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WHY FIRMS MAKE UNILATERAL INVESTMENTS SPECIFIC TO OTHER FIRMS: THE CASE OF OEM SUPPLIERS

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This study examines why and under what conditions firms will make unilateral relationship-specific investments to their transaction partners. We propose that firms are more likely to make such investments when the investment yields positive economic spillover values for other transactions with the same exchange partners as well as for third-party transactions. We also model two types of positive inter-project spillover effects that a transaction may generate: knowledge spillovers and reputation spillovers. We find empirical support for our developed theory in the context of Taiwanese suppliers of original equipment manufacturers. Copyright © 2008 John Wiley & Sons, Ltd.

INTRODUCTION

Firms sometimes find it economical to make relationship-specific investments that commit substantial resources to other firms. However, such investments would lose at least part of their value if the transactional relationship were terminated. Thus, a firm making a unilateral commitment runs the risk of opportunistic behavior by transaction partners who have not made a reciprocal commitment and who therefore would be in a superior bargaining position. Transaction costs economics maintains that to mitigate the risk, farsighted firms typically use formal contracts and *ex post* governance mechanisms to safeguard these relationship-specific investments. The concept of mutual sunk-cost commitment or *mutual hostage model* (Williamson, 1996) is an exemplar of transaction-costs reasoning in which the focal firm making relationship-specific investments that commit resources to another firm, requires the other firm to reciprocate by making a relationship-specific investment to enhance the stability of the transactional relationship, since the mutual commitment aligns the incentives of the firms.

Despite this cogent economic logic, which seems internally consistent and almost universally accepted by organizational economic theorists, we observe in business practice that in some buyer-supplier relationships it is common that one firm makes *unilateral* relationship-specific investments in which reciprocal commitment from the other firm is neither expected nor forthcoming. For example, suppliers to original equipment manufacturers (OEM)[1] often make both tangible and intangible investments that are specialized to the

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[1] OEM refers to a transactional arrangement between a brand name company (OEM buyer) and the contract supplier where the buyer provides detailed technical blueprints and most of the components to allow the contract supplier to produce according to specifications (Ernst, 2000).

requirements of an OEM buyer (Rokkan, Heide, and Wathne, 2003). Contrary to conventional transaction costs economics logic, OEM suppliers *do not* receive a reciprocal sunk-cost commitment from the buyer. Transaction costs economics interprets such unilateral commitments without economic safeguards as poor managerial practice and considers decisions to make such investments as 'myopia' (Williamson, 1996: 239). Making relationship-specific investments without requiring any safeguards in return, fails to meet the prediction of transaction costs theory. Williamson (1996) interprets theories that predict such myopic behavior (e.g., Pfeffer and Salancik's [1978] resource-dependence theory) as seriously incomplete since these theories neglect the foresight of managers and their ability to anticipate transactional hazards that characterize unilateral relationship-specific investments, as well as their ability to adopt governance mechanisms to attenuate these potential (*ex post*) contractual hazards.

Crucially, transaction costs economics has focused primarily on the individual transaction as the basic unit of analysis and has therefore not fully explored the possibility that transactions may be interdependent and can have spillover effects, such as learning and capability development. As Williamson (1999) emphasizes, because transaction costs economics assumes away production costs (and thus capability differences), there is room for theory refinement to capture differential firm-level capabilities and learning. Accordingly, Williamson (1999) maintains that the next generation in the evolving science of organization should address capabilities and learning in explaining the variance of governance choice as well as investment decision making.

This study responds to Williamson's (1999) call and extends transaction costs theory to explain OEM suppliers' decisions to make unilateral relationship-specific investments. Here, such OEM investments are not viewed as strategic mistakes, but rather as sound value-maximizing strategy. We go beyond traditional transaction costs theory that considers the individual transaction as the unit of analysis, and move toward a broader systems view of transactions. Specifically, a transaction can yield positive economic value beyond the individual resource exchange between the transaction parties. The greater the potential value created for future transactions that the individual transaction may create, the greater the real-options value of this individual transaction on future exchanges (Trigeorgis, 1996). In such cases, it is rational to take on investment projects (such as projects that involve unilateral relationship-specific investments), which have negative net present values from the perspective of a single transaction but that have positive overall net present values from a systems view of transactions. Thus, when the unit of analysis is the individual transaction, Williamson (1996) provides sound economic logic that unilateral sunk cost commitment shows a lack of managerial foresight. However, in our current extension of the theory, which incorporates a 'real options' perspective, the behavior of OEM suppliers can, under some circumstances, be considered economically rational. In particular, this study shows that relationship-specific investments can create two types of extra economic values: (1) inter-project spillovers with the same exchange partner, and (2) inter-project spillovers with other transactional parties. We find support for our developed theory from empirical tests on a sample of Taiwanese OEM suppliers.

The study is organized as follows: we next review the prior explanations for unilateral relationship-specific investments, particularly from transaction costs theory. We then develop an expanded theory that goes beyond the individual transaction as the unit of analysis and propose a set of hypotheses. The subsequent section describes the data and measures for empirical tests of the hypotheses, and then reports the empirical results. Finally, we close with concluding remarks.

Unilateral relationship-specific investment in transaction costs economics

Transaction costs theory, as developed by Williamson (1996), emphasizes the economic importance of devising or selecting governance structures for an individual transaction in order to reduce contractual hazards. Contractual hazards can arise from unilateral investments specific to the transaction parties. In particular, the economic value of relationship-specific investments depends on the continuity of the transactional relationship with the exchange partner. A firm that makes such unilateral investments increases its reliance on its transactional partner, and thus will enter into a subordinate bargaining position that might be exploited by its transaction partner.

Transaction costs theory counsels managers not to make unilateral relationship-specific investments

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unless sufficient economic safeguards have been put in place. Several safeguards have been proposed (Williamson, 1996). For example, the firm could require that the transaction partner sign a formal contract or enter into an equity alliance with its transaction partner to better ensure the continuity of the exchange relationship. The firm could also require the transaction partner to post an economic bond or to pay for the specific investments before making their own commitments. Another safeguard is to secure a mutual sunk-cost commitment or *mutual hostage* (Kim and Mahoney, 2006; Williamson, 1983). That is, the firm agrees to make relationship-specific investments only if the transactional partner reciprocates by committing investments specific to the firm. All of these economic safeguarding mechanisms ensure substantial negative consequences if the exchange relationship is terminated; thereby reducing the exchange partner's incentives to behave opportunistically. Without strategic moves by the focal firm to change the transaction partner's financial payoffs via economic safeguards, unilateral relationship-specific investments give rise to transactional (economic holdup) hazards, and are expected to yield a negative net present value (NPV).

