationalizations, which bear close correspondence to the construct's conceptual domain. For example, Walker and Weber's (1984, 1987) comparison of assembly components purchased by an outside supplier versus those produced in-house appears to align closely with the market versus hierarchy construct. Masten (1984), Masten, Meehan, and Snyder (1991), Monteverde and Teece (1982a), and Walker and Poppo (1991) employ a similar measure. Another example of a measure that appears to tap the market versus hierarchy construct is the manufacturers' representatives versus direct sales force operationalization found in Anderson's (1985) and Anderson and Schmittlein's (1984) studies.

The TCA literature also contains several studies that use continuous measures of the market versus hierarchy construct. For example, Balakrishnan and Wernerfelt (1986) specify governance structure as the degree of vertical integration, ranging from 0% to 100%. Other examples of this type of continuous conceptual operationalization (from market to hierarchy) include Gatignon and Anderson's (1988), Hu and Chen's (1993), John and Weitz's (1988), Klein's (1989), Levy's (1985), Maltz's (1993, 1994), and Masten,

Meehan, and Snyder's (1989) studies. One specification that seems somewhat problematic is the assessment of the degree of vertical integration as the ratio of value added to sales, which both Balakrishnan and Wernerfelt (1986) and Levy (1985) employ. As Balakrishnan and Wernerfelt (1986) acknowledge, this type of measure is distorted by differences in profitability among industries.

As would be expected, empirical operationalizations of hybrid or intermediate forms of governance come in a variety of forms. For example, Klein, Frazier, and Roth (1990) specify the use of joint ventures to enter foreign markets as a hybrid mode of governance falling in between merchant distributors (i.e., market) and a foreign sales subsidiary (i.e., hierarchy). Other researchers use similar operationalizations of governance structure (e.g., Erramilli and Rao 1993; Osborn and Baughn 1990). Some studies include measures of hybrid forms of governance, which more directly tap the processes represented by this type of governance structure. For example, Palay (1984) measures relational contracting as a hybrid mechanism governing relations between rail carriers and shippers by assessing five elements of their contractual relationships (i.e., means of enforcement, adaptations to changed circumstances, types of adjustments, and presence of long range and structural planning). Another example of a hybrid governance mechanism is Heide and John's (1990) measure of bilateral governance, which assesses the degree of joint action, continuity, and qualification efforts in buyer-supplier relationships.

Recently, an even broader range of governance mechanisms has been identified. For example, Stump and Heide (1996) examine how buyers safeguard their specific assets (invested in sellers) through such control mechanisms as partner selection, incentive design, and monitoring. Likewise, Parkhe (1993) studies the impact of opportunistic behavior on the level of contractual safeguards in strategic alliances. Other studies that focus on safeguarding-related issues include Anderson and Weitz (1992), Dutta and John (1995), and Heide and John (1988, 1992).

2. Asset specificity. Asset specificity refers to the transferability of the assets that support a given transaction (Williamson 1985). Assets with a high amount of specificity represent sunk costs that have little value outside of a particular exchange relationship. Williamson (1991b) has identified six main types of asset specificity: (1) site specificity, (2) physical asset specificity, (3) human asset specificity, (4) brand name capital, (5) dedicated assets, and (6) temporal specificity. We focus on human specific assets, because they represent the type of asset specificity most commonly assessed in both the empirical studies included in our review and TCA applications in general (Lohita, Brooks, and Krapfel 1994). There are at least two reasons behind its popularity: First, many TCA studies involve contexts in which human investments represent a substantial and important cost of doing business (e.g., sales, purchasing). Second, human specific assets lend themselves to a wide variety of measurement approaches, both directly through secondary data sources, such as sales reports, and indirectly through survey instruments.

Transaction cost analysis researchers typically treat human asset specificity as a latent construct and assess it using multi-item scales. The most commonly used measure of human asset specificity is Anderson's (1985, 1988) ten-item company nature scale. This scale "reflects how necessary it is for salespeople to forge working relationships with the firm in order to be effective and how much salespeople must learn" (Anderson 1985, p. 243). Variations of this measure also have been successfully employed by Anderson and Schmittlein (1984), Heide and John (1988, 1990, 1992), John and Weitz (1989), Klein (1989), Klein and Roth (1990), Klein, Frazier, and Roth (1990), Maltz (1993, 1994), Stump and Heide (1996), and Weiss and Anderson (1992). Across all of these studies, this measure consistently demonstrates high levels of unidimensionality and internal consistency. Furthermore, this measure appears to have an acceptable degree of convergent and discriminant validity (for validity test information, see Heide and John 1990; Klein, Frazier, and Roth 1990).

Other multi-item measures that focus on human asset specificity and appear to display reasonable internal consistency can be found in Anderson and Coughlan's (1987), Erramilli and Rao's (1993), and Sriram, Krapfel, and Spekman's (1992) studies. A few TCA studies employ single-item measures of either human specific assets (e.g., Bucklin and Sengupta 1993; John and Weitz 1988; Walker and Poppo 1991) or asset specificity in general (e.g., Parkhe 1993). For example, John and Weitz (1988) measure human asset specificity by using a single item that assesses the length of time a newly hired salesperson would need to become familiar with the firm's products and customers.

Although human asset specificity is typically measured through some form of survey instrument, many studies assess this construct through secondary data indicants. For example, Monteverde and Teece (1982a) assess human asset specificity by obtaining engineering cost ratings for automobile components. Studies by Masten and colleagues follow a similar approach (i.e., Masten 1984; Masten, Meehan, and Snyder 1989, 1991). Indicants such as these provide only an approximate specification of the construct, which leads to potential construct validity problems. However, given the constraints of secondary data, more direct measures may not be available. In such situations, multimethod approaches may be needed to establish construct validity prior to testing substantive hypotheses.

3. Environmental uncertainty. As is theorized in the TCA literature, environmental uncertainty refers to "unanticipated changes in circumstances surrounding an exchange" (Noordewier, John, and Nevin 1990, p. 82). Among all the TCA constructs, environmental uncertainty seems to be the most problematic from a measurement standpoint. Specifically, there appear to be two competing operationalizations of this construct. The most commonly held perspective emphasizes the unpredictable nature of the external environment, whereas the second view examines both unpredictability and complexity.

