

Asset Specificity and Value-Creation: An Empirical Analysis of Taiwan's Personal Computer Industry

資產專屬性與價值創造：台灣電腦產業的實證

Abstract

This research attempts to explore, both conceptually and empirically, the positive effect of committing on relation-specific investment by the supplier within a context of international subcontracting partnership. Conceptually, we bring dynamic capability perspective of inter-firm collaboration into the existing transaction costs consideration by arguing that this kind of investment could stimulate more joint initiatives, which, in turn, could result in competence building by the supplier. As the supplier's capability is essential to successful strategic outsourcing, relation-specific investment could therefore provide transaction value for, not merely incur transaction costs to, the inter-organization collaboration.

Empirically, we propose two new constructs of asset specificity, namely "IT specificity" and "process specificity", to highlight the necessity of establishing inter-organizational coordinating routines involving interaction between people and the information infrastructure under which inter-organization knowledge exchange and eventually synergistic complementarities could be facilitated. Based on a questionnaire survey of Taiwanese manufacturers in information industries and a linear structural equation modeling approach, the empirical results largely support our conceptual postulation that the supplier's investment in relation-specific assets will positively affect both its involvement in joint activities and competence building. Managerial implications based on these results and future research directions are suggested.

Key words: Relation-specific Investment, Competence Building, International Subcontracting

Introduction

This research attempts to explore, both conceptually and empirically, the potential value associated with efforts of making relation-specific investments by the supplier within the context of international subcontracting partnership. Relation-specific investments in the present study generally refer to the unilateral commitments made by the supplier, ranging from tangible assets (e.g., dedicated equipment and task forces) to intangible resources (e.g., implementation of inter-partner information exchange systems and customized routines), in order to ensure the achievement of collaboration goals. Transaction cost theory (Williamson, 1985) would suggest that the supplier's potential gains from making such specific investments are subject to the buyer's opportunistic behavior in switching purchasing to alternative supplying sources or in appropriating quasi-rent from the supplier (Klein, Crawford, and Alchian, 1978). However, more recent literature advances that a supplier's investment in relation-specific assets signals its supply assurance and hence commitment to a long-term partnership (Celly, Spekman, and Kamauff, 1999) with the buyer, and would even generate inter-partner synergies through interdependent complementarities (Madhok, 2000; Madhok and Tallman, 1998). Relation-specific investments may therefore provide transaction values for (Dyer, 1997; Zajac and Oslan, 1993), not merely imply transaction costs to, the inter-firm collaborations. The realization of such collaborative values, or relation rents, could be a source of firm-specific advantage (Dyer, 1997; Dyer and Singh, 1998).

Despite of these arguments, the existing literature clearly maintains a lead firm (or buyer) focus (e.g., Artz and Brush, 2000; Dyer, 1996, 1997; Celly, et al., 1999). Whether the supplier's efforts in making relation-specific investments are justifiable from the supplier's point of view is by and large missing in the literature. As an initial effort in narrowing the literature gap, we assert that the potential value of committing relation-specific investments by

the supplier could be realized through inducing a higher level of joint actions (Heide and John, 1990) with the leading buyer, which in turn will result in upgrading the supplier's resource configuration. In our view, the pursuit of competence-building opportunities is central to the supplier's strategic decision, and learning from competent customers through engaging in more information exchange and knowledge sharing activities become key sources for competence building (Hamel, 1991; Inkpen, 1996; Mowery, Oxley, and Silverman, 1996). Within a context of international subcontracting partnership, such learning is even more imperative to the supplier's future growth. While suppliers possess competencies in achieving manufacturing excellence, they rely on leading buyers to bring in updated product architecture and interface knowledge, which act as a lever for the supplier to use in elevating its existing competence level of manufacturing activities. If the competence-building effect could then be transformed into value-adding supply for the buyer, a virtuous cycle of synergistic interactions between transacting parties can then be established.

To properly reflect the essence of the foregoing arguments, conceptually, our research integrates the resource-based view of the firm (e.g., Penrose, 1959; Wernerfelt, 1984), in particular, the dynamic capability perspective of inter-firm collaboration (Madhok, 2000; Madhok, and Tallman, 1998) with existing conversation concerning relation-specific investments, in which transaction cost reasoning (e.g., Williamson, 1975, 1985) has been a dominant framework in research exploration. Specifically, we decompose relation-specific investment into three differential constructs, namely "dedicated specificity," "IT specificity," and "process specificity," and establish links among the supplier's commitment in relation-specific investment, its engagement in joint actions and the effect of competence building. To further validate this conceptualization, we choose Taiwanese contract manufacturers in information industries as the empirical setting. The abundance of international subcontracting activities within this broadly defined industry context and the

dynamics of collaborative contracting alliance ensure our research inquiry is sufficiently relevant.