Yet, in practice, some firms make strategic investments specific to transaction parties without being offered reciprocal commitments. For example, sometimes the investments are dedicated assets, which add to a firm's general capacity, but would not have been taken if not for the purpose of serving a particular buyer's demand. Even though dedicated assets in principal can be redeployed, the firm would have substantial excess capacity should the buyer prematurely terminate the contract (Williamson, 1996). Firms that agree to make relationship-specific investments without safeguards have been described in some organization theories as 'powerless,' and are thereby willing to accept the transaction hazard because no other contractual choices are available. An illustrative case in point is franchising, in which franchisees often are required, and agree, to make franchisor-specific investments. Williamson (1996), however, maintains that a power perspective is based only on *ex post* reasoning and thus is misleading. Franchisors ask franchisees to make specific investments not because the franchisors are exercising their power, but because the franchisors want to protect the brand name of the franchise, which is in the long-run interest of *both* franchisees and the franchisor. Since franchisees are not fully accountable for their shirking, franchisees are tempted to cut corners and to withhold quality, which consequently can degrade the brand name to the disadvantage of the entire franchise system. The requirement to make franchisor-specific investments—the functional equivalent of posting an economic bond or collateral—increases the costs of opportunistic behavior by franchisees (for fear of termination of the franchise contract), and thereby solicits greater franchisee cooperation. Thus, franchisor-specific investments are a safeguard for franchisors to protect their brand names from franchisees' quality shading by better aligning incentives between franchisees and franchisors (Klein and Leffler, 1981). Franchisor-specific investments correct for negative spillovers to the franchise system of potential shirking by franchisees.

What about other business cases in which unilateral specific investments do not serve the mutual purpose of better aligning economic incentives between transaction parties? Standard transaction costs theory suggests that farsighted firms will not make such commitments due to the contractual hazards associated with these investments. Therefore, a decision to make unilateral relationship-specific investments is currently categorized as 'myopia' (Williamson, 1996).

Extending transaction costs economics

We follow Williamson's (1999) suggested research initiative by extending transaction costs economics and thereby propose an alternative explanation to the myopia interpretation. We maintain that just as relationship-specific investments in franchising serve to correct *negative* spillovers associated with franchising contracts, relationship-specific investments in some cases—such as in OEM contracting—may be made as a stepping stone for capturing potential *positive* economic spillovers generated from the (initial) contracts. Therefore, the initial contracts may be the price of admission in order to gain more promising longer-term business opportunities.

Standard transaction costs economics has typically focused on a *single* transaction to examine governance structure choice. The individual transaction as the unit of analysis, however, precludes consideration of how transactions might

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interact. That is, traditional transaction costs theory assumes no (externality) effects beyond the individual resource exchange between the transaction parties. In this business setting, economic logic indicates that a transaction involving unilateral relationship-specific investments places the firm in financial risk of bearing a transaction partner's opportunistic behavior, which would generate negative NPV. However, transactions may be interdependent. For example, a transaction may provide positive influences on other transactions with the same or other transaction parties. Or, put differently, a transaction may have real options value. Thus, even when a unilateral relationship-specific investment generates negative NPV from the perspective of a single transaction, positive spillovers from the transaction can change the expected payoff from the investment and can turn the investment project into an economically profitable one. Hence, the decision to commit to a transaction involving unilateral relationship-specific investment could be rational *when the transaction is examined in its entirety* (Trigeorgis, 1996; Williamson, 1996).

We propose two positive spillover effects that a transaction may generate. First, there may be *inter-project spillovers* with the *same* transaction partner. By making unilateral relationship-specific investments for a transaction partner, a firm has an opportunity to develop multiple projects and economic bonding relationships with a particular transaction partner. In particular, a relationship-specific investment, such as communication codes, may be fungible across different projects with the same transaction partner and thus can improve the productivity of a firm for the particular transaction partner compared to other competitors. The transaction partner may find it valuable to develop other projects with the firm due to lower search and communication costs. In other words, unilateral relationship-specific investments may, over time, have a fundamental transformation from an *ex ante* asymmetric bargaining relationship into a viable *ex post* bilateral exchange relationship. Second, there may be inter-project spillovers with *other* transaction parties. A firm's transaction relationship with an exchange partner may enhance its bargaining position with other firms. For example, a firm may acquire new knowledge from interacting with the transaction partner and improve its overall capability (Parmigiani, 2007). In addition, a firm's willingness to make unilateral relationship-specific investments may facilitate knowledge transfer from the transaction partner, because such investments signal the firm's willingness to maintain a long-term cooperative exchange relationship and reduce the transaction partner's concern about the possibility of the firm becoming a future rival. Doing business with a high-profile company could improve a firm's reputation. The credential of being a supplier to a brand name buyer reduces other buyers' uncertainty concerning the supplier.

By examining a transaction in its entirety, and hence taking into account the positive spillover effects of the transaction, the extended theory considers the influence of capabilities and learning on governance choice (Argyres, 1996; Carter and Hodgson 2006). Along these lines, Mayer and Salomon (2006) find that firms with stronger technological capabilities outsource activities, despite high contractual hazards, when these firms also possess governance capability derived from their technological capability to decrease transaction costs. Thus, firms with stronger technological capability have more viable governance alternatives. Argyres and Zenger (2007) illustrate that a firm's decision to govern a particular capability is influenced by the degree to which this capability is cospecialized to its other activities. The current study uniquely contributes to this research stream by considering the opportunities of learning and capability development as drivers for suppliers' unilateral sunk-cost commitments. Because such commitments can potentially yield positive intertemporal spillover effects such as learning and capability development, unilateral relationship-specific investments may be understood as a stepping stone to reposition suppliers' resource profiles, and to enhance their capability to enter new markets (Nickerson, Hamilton, and Wada, 2001; Porter, 1980; Wernerfelt, 1984).

We next illustrate potential positive spillover effects of unilateral sunk-cost investments in the OEM business, where asymmetric bargaining power prevails in the interorganizational relationship. The key question under consideration is why are some weak OEM suppliers willing to make unilateral specific investments, which place these suppliers in a risky bargaining position? Williamson submits that firms: 'anticipate potential dependency conditions and organize with respect to

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them from the outset' (Williamson, 1991: 81). While not disputing this insight within transaction costs theory *when the transaction is the unit of analysis*, the current study emphasizes that this microanalytical logic needs to be extended. As shown below, within an asymmetric interorganizational relationship context, in which dynamics of learning are of particular importance, a weak OEM supplier will be willing to make unilateral relationship-specific investments despite potential bargaining hazards, if the supplier anticipates positive values from *inter-project knowledge spillover* and *reputation spillover* (Mayer, 2006).