The most popular operationalization of environmental uncertainty focuses on the unpredictability of the environment. For example, Anderson (1985, 1988), uses a nine-item scale that addresses elements related to both the instability

associated with environmental turbulence (e.g., complexity, volatility) and the dangers of venturing into new activities (e.g., new markets, new sales). Heide and John (1990) also conceptualize environmental uncertainty as unpredictability, but differ from Anderson in their operationalization by specifying two different types of unpredictability, volume and technological. Heide and John's (1990) technological unpredictability scale is also employed by Stump and Heide (1996). John and Weitz (1989) and Noordewier, John, and Nevin (1990) use similar measures of the unpredictability aspect of environmental uncertainty.

The opposing view of environmental uncertainty comes from Klein and colleagues (Klein 1989; Klein, Frazier, and Roth 1990). These scholars operationalize environmental uncertainty as a two-dimensional concept that entails elements of both unpredictability and changeability. Moreover, they suggest that these two types of uncertainty have opposing influences on governance structures. Specifically, they posit that whereas unpredictability encourages firms to form hierarchical mechanisms, changeability has just the opposite effect. For example, Klein (1989) distinguishes between dynamism and complexity as elements of environmental uncertainty. He defines uncertainty-dynamism as "the rate at which changes in the environment occur," and uncertainty-complexity as "the degree to which the respondent perceived the environment as simple or complex" (p. 257).

Having reviewed both of these two alternative conceptualizations of environmental uncertainty, the obvious question is, Which provides the appropriate conceptual domain for further TCA investigations? Ultimately, the answer must be made on theoretical grounds. If a researcher has reason to expect that key elements of the external environment could possibly act as a disincentive for hierarchical modes of governance, a multidimensional operationalization such as Klein's (1989) may be in order. In the absence of such a theoretical supposition, the traditional unpredictability operationalization may be sufficient. Another important point of consideration is the study context. For example, though the traditional unpredictability view of environmental uncertainty has commonly been employed in a domestic channel-relations context (e.g., Anderson 1985; Heide and John 1990), in which complexity is likely to be manageable, the context for Klein's (1989) and Klein, Frazier, and Roth's (1990) studies concerns foreign market entry decisions, in which complexity is likely to be a much greater concern.

In addition to these multiple-item measures, a few studies also have assessed the environmental uncertainty construct through single-item measures (e.g., Anderson and Schmittlein 1984; Masten 1984; Masten, Meehan, and Snyder 1991). For example, Anderson and Schmittlein (1984, p. 391) measure uncertainty as the "expected deviation between forecast and actual sales." Masten (1984) and Masten, Meehan, and Snyder (1991) employ a more questionable approach by asking survey respondents to classify components into dichotomous categories on the basis of their complexity.

Finally, environmental uncertainty also claims a wide variety of conceptual and empirical operationalizations among TCA scholars who employ secondary data sources. For example, Osborn and Baughn (1990) focus on techno-

logical intensity as indicated by size of research and development-to-sales ratios. Other secondary indicants of environmental uncertainty include Levy's (1985) use of stock market returns as an indicant of unanticipated events and Gatignon and Anderson's (1988) classification of country risk as an indicant of unpredictability.

4. Behavioral uncertainty. Transaction cost analysis views behavioral uncertainty as arising from the difficulties associated with monitoring the contractual performance of exchange partners (Williamson 1985). Compared to both asset specificity and environmental uncertainty, behavioral uncertainty has far fewer operationalizations. Thus, our assessment of this construct and its measurement is relatively straightforward.

Most of the studies in our review conceptualize behavioral uncertainty as the degree of difficulty associated with assessing the performance of transaction partners. This conceptualization appears to bear a close resemblance to Williamson's (1985) theoretical discussion of behavioral uncertainty. Once again, we see that many studies employ operationalizations that build on the work of Anderson (1985). Anderson views behavioral uncertainty as synonymous with the difficulty of evaluating (sales force) performance and assesses this construct with a seven-item scale, focusing on such factors as the degree of team sales and the accuracy of sales records. Anderson (1988) and Anderson and Schmittlein (1984) use variations of this measure. Several other studies use similar types of measures and conceptualize behavioral uncertainty as fundamentally an issue of performance assessment (e.g., Heide and John 1990; John and Weitz 1989; Stump and Heide 1996; Weiss and Anderson 1992).

Similar to both of the other two TCA dimensions, a few studies in our sample employ single-item measures of behavioral uncertainty. For example, Anderson and Schmittlein (1984) measure behavioral uncertainty as a single-item measure relating to the perceived difficulty of equitably measuring the results of individual salespeople. Bucklin and Sengupta (1993) and John and Weitz (1988) also use single-item behavioral uncertainty measures. In contrast to asset specificity and environmental uncertainty, there appear to be few secondary measures of behavioral uncertainty. Admittedly, such measures might be difficult to extract from secondary data sources. Among the studies in our review, Gatignon and Anderson's (1988) use of the level of international experience as a proxy for performance assessment in a foreign market entry context is the only secondary study to assess this construct.

5. General measurement-related concerns. Having completed this summary of the conceptualization and measurement of each element of the TCA framework, we now emphasize a few key points and express some general measurement-related concerns. First, as can be seen from the prior discussion, there appears to be a reasonable degree of consistency in the conceptualization and measurement of the TCA framework. Specifically, several studies build on the early work of Anderson (1985, 1988) in developing conceptual and empirical operationalizations of governance structure, asset specificity, environmental uncertainty, and

behavioral uncertainty. Thus, TCA research appears to have answered Day and Klein's (1987, p. 54) call to develop measures "that build on previous operationalizations."

Finally, we recognize one recent measurement development. In contrast to the typical approach of assessing the alignment between governance structure and transaction dimensions, a small but growing number of TCA researchers have attempted to measure transaction costs directly. This approach is capable of providing both a more direct test of TCA reasoning and an assessment of its normative implications. For example, Pilling, Crosby, and Jackson (1994) develop a 20-item measure of anticipated transaction costs that focus on ex ante costs of developing a relationship and ex post costs of monitoring performance and dealing with opportunistic behavior. Other measures or indicants of perceived or actual transaction costs can be found in Gates's (1989), Leffler and Rucker's (1991), Noordewier, John, and Nevin's (1990), Sriram, Krapfel, and Spekman's (1992), and Walker and Poppo's (1991) studies.