In the next section we will first provide a brief sketch of the comparisons between transaction cost economics (TCE, hereafter) and the resource-based view of the firm (RBV, hereafter) to establish a theoretical platform for hypothesis generation. We then outline the theoretical arguments regarding the links between the main research constructs. Research methods are presented, followed by an examination of the analytical results and the implication on international partnership management.

Theoretical Background and Hypotheses

The research target is concerned with relation-specific investments in international subcontracting partnerships. An international subcontracting partnership is defined in this study as a “cooperative, repeated exchange relationship between buyers and suppliers across borders”. More simply, it refers to a vertical collaborative relationship established on a global basis. Although the governance mode of this type of transaction by and large is market-based, it cannot be categorized as arms’ length market transactions (Dwyer, Schurr, and Oh, 1987; Ring and Van de Ven, 1992) since it usually involves recurrent transactions and the costs of switching from an existing buyer-supplier relationship are significant. Following TCE literature, such dyadic relations could be regarded as a hybrid mode (Borys and Jemison, 1989) or a relational contracting type (Williamson, 1991) of inter-organization transaction. Depending upon the tightness of the buyer-supplier relationship, such a vertical relationship could evolve from recurrent to interdependent in nature (Hemmert, 1999).

Taking each transaction as a unit of analysis, TCE basically suggests that the central motive of structuring a vertical collaborative relationship is to seek efficiency through economizing internal and external transaction costs, under which criteria an appropriate

governance structure for the transaction is determined. The relation-specific assets, or asset specificity in Williamson's terminology, involved in a transaction become a major source of friction and effective safeguarding measures are required in order to reduce the associated (transaction) costs. This is because relation-specific investments will transform an *ex ante* market type of competitive bidding into an *ex post* small number bargaining situation due to high switching costs (Williamson, 1985). TCE holds that a high frequency of transactions will mitigate some transactional problems since expected gains from opportunistic behavior could be reduced (Williamson, 1983). However, TCE's narrow emphasis on the efficient governance structure has been criticized as adopting too strong of an assumption of opportunism (Ghoshal and Moran, 1996; Conner and Prahalad, 1996), neglecting the value aspect of the transaction (Zajac and Oslon, 1993), and undermining the potential effectiveness that could be generated through implementing inter-firm co-specialized initiatives (Dyer and Singh, 1998; Madhok, 2000).

Perceiving a firm as a repository of idiosyncratic resources, the RBV provides a rather different view of the formation of vertical collaborative alliances. RBV basically suggests that firms collaborate for the purpose of combining two sets of resources in a synergistic manner (Penrose, 1959; Wernerfelt, 1984; Conner, 1991; Grant, 1996; Madhok and Tallman, 1998). In other words, a firm forms partnerships with others in order to either gain access to the partners' complementary resources to build its own resources, or for making use of the partners' similar resources to achieve scale economies (Dussauge, Garrette, and Mitchell, 2000). Along this logic, outsourcing emerges as a response to the increasing competitive pressure at the end market by choosing to concentrate on its area of competence while leveraging a collaborative partner's area of specialization (Quinn and Hilmer, 1994). Overall, TCE focuses on the issues of efficiency in a static context of given technology and competence and offers useful insights into the negative effects of specialized investments in dyadic exchanges. On the other hand,

the RBV emphasizes on the effectiveness and the value derived from complementarities of knowledge and synergistic potential through resource combination. Table 1 briefly shows the comparisons between TCE and RBV regarding the formation of vertical contractual partnerships.