Unilateral relationship-specific investments and Taiwanese OEM suppliers

In international outsourcing, an OEM supplier makes tangible and intangible investments in equipment, operating procedures, and systems that are specialized to requirements of a particular buyer (Bensaou and Anderson, 1999; Stump and Heide, 1996; Zaheer and Venkatraman, 1995). OEM suppliers provide manufacturing services according to OEM buyers' technical specifications or component performance requirements. These suppliers also design their manufacturing equipment and business processes for particular buyers in order to respond rapidly to their clients' demands. Yet, OEM suppliers rarely receive formal protections for their unilateral relationship-specific investments. For example, a newly adopted just-in-time (JIT) business model by Dell required that its suppliers prepare at least three months buffering in stock. However, Dell did not offer any guarantee on purchasing volumes due to high uncertainty in final product markets (Subramani and Venkatraman, 2003).

Taiwan is the world's largest supplier of manufacturing electronic components, personal computers, and devices (Ernst, 2000). However, most of the buyers are well-established international brands with superior bargaining positions. According to the 2005 International Procurement Office (IPO) in Taiwan Survey,[2] the top twenty IPO purchasing companies accounted for 97 percent, and the top five (HP, Dell, Sony, Apple, and IBM) accounted for 72 percent of total international information technology (IT) purchasing in Taiwan. These OEM buyers avoid concentrating their purchase orders with a single supplier, and frequently adjust their demand based on suppliers' performance. The overall structure of OEM supplying networks further reinforces asymmetric bargaining relationships between buyers and suppliers. Major OEM buyers have a group of first-tier OEM suppliers for a particular product. Further, although these first-tier suppliers have met the requirements of production quality and procurement process, buyers sometimes source from second-tier OEM suppliers. Recently, these OEM buyers introduced a price-bidding system on the Internet, which shifted cost reduction pressures to their suppliers and enhanced further their own bargaining positions. OEM buyers do cancel orders occasionally, which may cause an unexpected economic loss for their suppliers. For example, in 2005, Motorola canceled a Windows-based smart phone launching project (model MPx) due to its internal organizational adjustments. A Taiwanese supplier, COMPAL suffered a severe and unanticipated economic loss from its initial sunk-cost investments, which had been dedicated assets to Motorola.

This study contributes to the research literature on vertical integration by highlighting that even knowing that their clients may behave opportunistically, some OEM suppliers in Taiwan are still willing to make client-specific investments without economic safeguards. The strategic management logic is that small and inexperienced OEM suppliers in Taiwan view the exchange relationship with computer giants, like Dell, as a necessary strategic move. These OEM suppliers rely on unilateral relationship-specific investments to gain orders from major OEM buyers, and expect little, if any, economic profitability from current transactions with major OEM buyers. These OEM suppliers place much of the value of their strategic move on the positive spillovers these current transactions may yield from future transactions with the same OEM buyers or from other transaction parties.

[2] The project of IPO in Taiwan Survey was conducted by the Office of Committee for Information Industry Development and the Market Intelligence Center, Institute for Information Industry and was sponsored by the Industrial Development Bureau, Ministry of Economic Affairs. See http://www.ociid.org.tw/modules/wfsection/download.php?fileid=45.

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Knowledge spillovers and economic bonding relationships

The extant research literature informs us that unilateral sunk-cost commitments by OEM suppliers can function as an economic hostage (Fein and Anderson, 1997; Ross, Anderson and Weitz, 1997) and as a signal of a supplier's willingness to perform their obligations to buyers effectively (Celly, Spekman, and Kamauff, 1999; Gulati, Khanna, and Nohria, 1994). This study emphasizes that unilateral commitments can also be a strategic move to gain from current contracts by capturing value via knowledge and reputation spillover effects that will be applied to future contracts.

By making unilateral sunk-cost investments, OEM suppliers have an opportunity to develop multiple projects and economic bonding relationships with a particular buyer. The more dedicated assets that OEM suppliers invest, the more likely that these suppliers will accumulate partner-specific knowledge (von Hippel, 1994) and thereby will develop interorganizational routines (Nelson and Winter, 1982). Such knowledge will then enable these suppliers to outperform other potential suppliers in future transactions. Thus, these newly created capabilities can greatly improve exchange efficiency (Madhok, 2000) and enhance transaction value perceived by clients (Zajac and Olsen, 1993).

In addition, suppliers' relationship-specific investments may increase the economic incentive of their clients to transfer knowledge and information to these suppliers. The dedicated teams and joint decision making of new product development (Heide and John, 1990) increase the need for information sharing and knowledge-sharing activities between OEM suppliers and buyers (Dyer and Nobeoka, 2000; Kotabe, Martin, and Domoto, 2003; Zaheer and Venkatraman, 1994). Given that buyers often must provide timely market information and product designs to suppliers, the unilateral investments of these suppliers serve as sunk-cost commitments that reduce buyers' concerns about information leaking to their competitors.

Taiwanese OEM suppliers often use relationship-specific investments to develop and coevolve with their clients. Some Taiwanese suppliers invest heavily in dedicated plant and equipment to meet possible performance requirements of component or subsystem production, and to assure that their products or services are irreplaceable in the market. Once a supplier has built a substantial amount of physical plant and equipment, and adjusted their human resources and business processes to fit their clients' routines, the clients will typically rely more on their suppliers' capital investments (Parmigiani, 2007; Srinivasan and Brush, 2006). Thus, these relationship-specific investments, together with partner-specific knowledge that the OEM supplier has gained from prior projects, increase the likelihood of winning new and more valuable projects from the same transaction partner.

Taiwanese OEM suppliers attempt to ensure long-term exchange relationships with their buyers by broadening their vertical scope in the value chain (Ernst, 2000; Richardson, 1996). Ongoing transactional relationships permit contractual parties to reward cooperative behaviors, which foster collaboration and reciprocity in business transactions (Barthelemy and Quelin, 2006; Heide and Miner, 1992). Opportunistic behaviors are attenuated if the value of future transactions exceeds the short-term gains achieved through such behavior (Telser, 1980). Thus, OEM suppliers can reduce their transaction hazards by offering value-added services to their clients. For example, turnkey production arrangements in the personal computer industry enable Taiwanese suppliers (e.g., Mitac International) to integrate various stages of the value chain and to offer OEM buyers (e.g., Hewlett-Packard) manufacturing, support, and after-sales services. Adapting to the OEM buyers' demand for flexible products and speedy delivery, some Taiwanese suppliers have developed into a 'one-stop shopping center,' providing coordinated services to clients. Business routines developed from providing manufacturing services to the transaction partner can also support these expanded services.