How Valid is Transaction Cost Analysis's Conceptual Framework?

We provide an assessment of the validity of the TCA framework by synthesizing the key findings of the studies we review in terms of governance problems, their antecedent conditions, and the governance mechanisms used to manage them.

Safeguarding problem. A safeguarding problem arises when a firm deploys specific assets and fears that its partner may opportunistically exploit these investments. Thus, the antecedents of the safeguarding problem are opportunism and asset specificity. Among the studies in our review, safeguarding is the most commonly examined governance problem. These studies provide considerable support for TCA's hypothesized effects of specific assets and mixed support for its assumption about the existence of opportunistic actors.

Support for the role of opportunism comes from a recent lab study by Dutta and John (1995). This study reveals that a supplier that controls a market with a monopoly position is more likely to engage in price hikes than a supplier that shares the market with another supplier. Thus, this study lends support to Williamson's (1985) proposition that small-numbers bargaining leads to opportunistic exploitation. Additional support for opportunism comes from Anderson (1988), who finds that a direct sales force displays less opportunistic behavior than do manufacturers' representatives.

Somewhat contradictory evidence regarding the role of opportunism is also available among the studies in our review. In his examination of opportunistic behavior in interfirm relationships, John (1984, p. 287) reaches the following conclusion:

It appears that opportunism can be viewed usefully as an endogenous variable that is evoked by certain antecedents within a long-run relationship. In other words, individuals may not always behave opportunistically even if conditions permit such behavior. Refusals to honor agreements and misrepresentation of intentions cannot be taken for granted. Rather, they are induced by certain other factors.

In accordance with John's (1984) contention, Palay (1984) finds that idiosyncratic investments in rail freight relationships often lead to the development of trust between exchange parties. Finally, in his study of strategic alliances, Parkhe (1993) finds that opportunistic behavior among alliance partners is commonly attenuated by a history of prior cooperation.

Although the literature is mixed regarding the extent of opportunism in exchange relationships, it appears that when opportunism is present, it has a negative impact on performance. For example, Parkhe (1993) finds that opportunistic activities by a strategic alliance partner diminishes alliance performance. Indirect evidence of the performance-diminishing effects of opportunism comes from Pilling, Crosby, and Jackson (1994), who show that high levels of opportunism weaken the relational focus between buyers and suppliers.

Transaction cost analysis proposes that, because of the opportunistic behavior of trading partners, high levels of asset specificity increase the costs of safeguarding contractual agreements. The few studies in our review that try to measure actual or perceived transaction costs provide support for this proposition. For example, in their experimental study, Pilling, Crosby, and Jackson (1994) find that asset specificity has a significant positive impact on both ex ante and ex post transaction costs. Likewise, Walker and Poppo (1991) find that specific assets devoted to profit center transactions within a firm lead to lower transaction costs compared to specific assets invested in external suppliers.

When faced with the need to safeguard specific assets invested in an exchange relationship, early TCA work claimed that a firm generally seeks to minimize its transaction costs through vertical integration (Williamson 1985). This claim is broadly supported by the articles in our review. For example, several studies of the make-or-buy decision for production components find that parts requiring high levels of specific investments are more likely to be internally produced than externally sourced (Masten 1984; Masten, Meehan, and Snyder 1989, 1991; Monteverde and Teece 1982). Likewise, Lieberman (1991) finds that the threat of lock-in due to specific investments is positively related to backward integration by chemical manufacturers. High levels of investment in specific assets also are related positively to a firm's probability of integrating both its warehousing and shipping functions (Maltz 1993, 1994).

Other evidence for the use of vertical integration as a safeguard for specific assets comes from several studies of foreign market entry, which find that asset specificity is related positively to the use of higher levels of control in foreign markets (Anderson and Coughlan 1987; Erramilli and Rao 1993; Gatignon and Anderson 1988; Klein 1989; Klein, Frazier, and Roth 1990; Klein and Roth 1990). Likewise, in a domestic context, there is widespread support for the integration of the personal selling function under conditions of high asset specificity (Anderson 1985, 1988; Anderson and Schmittlein 1984; John and Weitz 1988). Other examples of positive relationships between specific assets and vertical integration are provided by both Levy (1985) and Walker and Poppo (1991).

As was noted previously, recent work in TCA theory (e.g., Williamson 1991b, 1996) suggests that firms can safeguard their specific assets through a wide range of hybrid governance mechanisms, such as pledges and bilateral contracting. These hybrid governance modes fall into two general categories. One maintains a discrete separation between the exchange parties and enforces agreements through contractual authority. The other fosters closer ties between exchange partners and enforces agreements through appeals to common interests. Following Heide's (1994) recent typology of governance structures, we respectively refer to these two types of hybrid mechanisms as *unilateral* and *bilateral*. Both types of governance structures are alternatives to market transactions and vertical integration for presenting viable safeguarding mechanisms.

Unilateral hybrid governance mechanisms provide a way to safeguard specific assets by solidifying ex ante agreements with an exchange partner. For example, faced with a high degree of site specificity, coal suppliers that are "mine-mouthed" next to an electrical utility plant safeguard their specific assets by entering long-term contractual arrangements (Joskow 1987). Similarly, Bucklin and Sengupta (1993) find that under conditions of high levels of specific investments, co-marketing alliance partners reduce power imbalances through formal contracts that build exit barriers, exclusive dealing, and financial incentives into the relationship. Other examples of how unilateral hybrid mechanisms can solidify an ex ante agreement can be seen in Monteverde and Teece's (1982b) and Stump and Heide's (1996) studies.

In contrast to the unilateral mechanisms, bilateral hybrid governance structures appear to provide a firm with a way to safeguard its specific assets by developing closer ties with its exchange partners. For example, Heide and John (1990) find that suppliers that have specific assets invested in a manufacturer establish close ties with that manufacturer by means of joint action and expectations of continuity. In a related study, Heide and John (1992) show that relational norms (i.e., flexibility, information exchange, and solidarity) are present in buyer-supplier relationships and enable buyers to protect their specific investments by gaining control over supplier decision making, thus reducing the hazards of opportunism. Support for the development of relational norms also can be found in Anderson and Weitz's (1992) and Palay's (1984) studies.