 Insert Table 1 About Here

Our study adopts a dynamic capability perspective of RBV that draws inspiration from Penrose (1959), Nelson and Winter (1982), and Teece, Pisano, and Shuen (1997), among others. Under this perspective, organizations are regarded as being capable of learning and organizational routines serve as the function of control, replication and imitation in the organization (Grant, 1996; Nelson and Winter, 1982: 112). The purpose of structuring collaborative partnerships is to support the firm's search for economic rents through both deploying and developing capabilities which firms are not able to fully develop in-house in a cost-effective manner or to purchase through a market transaction (Madhok, 2000: 281). The benefits of collaboration include not only those resulting from *ex ante* resource complementarities but also those that might be generated due to *ex post* investments in relation-specific assets by the transacting parties (Dyer and Singh, 1998; Madhok, 2000) and through inter-organizational learning over time, which, in turn, may help both firms to upgrade their competence (Lee and Chen, 2000). In other words, the value of the transaction is not based merely on the efficiency of governance structure but highly relies on the effectiveness of collaboration based on specialized investments and knowledge sharing routines established over time. Taking this conceptualization forward, in the following sessions we will develop specific hypotheses concerning relation-specific investments and competence building in international subcontracting partnerships.

Relation-specific Assets and Joint Action

Asset specificity in TCE has been defined as those investments for a specific transacting partner and will be of little value outside this relationship¹. For the purpose of this study, we choose to use the term “relation-specific investment” and further classify this construct into three types of specificity: they are (1) dedicated specificity (2) IT specificity and (3) process specificity. *Dedicated specificity* refers to dedicated equipment (e.g. capacity investment, manufacturing and testing equipments), dedicated human assets, and dedicated IT hardware/software. In addition, *IT specificity* delineates the online information exchange and partner-specific IT investments whereas *process specificity* focuses on partner-specific work routines and interactions between IT and people.

Joint action is an important behavioral element of relational exchange to signal the closeness and interdependence between partners (Kim, 1999; Heide and John, 1990; Joshi and Stump, 1999). Within the context of international subcontracting partnership, joint activities established between buyers and suppliers could be in the activity areas of product design, cost structure analysis, delivery system, personnel training and long-term planning. While this sort of inter-organization activity could be value-adding to the buyer, its realization will be dependent upon the buyer’s desired level of external control. Without structuring proper arrangements between the buyer and supplier, strategic outsourcing may increase the buyer’s vulnerability and even erode its competitive edge (Bettis, Bradley, and Hamel. 1992; Markides and Berg, 1988; Quinn and Hilmer, 1994). Therefore, relation-specific investment made by the supplier could constitute a “hostage” or “credible commitment” (Williamson, 1983) to the prospective relationships. In other words, a buyer would enjoy more control over a supplier

¹ Williamson (1991) 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.

that has made relation-specific investments. Given that such investments serve as an assurance of commitment (Celly et. al., 1999), other things being equal, it is conceivable that the buyer would be more willing to broaden the extent and scope of joint activities with the investing firm. Previous literature based on the buyer's point of view also evidenced that relation-specific investment would have a positive impact on joint actions (Heide and John, 1990; Kim, 1999; Zaheer et. al. 1998; Joshi and Stump, 1999). Therefore, we can establish the following hypothesis:

H1a: Dedicated specificity is positively associated with a supplier's engagement in joint actions with its buyer.

Owing to an increasing level of requirements for providing just-in-time manufacturing services on a global scale, many contract manufacturers have to elevate their responsiveness in operation as specified by their key customers. The evolution of new operation models in many IT-related industry sectors, for example, build-to-order (BTO) and global logistics, further facilitates the need of a tight inter-organization link among players along the supply chain. To achieve tighter coordination with key customers, it is critical that the supplier establish dedicated teams and invest in computer software, that are complementary in facilitating coordination, to integrate the information flow between partners (Kraut, Steinfield, Chan, and Hoag, 1999). Given the geographical, time and cultural dispersion occurring in cross-border contracting alliances, establishment of internet-based collaborative routines becomes an indispensable element to support joint activities (Economist, 2001). In brief, in addition to traditional dedicated asset specificity, both IT and process specificities offer a common platform for better communication and efficient coordination, and hence pave the way for closer cooperation between international partners. Thus, along the same logic between dedicated specificity and joint action, we can establish the following hypotheses:

H1b: IT specificity is positively associated with a supplier's engagement in joint actions with its buyer.

H1c: Process specificity is positively associated with a supplier's engagement in joint actions with its buyer.

Process Specificity and Competence Building

Williamson (1985) argues that, by investing in durable, relation-specific assets,

“the winner of an original contract acquires a cost advantage, say by reason of ...unique location or learning, including the acquisition of undisclosed or proprietary technical and managerial procedures and task-specific labor skills. (p. 53-54)”

This kind of inter-partner learning based on shared language/routines embedded in human assets has been highlighted in both RBV (e.g., Grant, 1996) and organizational capability literature (e.g., Kogut and Zander, 1992; Nelson and Winter, 1982). Knowledge-sharing routines (Dyer and Singh, 1998) together with managerial processes adapted to the specific partner could create collaboration-specific rents through synergistic complementarities (Madhok, 2000:279), which, in turn, have implications on the collaborative partner's competence building.