By making relationship-specific investments, an OEM supplier can gain learning advantages to leverage in future transactions with the same client, and the greater these expected advantages, the more likely OEM suppliers will accept transactional hazards associated with the client. We thus propose:

> *Hypothesis 1: The greater the economic value of inter-project knowledge spillover effects with a particular client, the more likely OEM suppliers will make unilateral relationship-specific investments.*

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Knowledge spillovers and capability leveraging

The exchange relationship between an OEM supplier and its buyer enables the supplier to develop dynamic capabilities that over time can enable this OEM supplier to gain profitable business from other buyers. The OEM supplier can apply its newly created capabilities not only to various stages of vertical supply chain activities with the same buyer, but also to a broader customer scope (Uzzi and Gillespie, 2002). An example of such an inter-project spillover with other buyers would be a Taiwanese supplier that over time acquires strategic resources, such as tacit knowledge and positive reputation, from an OEM-supplier relationship and leverages these resources in dealing with third parties. OEM buyers typically have superior technology and resource positions than their suppliers. The asymmetric flow of knowledge between OEM buyers and suppliers (Inkpen and Beamish, 1997) results in improvements in the suppliers' resource profiles, capabilities, and absorptive capacity (Cohen and Levinthal, 1990). Because OEM buyers are responsible for final product quality, typically these buyers must transfer key technology and timely information to their suppliers (Ernst, 2000).

HIPRO company's site-specific investments that enable knowledge leveraging serve as an exemplar. Founded in 1992, the company won its first order of personal computer power supplies from a major OEM buyer, Dell, about 10 years ago by agreeing to build JIT warehouses near Dell assembly sites worldwide. Being a supplier to Dell has been a valuable asset for HIPRO. According to our interviews with managers at HIPRO, Dell regularly sent staff members to visit their suppliers in Taiwan. In the process of qualifying to supply Dell, HIPRO learned how to improve its procurement and production control methods, to upgrade its knowledge of design-for-manufacturing, and to improve the efficiency of its own production networks. HIPRO has been able to leverage this knowledge when transacting with other buyers.

By making unilateral relationship-specific investments to serve its client, an OEM supplier can upgrade its capabilities, which can be leveraged to a broader customer scope. The knowledge of how to improve product quality acquired from one OEM buyer can be deployed to improve product quality for other clients (Kogut and Zander, 1992; Nobeoka, Dyer, and Madhok, 2002). We thus propose:

> *Hypothesis 2: The greater the economic value of inter-project knowledge spillover effects with other clients, the more likely OEM suppliers will make unilateral relationship-specific investments.*

Reputation spillovers and endorsement effect

In addition to knowledge spillovers from OEM buyers to OEM suppliers, there are also reputation effects for being associated with major OEM buyers (Stuart, Hoang, and Hybels, 1999). OEM buyers typically have more confidence in suppliers who have shown capabilities to meet the procurement requirement of other major OEM buyers, such as Dell. The value of a reputation spillover effect would be greater for suppliers like HIPRO whose products have no brand name recognition (Stuart, 2000). After winning an order from Dell, HIPRO found it easier to approach other OEM buyers (e.g., Cisco). Thus, even if the profit margin of manufacturing services with Dell was initially not a competitive rate of return on investment and its relationship-specific investments for Dell were not protected by long-term purchasing agreements, both the potential learning effect, and the reputation effect of being classified as a top-tier supplier, led to strategic advantage in dealing with other buyers and provided HIPRO with value beyond the transaction at hand.

Another example of leveraging strategic assets acquired from OEM buyers can be found in a company called WISTRON, which was a member of the ACER computer business group. WISTRON segmented its clients into four categories in the notebook computer business: international, local, channel, and distributor brands. Top-tier buyers, for example international brands, are in superior bargaining positions because these buyers purchase large volumes, make superior technology transfers, and give direct access to market information. Serving top-tier OEM buyers (e.g., IBM) improved WISTRON's market status (Podolny, 1993). Because other tiers of clients prefer to do business with suppliers serving top-tier OEM buyers, WISTRON enjoys a better bargaining position and can extract economic rents from these clients. Therefore, although it may incur economic losses

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from making unilateral relationship-specific investments to top-tier clients, it can more than recover these economic losses from transacting with other-tier clients.

These business cases indicate that a supplier's relationship with one contractual party (a major OEM buyer) can benefit its transactional relationships with other contractual parties (other OEM buyers). Being endorsed by a major OEM buyer reduces the market uncertainty of other buyers concerning the supplier's capabilities. Such reputation effects should be highest when there are substantial differences in market status between these transaction parties. When the economic value of reputation spillovers is large enough to compensate for the potential economic loss from contractual hazards, the OEM supplier will find that the value-maximizing strategy is to make these unilateral relationship-specific commitments. We therefore propose:

Hypothesis 3: The greater the economic value of reputation spillover effects with other clients, the more likely OEM suppliers will make unilateral relationship-specific investments.

METHOD

The research setting and data collection

Manufacturers in two industries—information technology and bicycles—were selected as the research setting for this study. The first sampling frame included all of the more than 400 electronic manufacturers listed in the Taiwan Stock Exchange Market. The second sampling frame was from a list of 290 local exhibitors in the 2006 Taipei International Cycle Show.

We chose both the information technology and the bicycle industry for several reasons. First, both industries are characterized by a high degree of asset specificity. Due to increasing pressure on the supplier for speedy delivery, OEM suppliers in the two industries must follow their clients' production specifications and quality standards in order to maintain effective collaboration. These suppliers typically make substantial investments in tools, equipment, and operating procedures and systems, which are specialized to the requirements of a particular buyer. Second, Taiwanese OEM suppliers play a major role in serving international brand players in these two industries. Consider notebook computers as an example. Taiwan has become the world's largest manufacturer of notebook computers since 1994. In 2005, almost 65 percent of the notebook computers sold under the international brand were designed and manufactured by Taiwanese firms under OEM arrangement. Taiwan is also well known for providing bicycle assembly services, components, and accessories for leading world brands (e.g., Shimano, Specialized, and Trek). Third, both industries are characterized as vertically deintegrated in global production networks, where international buyers concentrate on branding and product design, and OEM suppliers are responsible for manufacturing parts, components, and assembly services. Given the division of labor, a majority of information technology (IT) manufacturers and all of the bicycle manufacturers in Taiwan access international markets and advanced technology by serving international OEM buyers.

A benefit for pairing these two industries in this study is that the market power difference between OEM suppliers and their buyers varies in the two industries, which, as we discuss later, enables testing alternative explanations for our empirical results. Firms in the bicycle industry are much smaller than those in the information technology industry, and the market power between suppliers and their buyers is relatively more balanced in the bicycle industry. A bicycle consists of many components including tires, rims, hubs, frames, handlebars, cranks, saddles, chains, and pedals (Galvin and Morkel, 2001). The bicycle industry is highly fragmented and consists of a diverse group of small- and medium-sized component manufactures with specialized capabilities. Frame manufacturers or assemblers build bicycles using parts and components from multiple suppliers. Each component connects via standardized interfaces; and as a result, no single firm can overturn the entire product design. Due to market segmentation, international buyers do not overpower the Taiwanese OEM (parts and component) suppliers in the bicycle industry. In contrast, the market power difference in the information technology industry is much larger than in the bicycle industry. The purchasing of information technology OEM services in Taiwan is more concentrated with only a few well-established international brands, and most buyers have many OEM supplier alternatives. The overall structure of OEM supplying networks

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and the control of critical technology development by international buyers further reinforce asymmetry in buyer-supplier relationships. Therefore, manufacturers in these two industries are particularly suitable for our empirical testing.