In summary, though TCA's assumption of opportunism receives mixed support from the studies in our review, the use of governance in general and vertical integration in particular as a means of safeguarding specific assets is broadly confirmed. Empirical applications of TCA clearly show that many firms attempt to safeguard their specific assets from possible opportunistic behavior through vertical integration. However, these studies also demonstrate that in addition to vertical integration, firms can protect their specific assets by pursuing a variety of unilateral and bilateral hybrid governance mechanisms, such as quasi integration, selection procedures, and the development of relational norms.

Adaptation problem. An adaptation problem is created when a firm whose decision makers are limited by bounded rationality has difficulty modifying contractual agreements

to changes in the external environment. Thus, the antecedents of the adaptation problem are bounded rationality and environmental uncertainty. Because none of the studies in our review explicitly assesses bounded rationality, we focus our discussion on environmental uncertainty. Overall, these studies present mixed support for TCA's hypothesized effects of environmental uncertainty.

According to TCA, high levels of environmental uncertainty increase the costs of adapting contractual agreements. Only one study in our review explicitly assesses the impact of environmental uncertainty on transaction costs (Pilling, Crosby, and Jackson 1994). In this study, Pilling, Crosby, and Jackson find that environmental uncertainty has a significant positive effect on the ex ante costs of developing an exchange relationship but has no effect on the ex post costs of activity monitoring. Klein and Roth (1993) provide indirect support for the impact of environmental uncertainty on transaction costs by finding that firms facing lower levels of environmental uncertainty exhibit higher levels of satisfaction with their channel partners than firms facing higher levels of environmental uncertainty. Williamson (1985) posits that, when faced with the need to adapt to an uncertain environment, a firm will seek to minimize its transaction costs through vertical integration. This proposition garners only partial support from the TCA studies included in our review. Specifically, though some researchers find TCA's anticipated effects of environmental uncertainty, others find no effects of environmental uncertainty, and still others find that some types of environmental uncertainty actually act as a disincentive to vertical integration.

Compared to asset specificity, the studies in our review provide limited support for TCA's hypothesized effects of environmental uncertainty. Only a few of the studies that measure environmental uncertainty find it positively related to either vertical integration or hybrid forms of governance. For example, Levy (1985) finds that manufacturing firms with high levels of environmental uncertainty exhibit higher levels of vertical integration compared to firms with lower levels of uncertainty. Similarly, John and Weitz (1988) show that environmental uncertainty is related positively to forward vertical integration among manufacturers of industrial products. Masten (1984) finds that, when faced with high levels of environmental uncertainty, manufacturers are more likely to produce an assembly component internally than to purchase it from an external supplier.

In contrast to the studies described previously, many other TCA applications are considerably less sanguine in their support for TCA's hypothesized effects of environmental uncertainty. For example, Anderson and Schmittlein (1984) and Maltz (1994) find that environmental uncertainty has no significant impact on vertical integration. Other studies suggest that environmental uncertainty has a positive impact on vertical integration, but only through its interaction with other transaction-related factors, such as asset specificity (Anderson 1985) or the level of market competition (Walker and Weber 1987). Still other studies find that the relationship between environmental uncertainty and vertical integration may be nonmonotonic (Klein, Frazier, and Roth 1990; Masten, Meehan, and Snyder 1991). Finally, many studies suggest that environmental uncertainty may be

multidimensional and that different dimensions may have different effects.

Walker and Weber (1984) were the first TCA researchers to uncover the multidimensional nature of environmental uncertainty. They find that though high levels of *volume* uncertainty influenced an automobile manufacturer to make rather than buy a component, *technological* uncertainty had no impact on make-or-buy decisions. Heide and John (1990) find that technological unpredictability decreases expectations of relationship continuity, whereas volume unpredictability has no impact on continuity expectations in buyer-supplier relationships. Heide and John (1990) suggest that this negative impact of technological unpredictability results from the fear of being locked into a technology that may become obsolete. Likewise, Balakrishnan and Wernerfelt (1986) find that uncertainty in the form of technological obsolescence has a negative impact on vertical integration by manufacturers. Finally, Stump and Heide (1996) show that technological uncertainty decreases a supplier's willingness to invest in buyer-specific assets.

In addition to the fear of technological obsolescence, the dangers associated with operating in unfamiliar or quickly changing environments also appear to act as disincentives against vertical integration. For example, Klein (1989) shows that high levels of environmental *complexity* encourage exporters to exert higher levels of vertical control in foreign markets, whereas environmental *dynamism* (i.e., the rate of change) encourages exporters to exert lower levels of control. Likewise, Klein, Frazier, and Roth (1990) find that the presence of multiple sources of uncertainty in the environment (i.e., diversity) increases the likelihood of serving a foreign market through the use of external agents or distributors. The negative impact of environmental uncertainty on foreign market investment also is seen in Gatignon and Anderson's (1988), Hu and Chen's (1993), and Osborn and Baughn's (1990) studies.

In summary, the role of governance as a means of adapting to uncertain environments receives mixed support from the studies in our review. Although a few TCA researchers find that environmental uncertainty is positively associated with vertical integration, a greater number of researchers show that, in some contexts, environmental uncertainty either has no impact on vertical integration or acts as a disincentive against integration. Environmental uncertainty is a multidimensional construct, and firms are hesitant to adopt a hierarchical governance structure when this uncertainty entails risks of either unfamiliar operating environments or technological obsolescence.

Performance evaluation problem. A performance evaluation problem arises when a firm whose decision makers are limited by bounded rationality has difficulty assessing the contractual compliance of its exchange partners. Thus, the antecedents of the performance evaluation problem are bounded rationality and behavioral uncertainty. Because none of the studies in our review explicitly assesses bounded rationality, we focus our discussion on behavioral uncertainty. Although performance evaluation is the least commonly investigated governance problem, several studies in

our review provide considerable support for TCA's hypothesized effects of behavioral uncertainty.

Transaction cost analysis claims that high levels of behavioral uncertainty increase the costs of evaluating the performance of exchange partners. Unfortunately, none of the studies in our review formally tests the relationship between behavioral uncertainty and transaction costs. Assuming that such a relationship exists, Williamson (1985) claims that firms try to minimize the costs of evaluating the performance of their exchange partners through the mechanism of vertical integration. This assertion receives strong support from the empirical TCA studies in our review.