We define competence building as the extent to which the supplier improves its capability to provide value-adding services. While competence entails coordination and learning (Williamson, 1999: 1094), process specificity, i.e., the integration of people and information systems with partner-specific routines, not only could facilitate inter-organization coordination but also could serve as a vehicle for channeling both explicit and implicit knowledge between partners. In practice, a dedicated team for a specific partner allows for more customized communication, immediate feedback and prompt problem solving whereas an information system connected via Internet between partners enables information to be exchanged in a timely

manner. Since the supplier's investment in relation-specific assets signals its assurance of commitment (Celly et. al., 1999), the buyer would in turn be more willing to share knowledge with the investing firm. Depending upon the supplier's absorptive capability (Cohen and Levinthal, 1993), process specificity could provide a great opportunity for the supplier to upgrade resource configuration. As such, we can establish the following hypothesis:

H2: Process specificity is positively associated with a supplier's competence building.

Joint Action and Competence Building

As discussed above, joint action refers to the extent and degree of closeness and interdependence between partners. As joint actions involve staffs from respective parties to interact on a regular basis, knowledge exchange as well as routine and culture assimilation between collaborative partners occur more easily (Hamel, 1991). For example, to leverage the supplier's expertise, buyers would invite first-tier suppliers joining in the early phase of new product development activities. By joining in these activities, suppliers could learn the trend of market demand, key specifications of newly defined products, and more importantly the buyer's managerial orientation and working culture (Vonderembse and Tracey, 1999). In addition to knowledge acquisition from the buyer, these inter-organization processes and routines, which are embedded in distinct ways of coordination, could eventually become relation-specific assets of the supplier under which its competitive advantages over other competitive vendors are based (Teece et. al., 1997). In other words, more chances of working together enable the suppliers to acquire more knowledge associated with buyers' capabilities. Such knowledge can then be incorporated into the suppliers' own corporate system and become "internalized".

Note that such inter-organization learning within the context of international outsourcing

tends to be complementary rather than substitutive, as often observed in the case of horizontal alliances (e.g., Hamel, 1991). From a value-creating point of view, we could even argue that the supplier's competence upgrading aligns with the buyer's interests. This is because the alliance structure of international subcontracting is based on vertical specialization, that is, branded buyers focus on product innovation and marketing activities while suppliers dedicate themselves on providing manufacturing-related services. Imitation barriers in each stage and specialization value could reduce the likelihood of sub-optimal behaviors from respective partners. Competent suppliers therefore could enhance the buyer's competitiveness. In fact, it is very common for branded buyers to utilize a constant vendor qualification procedure to distinguish competent suppliers. In other words, competent and compatible suppliers could have a better chance to build a wide range of joint actions with their buyers.

As such, joint actions and competence building seem to be intertwined and mutually reinforced in subcontracting partnership. The idiosyncratic routines developed from joint activities are embedded in relationships. They are actually the underpinnings of the supplier's competence and sources of competitive advantage and provide formidable barriers against the entry of competitors. Therefore, we can establish the following hypotheses:

H3a: A supplier's engagement in joint actions with its buyer is positively associated with the supplier's competence building.

H3b: A supplier's competence building is positively associated with its engagement in joint actions with its buyer.

Control variables

Based on previous literature, four confounding factors to our investigation of the main constructs have to be controlled; they are *relational capital*, *duration*, *absorptive capacity* and

the *tacitness of knowledge*. Relational capital refers to the level of mutual trust, respect and friendship that arises out of close interactions, both at the individual level and at the firm level, between partners (Kale, Singh, and Perlmutter, 2000; Zaheer et al., 1998; Dyer and Chu, 2000). Recent research supports that trust can increase relation-specific investments (Dyer and Singh, 1998) whereas knowledge transfer requires a sense of community in virtual teams in addition to IT (McDermott, 1999). Thus, relational capital underpins the willingness and openness of the partners to share their knowledge with each other (Hamel, 1991). The second control variable is the duration of cooperation between partners. It takes time to accumulate, digest and transform absorbed knowledge into firm-specific competence (Dierickx and Cool, 1989; Simonin, 1999). Furthermore, it takes time for partners to develop knowledge sharing routines and mutual trust that will maximize the frequency and intensity of interactions (Dyer and Singh, 1998; Gulati, 1995). The third confounding factor concerns partner-specific absorptive capacity that facilitates knowledge-sharing routines between partners (Dyer and Singh, 1998). Usually, overlapped technology, prior related experiences and established interaction routines are identified as major sources of absorptive capacity (Cohen and Levinthal, 1990; Shenkar and Li, 2000; Dyer and Singh, 1998). Lastly, tacitness of knowledge is empirically identified as the most significant determinant of knowledge transferability (Simonin, 1999, 2000; Zander and Kogut, 1995).