In terms of the research process, we sent a packet containing: (1) a cover letter stating the purpose of our study and promising anonymity, (2) a questionnaire, and (3) a return envelope to firms in the information technology industry in November, 2005. We asked that managers who were primarily responsible for OEM business to be respondents. The respondents had job title positions of project manager, sales manager, marketing vice president, and president. To increase accuracy of these responses, respondents were asked to focus on a transaction relationship with OEM buyers within the last five years for which they had been responsible. Two weeks after the first mailing, we sent a follow-up letter and collected the mailed questionnaires. A total of 82 usable responses were received, resulting in a response rate of 17.5 percent. This response rate is considered acceptable, since some of the manufacturers did not have OEM business or had signed a nondisclosure and confidentiality agreement (NDA) concerning client information. Nonresponse bias was assessed by comparing early and late respondents (Armstrong and Overton, 1977). There were no significant differences between early and late responding firms in terms of capital and numbers of employees.

The data for the bicycle industry were collected through on-site interviews. We excluded nonmanufacturing companies, and contacted all the exhibitors in the export area—mainly parts and accessories manufacturers—in the Taipei World Trade Center Exhibition Hall during the four-day exhibition in March, 2006. Forty-five qualified OEM suppliers agreed to participate and a total of 41 usable responses were obtained. We compared our data with members of the Taiwan Bicycle Exporters' Association, and found no significant differences in capital or in numbers of employees.

Measurement

The survey instrument was developed based on field interviews and previous research studies. Before designing our survey questionnaires, we conducted a case study of eight firms from the information technology, animation, footwear, and furniture industries to explore the possible spillover effects that an OEM supplier anticipates with international outsourcing. In-depth interviews with owners and managers of these case companies provided us with items for construct measurement. The interviews with the first five firms were exploratory and focused on characteristics of relationship-specific investments, possible economic safeguards, and spillover effects. In later interviews, we targeted three companies in the information technology industry, and we clarified key constructs and relationships among them, including relationship-specific investments, multiple projects and services, capability upgrading, and market visibility.

The draft of the questionnaire was developed and personally administered with representatives of two companies: one marketing vice president and one product manager. Executives from these two companies helped us identify questions that were unclear, subject to multiple interpretations, and/or difficult to answer. The revision was then pretested in a medical equipment trade show. Table 1 reports the key constructs and the details of items used in the analysis.

Dependent variables

Relationship-specific investment

There has been considerable diversity in the measurement of asset specificity (Carter and Hodgson, 2006; Rindfleisch and Heide, 1997). For example, David and Han (2004) found 27 different measures of asset specificity, in which the most common were various measures of physical asset specificity and human capital specificity. To maintain construct validity, we followed prior research and adopted measurements particularly suitable to our OEM setting (Heide and John, 1990; Zaheer and Venkatraman, 1995). In particular, we measured relationship-specific investment by seven indicators capturing both the tangible and intangible aspects of investment in the OEM supplier-buyer transaction setting. The tangible investment was measured by three items based on Heide and John (1990) and on our field interviews, which describe the physical investment made by an OEM supplier in tooling, equipment, and engineering expenses that are specific to the requirements of an OEM buyer. The intangible investment was measured using four items that describe the investment made

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Table 1. Key constructs

Construct	Items
Relationship-specific investment	1. Your company has made significant investment in production and testing equipment dedicated to this focal buyer. 2. Your company has made significant investment in tooling and engineering design dedicated to this focal buyer. 3. Your company has made significant investment in information technology and logistic systems dedicated to this focal buyer. 4. Your company has spent a lot of time with the focal buyer in learning its operation routines and in building relationships with its staff. 5. Your company has made significant adjustments in your product and production system in order to adapt to this focal buyer's unusual needs and technical specifications. 6. Your company has made significant adjustments in internal operation processes in order to adopt this focal buyer's unusual needs and technical specifications. 7. Your company has spent a lot of time and effort in coordinating the operation processes of your own suppliers in order to adopt this focal buyer's unusual needs and technical specifications. (Likert seven-point scale; 7 = extensive investment, 1 = minimal investment)
Multiple projects	Your company has developed multiple projects with this focal buyer. (Likert seven-point scale; 7 = strongly agree, 1 = strongly disagree)
Integrated services	In addition to manufacturing services, which of the following services did your company provide for this focal buyer? 1. Manufacturing of higher level products 2. Research and development 3. After-sales and maintenance services (1 = yes, 0 = no)
Capability upgrading	After working with this focal buyer, your company has gained significant improvement on following capabilities: 1. Capacity turnover 2. Manufacturing process capability 3. Quality control capability 4. New product development capability 5. Overall managerial capability (Likert seven-point scale; 7 = strongly agree, 1 = strongly disagree)
Reputation enhancement	1. After doing business with the focal buyer, the market visibility of our company has increased. 2. After doing business with the focal buyer, the market status of our company has been enhanced. 3. After doing business with the focal buyer, it is much easier to obtain new orders from other clients. (Likert seven-point scale; 7 = strongly agree, 1 = strongly disagree)

by the OEM supplier in business processes and procedures, and in people that are specific to the requirement of an OEM buyer (Zaheer and Venkatraman, 1995). All indicators were measured on a seven-point scale from 'extensive investment in terms of time and effort' to 'minimal investment.' The Cronbach alpha measure of reliability for this construct is 0.897.

It should be noted that an ideal measure for exchange hazard would be the cost of losing a buyer's business after the specific investment is made. However, we neither have these data nor would companies typically share such sensitive data within questionnaires. The best we could do was the seven-point Likert scale measure that we did obtain. Still, we were able to obtain some proxies for the potential cost of losing the buyer's business. These proxies are measured by asking the respondent: 'if the relationship with this client was terminated, your company would suffer a severe loss in business;' and 'whether it is not easy to find a similar client in a short period of time.' All of the

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proxies were measured on a seven-point scale from 'strongly agree' to 'strongly disagree.' We find that the correlation coefficients between our measure for unilateral relationship-specific investments and the two proxies are 0.393 and 0.417; both are significant at the 0.01 level. These empirical results further corroborate the validity of our construct.

Independent variables

Knowledge spillovers

We used both *multiple projects* and *integrated services* to capture inter-project spillover effects with the same transactional party. The construct of multiple projects was operationalized as a single item reflecting the horizontal scope of an OEM-supplier relationship. The item was measured on a seven-point scale from 'strongly agree' to 'strongly disagree.' The construct of integrated services was measured as the logarithm of the number of activities along the value chain, such as global logistics and after-sales services, which the respondent had offered for the same OEM buyer. This item captures the degree of vertical scope of the exchange relationship.