A series of studies by Anderson and colleagues show that behavioral uncertainty is positively related to a manufacturer's decision to employ a direct sales force rather than manufacturers' representatives (Anderson 1985; Anderson and Schmittlein 1984; Weiss and Anderson 1992). Furthermore, both Anderson (1985) and Anderson and Schmittlein (1984) examine the full TCA model (i.e., asset specificity, environmental uncertainty, behavioral uncertainty, and frequency) and find that behavioral uncertainty produces the strongest effect sizes among all four dimensions. Both Gatignon and Anderson (1988) and John and Weitz (1988) provide additional support for the positive relationship between behavioral uncertainty and vertical integration.

In addition to fostering higher levels of vertical integration, firms attempt to reduce the performance evaluation costs associated with behavioral uncertainty through the use of hybrid governance mechanisms. For example, Heide and John (1990) show that behavioral uncertainty faced by manufacturers is positively related to the degree to which they seek supplier qualification through such activities as evaluating the supplier's engineering and manufacturing capabilities.

In summary, though none of the studies in our review tests either the assumption of bounded rationality or the

relationship between behavioral uncertainty and transaction costs, TCA's claim that firms employ vertical integration as a means of easing the burden of performance evaluation is broadly supported. Empirical applications of TCA clearly show that firms attempt to manage the performance evaluation problem through both vertical integration and hybrid governance structures.

Theoretical Questions and Further Research

As can be seen from the preceding review, TCA research is faced with several unanswered questions. In this section, we consider these questions in conjunction with some recent critiques of TCA to identify key issues for further research. In particular, we focus on (1) the concept of transaction costs, (2) TCA's behavioral assumptions, (3) the effects of environmental uncertainty, (4) TCA's unit of analysis, and (5) the governance decision.

The Concept of Transaction Costs

As several TCA critics have noted, the concept of transaction costs was not articulated clearly in Williamson's (1975, 1985) original framework (see Dow 1987; Kay 1992). Currently, however, the nature of these costs is much better understood. In Table 2, we summarize the source and nature of the most common forms of transaction costs. As is shown in this table, transaction costs may arise in the form of *direct* or *opportunity* costs (Malone 1987; Masten, Meehan, and Snyder 1991). These costs are directly related to asset specificity, environmental uncertainty, and behavioral uncertainty.

As was noted previously, asset specificity creates a safeguarding problem (Rubin 1990). Without appropriate safeguards, firms face the risks of expropriation (ex post) or pro-

TABLE 2
Sources and Types of Transaction Costs

	Asset Specificity	Environmental Uncertainty	Behavioral Uncertainty
A. Source of Transaction Costs			
Nature of Governance Problem	Safeguarding	Adaptation	Performance Evaluation
B. Type of Transaction Costs			
Direct Costs	Costs of crafting safeguards	Communication, negotiation, and coordination costs	Screening and selection costs (ex ante) Measurement costs (ex post)
Opportunity Costs	Failure to invest in productive assets	Maladaptation; Failure to adapt	Failure to identify appropriate partners (ex ante) Productivity losses through effort adjustments (ex post)

ductivity losses resulting from the failure to invest in specialized assets (*ex ante*). For example, to discourage opportunism on the part of their principal, manufacturers' agents incur direct costs in order to develop ties with their downstream customers (Heide and John 1988). Without such safeguards, an agent's market development efforts could be exploited, or such investments may not be made at all.

Environmental uncertainty creates an adaptation problem. The associated transaction costs include the direct costs of communicating new information, renegotiating agreements, or coordinating activities to reflect new circumstances. A failure to adapt involves an opportunity cost of maladaptation (Malone 1987). For example, an original equipment manufacturer (OEM) may need to incur considerable transaction costs in order to motivate an external supplier to modify the design of the components that constitute its end product (Walker and Weber 1984). A failure to undertake such changes, however, may place the OEM at a competitive disadvantage relative to other manufacturers.

Behavioral uncertainty gives rise to a performance evaluation problem. To the extent that a party's true level of performance is not readily apparent, direct measurement costs may need to be incurred. These may be in the form of measuring outputs or behaviors (Eisenhardt 1985). In the original TCA framework, because of the need to prevent opportunistic exploitation, evaluation problems give rise to measurement costs. Ouchi (1979) provides a different account of this process. According to Ouchi, measurement costs are incurred in order to distribute rewards across parties in an equitable fashion. If rewards are not allocated equitably, a party may eventually reduce its individual efforts. Thus, a performance measurement failure may lead to opportunity costs in the form of productivity losses. For example, a failure on the part of a manufacturer to monitor and control free riding across sales territories could cause distributors to reduce their sales efforts for the manufacturer's brands, which ultimately could place the firm at a competitive disadvantage.

Behavioral uncertainty causes difficulty because of *ex post* information asymmetry regarding task performance. Information asymmetry also may exist *ex ante*, because of an inability to ascertain a party's true characteristics prior to exchange. Typically referred to as *adverse selection* (Akerlof 1970), this problem is more commonly associated with agency theory than with TCA *per se*. For our purposes, however, we note that this form of information asymmetry gives rise to direct transaction costs in the form of selection and screening efforts designed to identify appropriate exchange partners *a priori* (Bergen, Dutta, and Walker 1992). The relevant opportunity costs are associated with losses resulting from establishing relationships with parties that lack needed skills or motivation.

The preceding discussion highlights some important aspects of transaction costs. First, such costs may be incurred both *ex ante*, in connection with selection or information gathering, and *ex post*, in connection with measurement and enforcement. Second, the relevant opportunity costs, though not as well understood as the direct costs, may be important determinants of firm performance. The potential inability to use specialized assets and adapt to changing circumstances or more generally to the foregone profits

from "valuable deals that won't be done" (Calfee and Rubin 1993, p. 164) suggests that a firm's governance decision not only influences costs in a narrow sense, but also is an important determinant of value. This point has not always been recognized in previous research (Zajac and Olsen 1993).