 Insert Figure 1 About Here

Methods

Data and Sample

The information industry in Taiwan is chosen as the industry scope for our empirical study for couple of reasons. The information industry has been characterized as being horizontally

configured (Yoffie, 1997: 17), where competition occurs at each horizontal stage of the industry value chain and inter-firm collaboration based on specialization has become a dominant game rule. Due to the urging global demand for computers during the last decade and the wave of strategic outsourcing, Taiwanese contract manufacturers have successfully acquired the lion's share of the global manufacturing output. This industry landscape therefore provides a rich context for accessing international subcontracting partnerships from the supplier's point of view. Nevertheless, due to a high intensity of competition in the end product markets, the subcontracting partnerships between indigenous manufacturers and international branded companies are subject to a high degree of uncertainty in supply competition and continuous price/cost reduction. In addition, increasing pressure on the supplier to achieve time-to-market performance (Curry and Kenny, 1999) requires the supplier to maintain efficient and effective collaborations based on specific investment and capabilities, which make our research inquiry sufficiently relevant.

The data for this study was collected through a questionnaire² mailed to 286 Taiwan manufacturing firms pertaining to the information industry in March 2001. The sample list was compiled from two different sources: the Year 2000 version of "Directory of Major Companies of Information Industry in ROC" published by Institute of Information Industry (III), and a supplier list of an International Sourcing Center (ISC) for Taiwan. Each informant was asked to complete the survey questionnaire with reference to a self-selected foreign buyer that is important to his or her firm. Care was taken before mailing the questionnaire to ensure that the informants were selected properly. Since the unit of analysis in this study is a dyadic relationship, five firms returned more than one questionnaire. Follow-up phone calls were made to ensure that questionnaires from the same firm focused on different foreign buyers. In

² The questionnaire is available upon request from the author.

sum, 119 completed questionnaires were returned (i.e., 41.6% response rate). Nine questionnaires were eliminated due to substantial missing data on key construct items, resulting in 110 questionnaires left for analysis. This response rate (41.6%) is much higher than that found in previous research using survey data to examine inter-organizational relationships (e.g., Young-Ybarra and Wiersema, 1999).

The profile of respondent firms is sufficiently diverse in terms of product and firm size. In terms of product types, 23.3% of the sample firms are peripherals, 19.3 % desktop PC and notebook PC, 15.2% card/board, 15.2% semiconductors, and 10.4% components. In addition, the sample is composed of companies with annual sales turnover ranging from NT\$ 200 million to NT\$160 billion. The number of employees ranges from 69 to 35,000, with an average of 3,202. In addition, of the respondents in this study, 21% are top executives and 67% are division directors.

Measurements

Most of the questionnaire measurements in this research are based on 7-point Likert scales, ranging from 1= “strongly disagree” to 7= “strongly agree”. We generated multi-item scales based on previous related research and field interviews with marketing managers of some supplier firms. The measurement validation process began with calculating item-to-total correlations and exploratory factor analysis (EFA) to identify items that do not pertain to the specified domain. The component matrix shows uni-dimensionality for the construct of joint action and competence building. Next, PRELIS 2, a data pre-processing program of the LISREL 8.2 software package, was used to perform factor score regression and the total scores for the two constructs were calculated based on the coefficients of factor score regression. The convergent validity of the measurement scales was examined through confirmatory factor analysis (CFA). All standardized factor loadings were significant, ranging from 0.71 to 0.98. Descriptive statistics and correlations of constructs can be found in Table 2, while Table 3

presents the measurement items and the Cronbach α of each composite and construct.