A *capability upgrading* scale was developed to describe the inter-project knowledge spillover effects with other transaction parties. This construct is measured by the extent to which an OEM supplier had experienced significant improvement in several aspects of capability, such as capacity turnover, production processes, quality control, new product development, and managerial capability. We used five indicators to measure various types of capability improvement after serving this OEM buyer. All of the indicators were measured on a seven-point scale from 'strongly agree' to 'strongly disagree.' The Cronbach alpha measure of reliability for this construct is 0.92.

Reputation spillovers

A reputation spillover effect refers to the degree to which the prominence of a business partner affects the market status and visibility of the OEM supplier, and which enables the supplier to gain new markets and other clients (Rindova, Williamson, Petkova, and Sever, 2006; Stuart, 2000). The *reputation enhancement* scale was developed to assess the positive spillovers that an OEM supplier can generate due to the endorsement effect (Stuart *et al*., 1999) of a good reputation of its buyer. We use three indicators to measure the benefits of being associated with a prominent buyer. All of the indicators were measured on a seven-point scale from 'strongly agree' to 'strongly disagree.' The Cronbach alpha measure of reliability for this construct is 0.92.

Control variables

We included two types of control variables: industry/firm-level controls and a measure of economic safeguards. First, we controlled for *industry* effects by including a dummy variable to differentiate the information technology industry and the bicycle industry. Second, we controlled for the *length of association* by using the logarithm of the number of years of the exchange relationship. A long-term relationship cultivates confidence between the two exchange partners (Gulati, 1995; Hoetker, 2005), and thus may increase the OEM supplier's willingness to invest in specific assets. Third, we included *firm size* and *relative scales* to control for extraneous factors, such as resource advantages and bargaining power, which may influence both the asymmetric flows of knowledge and the investment decision of relation-specific assets. For instance, larger OEM suppliers have more resources to invest in R&D or branding, which in turn reduces their dependency on external sources of knowledge and their OEM buyer's endorsement. These suppliers may be in a better bargaining position to require reciprocal commitments relative to smaller suppliers and therefore are more likely to make relationship-specific investments. The variable of firm size was measured as the logarithm of the number of employees in 2005. The variable of relative scales was judged by comparing the focal company and its OEM buyer in terms of the average sales in the past two years (2004–2005). This item was measured on a five-point scale from 'much larger than your OEM buyer = 5' to 'much smaller than your OEM buyer = 1.'

Finally, we controlled for the degree of *reciprocal investments* by OEM buyers, which are viewed as mutual sunk-cost commitments (Bensaou and Anderson, 1999). This construct describes the extent to which an OEM buyer provides effort to become familiar with its supplier's personnel and business procedures, and modifies its product features to accommodate the supplier's specifications

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for components. We use four indicators to measure relationship-specific investments that OEM buyers made for their suppliers. All indicators were measured on a seven-point scale from 'strongly agree' to 'strongly disagree.' The Cronbach alpha measure of reliability for this construct is 0.84.

RESULTS

Table 2 reports the descriptive statistics and correlations between variables. The largest correlation coefficient between two independent variables is 0.644 (between capability upgrading and reputation enhancement). The reason that capability upgrading and reputation spillover are highly correlated is that for our sample firms, these two effects often appear at the same time; that is, when an OEM supplier gets to serve a big OEM buyer, its capability is upgraded and simultaneously its reputation is improved. The fact that the two constructs are not completely correlated suggests that the two effects do not always go hand in hand. We tested the potential colinearity problem by checking variance inflation factors (VIF). The largest VIF coefficient is smaller than 3, well below the threshold of 10, indicating no serious threat of multicolinearity. Hypotheses 1, 2, and 3 predict conditions under which OEM suppliers will make unilateral relationship-specific investments. The research hypotheses were tested using ordinary least squares regression models.

Table 3 contains the results from regression analysis in which the dependent variable is the extent of relationship-specific investments made by OEM suppliers. We tested the hypotheses by introducing variables sequentially in the models. The first model includes control variables only, and the remaining models test our hypotheses. As shown in Models 2 and 3, the coefficients of multiple projects and integrated services are positive and statistically significant at the 0.1 level or below, confirming the positive relationship between horizontal and vertical scope of transactions and the commitment of relationship-specific investments. Therefore, Hypothesis 1—that the greater the economic value of inter-project knowledge spillover effects *with a particular client*, the more likely OEM suppliers will make unilateral relationship-specific investments—is empirically supported.

The two other hypotheses concern the spillover effects of relationship-specific investments beyond

Table 2. Descriptive statistics and correlations

Variables	Mean	S.D.	1	2	3	4	5	6	7	8	9
1. Relationship-specific investment	4.50	1.21									
2. Multiple projects	5.10	1.38	0.294**								
3. Integrated services	2.69	0.85	0.221*	0.302**							
4. Capability upgrading	4.78	1.20	0.517**	0.376**	0.138						
5. Reputation enhancement	5.04	1.31	0.468**	0.420**	0.273**	0.644**					
6. Industry	0.34	0.47	−0.017	−0.014	0.123	−0.216*	−0.092				
7. Firm size	948	2395	0.115	0.082	0.109	0.211*	0.203*	−0.523**			
8. Relative scale	2.17	1.13	−0.002	−0.048	−0.011	−0.225*	−0.357**	0.272**	−0.177*		
9. Length of association	4.24	1.81	0.261**	0.171	0.001	0.106	0.076	0.120	0.079	0.055	
10. Reciprocal investment	3.29	1.43	0.406**	0.135	−0.123	0.349**	0.251**	−0.168	0.149	0.045	0.088

N = 123; * $p < 0.05$; ** $p < 0.01$ in a two-tailed test

Table 3. Result of regression analysis for relationship-specific investment

Model	1	2	3	4	5	6
Control variables						
Industry [a]	0.070	0.063	0.000	0.102	0.012	0.020
	(0.695)	(0.636)	(−0.002)	(1.129)	(0.130)	(0.215)
Firm size	0.070	0.057	0.004	0.035	−0.001	−0.032
	(0.714)	(0.600)	(0.045)	(0.397)	(−0.009)	(−0.357)
Relative scales	−0.038	−0.026	−0.031	0.054	0.124	0.108
	(−0.450)	(−0.308)	(−0.377)	(0.687)	(1.483)	(1.311)
Length of association	0.215**	0.183**	0.207**	0.175**	0.196**	0.175**
	(2.567)	(2.205)	(2.535)	(2.305)	(2.570)	(2.327)
Reciprocal investment	0.390***	0.365***	0.424***	0.247***	0.278***	0.261***
	(4.660)	(4.428)	(5.147)	(3.089)	(3.512)	(3.218)
Independent variables						
Multiple projects		0.209**				−0.010
		(2.550)				(−0.118)
Integrated services			0.273***			0.160*
			(3.296)			(1.968)
Capability upgrading				0.439***		0.285***
				(5.334)		(2.834)
Reputation enhancement					0.429***	0.216**
					(5.096)	(2.025)
F value	6.665***	6.899***	7.461***	11.600***	11.067***	9.010***
R^2	0.222	0.263	0.284	0.375	0.364	0.424
Adj. R^2	0.188	0.225	0.246	0.343	0.331	0.377
ΔR^2		0.041**	0.069***	0.153***	0.142***	0.209***