One frequently expressed concern is that despite TCA's explicit normative orientation, there is limited empirical evidence of the performance effects of following TCA's guidelines. Most of the studies in our review are limited to documenting whether firms follow TCA prescriptions rather than to examining how firm decisions affect performance. Transition cost analysis researchers have justified this descriptive-oriented approach by intentionally studying competitive industries, in which the survivors are assumed to follow normative decision rules (Shelanski and Klein 1995).⁶

The limited research on TCA's performance implications makes it difficult to assess fully its theoretical value and empirical validity. As can be seen in our review, a small but growing number of researchers (e.g., Heide and John 1988; Noordewier, John, and Nevin 1990; Pilling, Crosby, and Jackson 1994; Sriram, Krapfel, and Spekman 1992; Walker and Poppo 1991) have attempted to measure transaction costs or performance dimensions. We encourage future researchers to further these efforts by developing reliable and valid measures of transaction costs and examining the performance implications of aligning governance problems and structures.

Two related areas of further research also deserve substantial attention. First, though TCA recognizes that governance decisions involve a trade-off between transaction and production costs, few studies have examined the role of production costs. In addition, there is a considerable degree of divergence among the studies that do include production costs, as some researchers find that production costs have a greater impact on governance structures than transaction costs (e.g., Klein, Frazier, and Roth 1990; Walker and Weber 1984, 1987), whereas others find just the opposite (e.g., Anderson 1985; John and Weitz 1988). Clearly, further research is needed to clarify the role of production costs *vis-à-vis* transaction costs in determining appropriate governance structures.

In addition to the role of production costs, further research is needed to assess the impact of the costs associated with internal organization. Examples of internal organization costs include the costs of monitoring employees, administrative overhead, and bureaucratic inefficiency due to political posturing (Anderson 1985; Masten, Meehan, and Snyder 1991). Williamson (1985) acknowledges that internal organization possesses inherent problems, such as "low-powered" incentives relative to markets. Other scholars have argued that transaction costs exist within firms, as well as in markets (e.g., Demsetz 1991; Dow 1987; Eccles 1985). Unfortunately, empirical evidence regarding the impact of

⁶According to Shelanski and Klein (1995, p. 338), TCA and many of its extant empirical tests are based on the implicit assumption that "market forces bring about an efficient sort between transactions and governance structures, so that exchange relationships observed in practice can be explained in terms of transaction cost economizing."

the costs of internal organization is scarce. In one of the few empirical studies on internal organization costs, Masten, Meehan, and Snyder (1991) find that these costs account for approximately 14% of the total costs of component procurement for a large naval project. More important, Masten, Meehan, and Snyder's findings suggest that asset specificity leads to internal organization, not by increasing the costs of market exchange (as TCA suggests) but by decreasing the costs of internal organization.

Transaction Cost Analysis's Behavioral Assumptions

As was noted previously, TCA is built on two key behavioral assumptions: bounded rationality and opportunism. Each of these assumptions has received considerable scrutiny in recent years.

Bounded rationality. In general, bounded rationality appears to be the least controversial of TCA's two assumptions. However, two specific critiques deserve mention. First, bounded rationality has sometimes been interpreted as an indication of stupidity on the part of economic actors. This is an incorrect interpretation. Bounded rationality simply means that certain physical limits exist on the human ability to process information. Decision makers are intentionally rational, but only limitedly so (Simon 1961). The limitations of human decision making have been well documented in the literature and include such shortcomings as overconfidence, competitive blind spots, and improper valuation of gains and losses (e.g., Kahneman and Tversky 1979; Mahajan 1992; Zajac and Bazerman 1991).

A more interesting issue is the apparent inconsistency between TCA's original use of the bounded rationality concept and more recent references to farsightedness (Williamson 1991a). At first glance, farsightedness, or the ability to anticipate future exchange conditions, appears counter to bounded rationality's focus on cognitive limitations. It should be noted, however, that TCA's use of the term *farsightedness* pertains to the ability to anticipate conditions of dependence that are created by specific investments (Williamson 1993, p. 461). It does not include the ability to "specify complete decision trees" *ex ante* (Williamson 1975, p. 23). Thus, bounded rationality and the resulting inability to write comprehensive contracts remain an important part of TCA.

Opportunism. Compared to bounded rationality, TCA's assumption of opportunism is considerably more controversial (Donaldson 1990; Ghoshal and Moran 1996). Much of the controversy has focused on whether TCA's notion of opportunism is descriptively accurate, or whether terms such as *trust* more closely describe how exchange partners behave. In our opinion, this particular critique of TCA is somewhat misplaced.⁷ As was noted previously, TCA does

not assume that all social actors are opportunistically inclined, only that some actors behave opportunistically, and it is difficult and costly to identify opportunistic actors *ex ante* (Barney 1990). Furthermore, the current TCA literature explicitly acknowledges that opportunism is an endogenous variable, rather than an invariable and fixed condition (Anderson 1988; John 1984).

On the basis of recent research, we believe that there are other questions surrounding opportunism that warrant greater attention. These questions pertain to (1) the proper labeling of relationship behaviors, (2) the antecedents of these behaviors, and (3) the implications of deviations from opportunism. In regard to the first, Chiles and McMackin (1996) draw a distinction between real trust and trust-like behaviors. In his recent work, Williamson (1993, 1994a, b) expresses a similar view and warns against combining seemingly similar behaviors into a common category and labeling it "trust." Real trust originates from the social context of a particular relationship through social norms, such as reciprocity (Gouldner 1960), or through personal relationships (Granovetter 1985; Macaulay 1963). In contrast, trust-like behaviors can be explained by economic calculus or the presence of incentive structures that promote relationship-oriented behaviors or restrain opportunism. For example, Axelrod's (1984) research on the prisoner's dilemma suggests that cooperation can be promoted among self-interested parties if the structure of the game permits rewarding or punishing prior moves. In this scenario, cooperation is determined purely by self-interest or "calculativeness." Thus, though shared purposes and common goals (Zajac and Olsen 1993) are important in business relationships, the real issue is *how* they arise. In the absence of preexisting norms, this may require developing incentives that produce a "similarity of selfish interest" (Macneil 1981, p. 1034).

Ultimately, the most important question surrounds the implications of deviations from opportunism. Recall that the basic premise of TCA is that the risk of opportunism creates a need for formalized governance structures. Several researchers have argued on conceptual grounds that trust, due to either social norms or personal relations, may serve as a substitute for formal mechanisms such as contracts and direct controls (e.g., Griesinger 1990; Hill 1990; Macaulay 1963). The empirical evidence on this issue is both limited and mixed. In support of the substitution hypothesis, Gulati (1995) finds that previous alliances between a set of parties reduce the need for explicit (i.e., equity-based) governance in subsequent alliances. Likewise, Stump and Heide (1996) show that early supplier qualification efforts tend to reduce buyers' subsequent monitoring efforts. A different pattern of results emerges from Heide and John's (1992) study of buyer-supplier relationships. They find that the presence of relationship-specific norms enhances a buyer's ability to acquire control over a supplier. By themselves, however, norms have no effect on buyer control. Thus, norms serve as moderators of control, rather than have a direct impact on it. An important avenue for further research is to determine the specific consequences of competing behavioral assumptions.

⁷It should be noted that TCA is not alone in recognizing opportunistic behavior. For example, opportunism appears prominently in both theories of bureaucracy (e.g., Crozier 1964) and interpersonal relations (e.g., Goffman 1969). Accounts of opportunism and exploitation can also be found in various versions of power-dependence theory (e.g., Hickson et al. 1971; Pfeffer and Salancik 1978).

The Effects of Environmental Uncertainty

The impact of environmental uncertainty on governance decisions is ambiguous. According to the original TCA framework, the effect of external uncertainty is an inability to write an a priori comprehensive contract (Williamson 1985). In turn, an adaptation problem is created, which involves potential transaction costs in connection with modifying relationships to changing circumstances. The original prediction, however, is that adaptation is only problematic in the presence of specific assets (Williamson 1975). If specific assets make an exchange partner difficult to replace, because of a high level of switching costs, requests for adaptation may be opportunistically exploited. For example, a partner may demand concessions or engage in costly haggling and create holdup costs. In the absence of specific assets, however, the adaptation problem can be managed simply by replacing an incumbent exchange partner with a new one. Thus, in a statistical sense, TCA's original framework hypothesizes an interaction effect between environmental uncertainty and asset specificity.

Few studies report evidence of the interaction between environmental uncertainty and asset specificity (e.g., Anderson 1985; Walker and Weber 1987). In contrast, there is abundant evidence of main effects of uncertainty. Several different explanations exist for the apparent discrepancy between TCA's conceptual framework and the empirical evidence. Shelanski and Klein (1995) speculate that researchers have simply failed to test for interactions. However, at least three studies in our review test this interaction but find no significant effects (i.e., Anderson and Schmitte 1984; Gatignon and Anderson 1988; Klein, Frazier, and Roth 1990). A more plausible explanation, suggested by both Noordewier, John, and Nevin (1990) and Klein, Frazier, and Roth (1990), is that what appears in the extant studies as main effects may actually be interactions. For example, Noordewier, John, and Nevin do not explicitly measure asset specificity in their study, but assume that asset specificity exists at a nonzero level. Thus, their test of uncertainty, though not a formal test of an interaction with asset specificity, may be consistent with TCA's notion of the joint effects of these variables. Another possibility is that because interactions and main effects often are highly correlated, the inclusion of both types of effects leads to an increase in standard errors, which makes both effects nonsignificant. For example, Klein, Frazier, and Roth (1990) examine the effects of asset specificity and environmental uncertainty, but find no significant effects for either the interaction term or the main effects of uncertainty due to collinearity.

Although we believe that the latter line of reasoning is plausible, it is also possible that the reported main effects of environmental uncertainty have a conceptual explanation. These main effects suggest that the problem created by environmental uncertainty is handled more efficiently by creating a governance structure that permits adaptation within an ongoing relationship, rather than by switching to a new partner if changes need to be made. In other words, internal organization and other forms of planned governance (Williamson 1991b) are inherently superior to market or spontaneous governance with respect to processing

and responding to new information. In the case of complete integration, this is due to the presence of an authority structure that can bring about adaptation through fiat (Williamson 1985) or command (Lindblom 1977). However, even in nonintegrated situations, close relationships (Heide and John 1990) may enjoy commonalities in knowledge and modes of communication (Conner and Prahalad 1996) that permit more efficient adaptation than does market governance. Therefore, the observed main effects of uncertainty are perhaps not surprising. This line of reasoning is consistent with Rangan, Corey, and Cespedes's (1993, p. 473) assertion that environmental uncertainty should be considered an antecedent of asset specificity, and that "uncertainty and asset specificity are sequential rather than independent constructs."

A final comment on uncertainty concerns the relative merit of tight versus loose coupling. Research on organization design has suggested that there are limits to the amount of uncertainty that can be managed through formal organizational arrangements (Scott 1987). Extreme levels of uncertainty could lead to information processing problems of such a magnitude that the loose coupling afforded by market governance becomes preferable (Shelanski and Klein 1995). It appears that some types of uncertainty (i.e., threat of technological obsolescence and instability of foreign markets) may be handled better through market governance than through internal organization because of the flexibility associated with market-based exchanges (Balakrishnan and Wernerfelt 1986; Heide and John 1990; Klein 1989). In summary, though certain aspects of uncertainty are well documented in the empirical research, several unanswered questions remain that deserve further investigation.

Transaction Cost Analysis's Unit of Analysis

Consistent with the early work of Commons (1934), TCA's modal unit of analysis is the individual transaction. As a result, the tendency in previous empirical work has been to focus on how individual relationships or exchanges are organized at a given point in time (Nooteboom 1992). This implicit tendency to focus on single transactions and relationships ignores the temporal nature of interorganizational relationships. As Sahlins (1972, p. 185) observes, "A material transaction is usually a momentary episode in a continuous social relation." Expanding the unit of analysis beyond single transactions has important implications. First, past interactions or exchange episodes (Hakansson and Snehota 1985) may influence how a new transaction is organized. For example, Gulati (1995) shows how the governance features of earlier joint ventures between firms (i.e., the financial arrangements used) influence the governance of subsequent ventures. Gulati's general conclusion is that prior learning or experience with a particular exchange partner may reduce the need for more formal governance mechanisms in subsequent transactions.

In addition to the impact of past relationships, anticipation about future exchanges may influence how a present exchange is organized. Drawing on Axelrod's (1984) work on repeated games, Heide and Miner (1992) show that the "shadow of the future," represented by a relationship's

expected time horizon, promotes cooperation in the present. Likewise, Parkhe (1993) finds that partners that commit specific investments (i.e., pledges) to a strategic alliance lengthen the shadow of the future, which leads to increased alliance performance by reducing the need for costly contractual safeguards. In game theory terminology, expectations of future exchanges serve as enforcement devices because of the ability to reward or punish prior "moves." As Parkhe (1993) notes, important conceptual linkages between TCA and game theory could provide insights into both perspectives.