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$; N = 123; [a] Industry: 0 = information technology, 1 = bicycle; and the numbers in parentheses are t statistics

the current transactional party that are due to capability upgrading and reputation enhancement. In Models 4 and 5, we find empirical evidence that corroborates both Hypothesis 2 and Hypothesis 3. The coefficients of capability upgrading and reputation enhancement are all statistically significant and with the expected positive signs. We thus conclude that the expected economic value from other transaction parties influences the investment decision on the current transaction. Model 6 pooled all of the explanatory variables in one model and yielded empirical results that are largely consistent with previous models.

Among the control variables, the time length of association has positive effects on relationship-specific investments. A long-standing relationship cultivates trust, which facilitates interorganizational knowledge transfer (Dyer and Singh, 1998; Hoetker, 2005) and thus may increase the OEM supplier's willingness to commit relationship-specific investments. A buyer's reciprocal investment is also positively associated with the level of specific investments that a supplier has committed to the buyer, suggesting that reciprocal commitments promote cooperative exchange relationships. Reciprocal investment is in line with the principle of mutual sunk-cost commitment (Kim and Mahoney, 2006), which can be seen as an effective governance mechanism that supports learning and the creation of specific interorganizational routines and partner-specific knowledge.

DISCUSSION AND IMPLICATIONS

This research study explains why firms sometimes make unilateral relationship-specific investments without economic safeguards. We propose that firms make such investments when these investments possess substantial real-options value (Trigeorgis, 1996). The current study's context of OEM buyer-supplier transactions shows that relationship-specific investments can yield both positive knowledge and reputation spillovers. Farsighted firms that anticipate such spillover effects will make investments specific to their exchange

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partner even when their exchange partner fails to offer reciprocal investments. Therefore, unilateral relationship-specific investments without *ex ante* economic safeguards are not necessarily a strategic mistake.

This study extends transaction costs theory in several ways. First, it goes beyond the individual transaction as the unit of analysis (Argyres and Liebeskind, 1999; Nickerson, 1997) and considers the positive economic values (via capability development, learning and inter-project spillovers) that an individual transaction could yield beyond the individual resource exchange between the transaction parties. This theory refinement enables us to explain more fully unilateral relationship-specific investments in the OEM business, where asymmetric bargaining power prevails within the interorganizational relationship. Unilateral relationship-specific investments entail the strategic disadvantage of placing OEM suppliers in a risky bargaining position. However, countervailing strategic advantages can accrue to such strategic moves. An OEM supplier's unilateral relationship-specific investment can provide that supplier with a stepping stone to reposition their resource profiles and to enhance their capability to enter new markets (Nickerson *et al*., 2001; Wernerfelt, 1984).

Second, the dynamic approach developed in the current study also enables us to respond to the call from transaction costs theory that the next generation of research in the evolving science of organization should incorporate learning and capability development into governance choice and investment decisions (Argyres and Zenger, 2007; Mayer and Argyres, 2004; Williamson, 1999). By taking into account the intertemporal spillover effects of investments our extended theory considers the opportunities of learning and capability development as drivers for unilateral relationship-specific investments. In this dynamic approach, a smaller contractual party that is initially in a weaker bargaining position is more likely to accept a negative NPV project, because in an economic calculation beyond the single project, sunk-cost investments associated with one project may generate positive economic spillovers (via learning and capability development) for future transactions with the particular party and for transactions with other exchange partners.[3]

Third, a recent extensive review of the transaction costs economics literature (Macher and Richman, 2008) reports that few empirical studies have considered the degree of asset specificity as endogenous (Bensaou and Anderson, 1999; Saussier 2000) and have given little attention to strategic decisions regarding whether or not to invest and when to invest. Our study examines this particular strategic issue and our empirical findings indicate that firms are more likely to invest in specific investments when these firms expect their investments to have more positive spillovers.

Fourth, researchers recently called for an increasing interdisciplinary approach, combining transaction costs economics and other theoretical lenses, to interpret the behaviors of firms (Mahoney and McGahan, 2007). Our study responds to this call by incorporating real options logic into standard transaction economics. It considers unilateral relationship-specific investment as an option in gaining preferential access to future opportunities (e.g., opportunities for capability development and reputation enhancement).

It should be noted that the idea of inter-project spillover is a part of the research literature on bilateral governance. Our first proposition concerning the relationship between the economic value of inter-project knowledge spillover with a particular client and unilateral relationship-specific investment is consistent with the logic of relational trust (Dyer, 1996; Gulati, 1995). If suppliers can anticipate positive economic returns in repeated transactions due to the 'shadow of the future' (Heide and Miner, 1992; Parkhe, 1998), then these suppliers are more willing to commit unilaterally without the reciprocal commitment from their exchange partners.

Contributing to the extant research literature, this study emphasizes the business case where a weaker OEM supplier cannot easily extract reciprocal economic safeguards from a dominant OEM buyer. Alliance governance in asymmetric interorganization relationships must consider the strategic issue of how a weak contractual party can initiate

[3] Nickerson (1997) observed that in standard transaction costs theory the individual transaction is the unit of analysis, which gives way to a constellation of activities and multilateral exchanges, and governance decisions cannot be isolated from choices of market position and resources profiles. This study holds this view and uniquely places emphasis on the decision-making logic of a contractual party with a weak bargaining position, in which there are opportunities for capability building, organizational learning, and positive spillover benefits both for other projects with the same transaction partners and with different transaction partners.

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a transaction with a dominant exchange partner; and then over time fundamentally transform their relationship to relational governance. Indeed, our empirical results show support for the transformation of the initial OEM supplier-buyer relationship toward relational governance. In particular, we find that when OEM suppliers have a longer-term relationship with the buyer, these OEM suppliers are more likely to make unilateral relationship-specific investments. This observation is consistent with our logic that a long-standing relationship cultivates trust (Gulati, 1995), which promotes knowledge transfer from the buyer to the suppliers.