The previous examples show that the time dimension within a given relationship has implications for how an individual transaction is governed because of either the past history of interorganizational relations or the incentive structure created by the expectation of future transactions. In addition, the governance of a particular transaction may be influenced by other actors within an interorganizational network, either directly or indirectly (Anderson, Hakansson, and Johanson 1994; Hakansson and Snehota 1995). However, the specific processes that may occur within an interorganizational network have not always been clearly described. DiMaggio and Powell's (1983) theory of institutional isomorphism provides some insight into this issue. The main premise of this theory is that organizational decision making may be influenced as much by imitation as it is by efficiency. Unlike TCA, which attempts to explain governance choice on the basis of certain dimensions of a relationship, institutional isomorphism theory claims that the structure of a given relationship is a question not only of efficient adaptation at the dyadic level, but also of imitation throughout a network. For example, recent work on population-level learning by Miner and Haunschild (1995, p. 155) suggests that in contrast to TCA's emphasis on fixed transaction dimensions in determining particular organizational forms, "the population learning perspective would emphasize instead ways in which firms may have copied such practices from each other, often believing them to be technically useful." Expanding the unit of analysis is helpful in identifying a broader range of governance options than what was considered in the original TCA framework. We hope that further research will document these governance options in greater detail.

The Governance Decision

Our review of empirical TCA research highlights some of the alternative governance mechanisms used in managing interorganizational relationships. Some researchers have labeled these alternative governance mechanisms "hybrids" and suggest that they can be viewed conceptually as mid-points on a continuum ranging from market exchange to hierarchical integration (e.g., Williamson 1991b).

Several other researchers have argued that this hybrid perspective is too simplistic and that the market-hierarchy continuum obscures the different ways in which relationships can be organized (e.g., Bradach and Eccles 1989). Echoing these thoughts, both Heide (1994) and Robicheaux and Coleman (1994) suggest that there is a broad range of nonmarket relationships that differ in important and systematic ways. For example, some of the studies in our

review claim that governance problems can be managed by early selection and/or socialization efforts (e.g., Heide and John 1990). Other studies focus on the role of incentives (e.g., Anderson and Weitz 1992) and the development of relational norms (e.g., Heide and John 1992) in governing relationships.

Although many different governance classification schemes can be developed, the diversity of governance mechanisms identified in previous research raises important theoretical and practical questions. First, the relative effectiveness of different governance mechanisms in addressing particular governance problems has not been explored fully. For example, is partner selection preferable to incentive design for the purpose of minimizing the risk of subsequent holdup? Would a manufacturer be better off investing in a comprehensive supplier selection process (Stump and Heide 1996), rather than relying on contractual penalties (Masten and Crocker 1985)?

Second, previous research has identified a range of distinct governance problems but has not fully answered how the available governance mechanisms align with these problems. For example, though partner selection is most commonly associated with information asymmetry problems (e.g., Ouchi 1979), it also may minimize the risk of holdup (Stump and Heide 1996) as well as facilitate adaptation to uncertainty. Thus, any individual governance mechanism may serve multiple purposes.

Third, on a related note, the specific effects of different governance mechanisms have not been well documented by previous research. As an example, hard contractual provisions (Joskow 1987) and explicit control (Celly and Frazier 1996) may serve as effective checks on opportunism. It is unclear, however, what other effects such mechanisms have. Conceivably, such strategies may produce compliance without inducing true cooperation (Bonoma 1976). Thus, though a large body of empirical evidence has been generated on the use of various governance mechanisms, a discriminating theory of governance choice is still at an early stage of development.

Fourth and finally, TCA's aforementioned emphasis on individual transactions as the unit of analysis ignores how different governance forms can be combined. Transaction cost analysis implicitly frames a firm's governance decision as a choice between competing alternatives—in its simplest form a discrete choice between market, hierarchy, or some intermediate or hybrid form (Williamson 1991b). In all of this literature, however, the focus is on a *single* governance form. Bradach and Eccles (1989) challenge this view and persuasively argue that firms may purposely combine different governance forms by using a "plural forms" approach. Although Bradach and Eccles (1989) limit themselves to presenting the general argument, subsequent research has begun to identify the specific antecedents of such a strategy. Bergen and colleagues (1995) provide the first TCA study of plural forms; they use an industrial distribution context, in which manufacturers often face the options of either serving a particular sales territory entirely with independent agents (i.e., market governance) or relying on a combination of agents and direct sales to house accounts (i.e., market and hierarchical governance). They suggest that a plural forms

approach permits manufacturers to achieve the benefits typically associated with market governance (e.g., scale economies, high-powered incentives) while minimizing its inherent shortcomings (e.g., risk of opportunistic exploitation). Specifically, augmenting an agent system with a direct sales force permits a manufacturer to manage the safeguarding and performance evaluation problems that might be associated with a (unitary) agent system. As such, a plural forms approach may offer governance synergies of various kinds. This is an especially important area for future applications of TCA.

Conclusion

Like all useful theories, TCA has steadily evolved over time in response to new theoretical and empirical developments. For example, though a workable theory of transaction costs had been formulated by the early 1970s, its transaction dimensions were not formally specified until around 1980

(Joskow 1988). Although the marketing discipline has recently seen an explosion of TCA research efforts, and transaction costs are quickly becoming an established research paradigm, the basic theory is still in need of further development (Rangan, Corey, and Cespedes 1993). As Williamson (1992, p. 349) states, "Transaction cost economics needs to be refined and extended. It needs to be qualified and focused. It needs to be tested empirically."

The first step in refining any theory is to conduct a thorough assessment of its current status and a synthesis of its key findings. By providing a comprehensive and integrative review of 45 key empirical examinations of the TCA framework, along with an agenda for future research efforts, we lay the conceptual groundwork for the further refinement and extension of TCA investigations both within marketing and in related disciplines. We hope this effort provides TCA researchers with a useful review of previous TCA research, a synthesis of our current knowledge, and a set of fresh insights for further investigations of this intriguing theory.

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