Our research study examines why weak OEM suppliers are willing to make unilateral relationship-specific investments. Market power theory suggests that such behaviors might be driven by market power differentials; that is, weaker firms have few options and thus are forced to accept greater transactional hazards (Shervani, Frazier, and Challagalla, 2007). To see whether this alternative market power explanation captures our empirical results, we reexamined the hypotheses on the subsample of firms in the bicycle industry, in which the market power differential between OEM buyers and suppliers are small. If market power was the sole explanation for our empirical result, we would find the hypotheses to be supported only by the IT sample. However, this outcome is not what we empirically observed. In particular, we found the predictions of inter-project spillover effects with third parties—capability building ($\beta = 0.405$, $p < 0.01$) and reputation enhancement ($\beta = 0.389$, $p < 0.05$)—were still robust to the bicycle industry. Only one variable that captures the potential value of repeated transaction (Hypothesis 1) was not statistically significant. This empirical result indicates that unilateral investment by OEM suppliers is not solely driven by market power differentials. While market power differentials can force a weaker firm to do things that it is unwilling to do, our study suggests that such a weaker firm is strategic and is likely to agree to such investments only when the investments provide other benefits for the firm.

Indeed, this research study emphasizes that a weaker bargaining positioned OEM supplier that delivers economic value to a major OEM buyer can, over time, effectively increase the OEM buyer's dependency on the OEM supplier. Therefore, *dependency balancing* can be a strategy to mitigate the economic safeguarding problem faced by a weaker bargaining contractual party (Heide, 1994; Heide and John, 1988; Subramani and Venkatraman, 2003). A recent empirical study of the Japanese auto industry also found that dependency balancing through purchasing larger volumes from suppliers can be seen as a credible commitment by auto assemblers to align economic interests (Ahmadjian and Oxley, 2006). The recommendation in the extant research literature is that the dominant contractual party commits first, which thus increases the economic incentives of the weaker contractual bargaining party to invest in specific assets.

The current study extends this line of research by focusing on the perspective of a weaker contractual bargaining party. Thus, we focus on the contractual party at risk and its contribution to the overall strategic alliance, based on the effects of capability and transaction value (Ghosh and John, 1999; Zajac and Olsen, 1993). We suggest that value creation via relationship-specific investment is a main motivation for successful relationship initiation and future continuity. By committing unilateral relationship-specific investments and by broadening service scope, a weak OEM supplier can initially focus on delivering economic value to a major OEM buyer, and over time effectively increase the buyer's dependency on this supplier.

Unilateral relationship-specific investment promotes a high level of interdependency that cultivates trust and commitment (Gulati and Sytch, 2007), which not only facilitates more effective vertical coordination, but also generates positive economic value in terms of inter-project spillovers based on economic bonding relationships. Contractual holdup hazards will be mitigated and interorganizational trust can be established (Zaheer, McEvily, and Perrone, 1998).

This study has several limitations. First, there is a single source for data on relationship-specific investments and independent variables that could result in common method bias. However, a single data source in our empirical context should not seriously compromise internal validity, because both the dependent and independent variables address actual data rather than an assessment of performance. Thus, the relationship between dependent and independent variables allow for few alternative explanations. We also enhanced the validity of the measures by using Harman's (1967) one-factor test. Un-rotated factor analysis of all

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variables of interest with an eigenvalue-greater-than-one criterion revealed four factors, and thus common method variance does not account for most of the interrelationships (Podsakoff and Organ, 1986).

Second, empirical evidence is limited to a sample of Taiwanese OEM suppliers, and thus external validity requires further investigation. In particular, research studies have addressed the influence of cultural and institutional factors on international cooperation. For instance, it is found to be much easier to build and maintain close relationships in Japan and some other Asian countries such as Taiwan than in Western cultures (Dyer, 1996). Taiwanese firms may continue to upgrade their resource profiles in order to maintain harmonious relationships with their powerful exchange partners. In addition, Taiwan and some other Asian countries have a long-term view that promotes long-term investments (Hofstede, 2001). This long-term view is consistent with a real options lens in which firms may be willing to accept a negative NPV project when there is expected spillover value from multiple transactions. It is plausible however that the strategic implications yielded from the empirical evidence of the current research study can be generalized to other business contexts in which asymmetric interorganizational relationships prevail, such as equity joint ventures, channel relationships, and international alliances.

Third, this study did not examine the economic effects of knowledge and reputation spillovers from the perspective of OEM buyers and their strategic implications for buyers' governance decisions (Mayer, 2006). For example, OEM suppliers' strategic behaviors might lead to their buyer's knowledge leakage, which in turn might increase their buyer's intentions to internalize manufacturing (Nickerson and Silverman, 2003), or to more closely monitor their suppliers (Mayer, Nickerson, and Owan, 2004). If an OEM buyer takes actions to prevent its supplier's economic value-maximizing moves (Arruñada and Vázquez, 2006), it might affect a supplier's capability to fully realize the potential economic value from these spillovers. Future empirical studies comparing the expected economic payoffs between pairs of buyers and suppliers will further enrich our understanding of the dynamics of economic spillover effects and their consequences concerning governance choices.

Finally, we measured asset specificity by OEM suppliers' investment in terms of physical assets, procedures, and human capital that are tailored to the relationship with a particular buyer (Heide and John, 1990). Such a measure may not fully reflect the monetary (switching) costs of losing the buyer's business. In addition, firms typically make investments in learning how the firms in which they have transactions operate their businesses. Therefore, relationship-specific investments may be a matter of degree. Yet, according to our interviews with case companies, each major OEM buyer has a specific production routine and procurement policy that must fit with its own business model. Thus, it is the supplier's responsibility to customize the design in information technology, logistic systems, and operation processes to accommodate to the client's customized needs. Ostensibly, these physical assets and information technology investments could be redeployed for future clients. However, in the current study, we have delved into the microanalytical details, and have discovered that the efforts and knowledge that make those technologies work within a specific organizational environment are time-consuming and partner-specific. For example, it is difficult for a supplier to serve IBM just because it has been familiar with Dell's procurement processes and routines, since these investments are specifically tailored to the relationship with Dell and would be costly to switch in serving other clients. Thus, these industry participants regard switching costs as substantial. Future research should develop more fine-grained measures for asset specificity and attempt to incorporate the monetary (switching) costs of losing the buyer's business.

CONCLUSIONS

This study has shown how unilateral relationship-specific investments can be understood not simply as acts of myopia on the part of managers taking such actions, but rather as rational strategic moves for maximizing their economic value. We complement transaction costs theory through a real options lens by introducing systemic thinking and broadening the unit of analysis from a single transaction to intertemporal dyadic exchange relationships and triad interactions. Our empirical evidence based on the OEM business in Taiwan indicates that firms are more likely to make

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unilateral relationship-specific investments when: (1) transactional hazards are mitigated; and (2) the investment yields sufficient economic values for other transactions with the same exchange partner and for third-party transactions.

In summary, the current study contributes to the extant research literature in the field of strategic management by refinement of transaction costs theory beyond the transaction as the unit of analysis in order to capture real options values. Importantly, this research study is likely to be generative of further empirical inquiries. Finally, this research offers an economic logic for improved procurement strategy policies in which unilateral relationship-specific investments can, in some business circumstances, be an economic value-maximizing strategy.

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