 Insert Table 2 and 3 About Here

Econometric Approach

This research uses the maximum likelihood estimation procedure in LISREL8.2 program to evaluate the hypothesized relationships shown in the conceptual framework (Figure 1). LISREL structural models have two basic components; they are: the creation of latent variables (measurement model) and the formation of structural models of causal relations between the latent variables (Joreskog and Sorborn, 1996). Such analysis allows for modeling based on both latent (unobservable) variables and manifest (observable) variables - a critical and useful feature of this study since most of the constructs are abstractions of unobservable phenomena.

A typical LISREL model has two parts. The structural equation model, which specifies theoretical relationships among latent variables, is defined by the following:

$$\zeta = \hat{\alpha} * \xi + \tilde{A} * \eta + \varepsilon$$

where η is an $m \times 1$ vector of endogenous latent variables, ξ is an $n \times 1$ vector of exogenous latent variables, β is an $m \times m$ matrix of coefficients for η (with zeros in the diagonal), and Γ is an $m \times n$ matrix of coefficient for ξ . The measurement models, which relate latent variables to their observable indicators, are expressed as:

$$Y = \ddot{E}_y * \zeta + \hat{\alpha}$$

$$X = \ddot{E}_x * \eta + \hat{\alpha}$$

where $Y_{(p \times 1)}$ and $X_{(q \times 1)}$ are measurement variables for endogenous and exogenous constructs, respectively, Λ_Y ($p \times m$) and Λ_X ($q \times n$) are the corresponding matrices of loadings, and ε and δ are error vectors. LISREL estimates the unknown coefficients in an iterative way. For

estimation purpose, the commonly used maximum likelihood estimation (MLE) method was chosen in this paper.

In addition to the overall linear structural model, we tested the existence of moderating effects by first segregating the sample set into two groups based on the average score of respective control variable. Multi-sample testing approach was used in this paper, which checked the equality of coefficients in two sub-samples by imposing and relaxing the equality constraint in two separate runs. By comparing model fit difference ($\Delta\chi^2$) of the constrained and unconstrained models, we can decide whether to reject or accept the hypothesis.

Results and Discussion

The empirical results are summarized in Table 4. Although the Chi-square value of our proposed model suggests a borderline fit ($\chi^2 = 49.68$, $df = 28$, $p = 0.007$), the goodness-of-fit index (GFI = 0.92) and the adjusted goodness-of-fit index (AGFI = 0.85) are both acceptable. Indices relating to residual analysis, such as RMSEA = 0.084 and RMR = 0.072, also show no indication of a poorly fitted model. Specifically, the findings show that both dedicated specificity and IT specificity positively affect the scale and scope of joint action between partners ($p < .05$ and $p < .1$, respectively). Hypothesis 1a and 1b are then supported. However, although the third element of relation-specific investments -- process specificity -- is also positively associated with joint action, it does not achieve the desired level of statistical significance. Hence, H1c is not supported. Moreover, consistent with hypothesis 2, the effect of process specificity on competence building is positive and significant ($p < .05$). As to the hypothesized effects between joint action and competence building, the empirical findings show that joint action will positively affect the supplier's competence building ($p < .01$), while the effect of competence building on joint action is negative but insignificant. Hence, only H3a is supported.

Insert Table 4 About Here

Meanwhile, the moderating effects were tested and none of them was found significant. The resulting delta chi-square ($\Delta\chi^2$) value between constrained and unconstrained model is 0.16 for relational capital, 1.36 for absorptive capacity, 1.12 for tacitness of knowledge, and 0.92 for duration³ (degree of freedom of all tests = 2). These figures suggest that all four control variables have no moderating effects.

Overall, the empirical findings by and large support our conceptual postulation. The positive effect of dedicated specificity on joint action seems to confirm the notion suggested by the previous literature (e.g., Celly et. al, 1999) that a supplier's investments in relation-specific assets could signal its commitment to the transacting partner, which could in turn increase the partner's willingness to involve the supplier in more joint initiatives. Different from previous literature, we extend the construct of relation-specific investment to elements reflecting the organizational linkages through both information infrastructure and inter-organization routines. As far as their impacts on the supplier's competence building are concerned, the empirical findings seem to indicate that there exist both direct and indirect effects. A direct effect occurs from process specificity to competence building while an indirect effect starts from IT specificity through joint action to competence building. In other words, investing in IT infrastructure alone, for example, implementing SAP R3 system for involving in the buyer's supply chain management system, would not directly lead to qualitative changes in the supplier's resource profile. The direct influence on the supplier's competence building seems to rely on both frequent people interactions based on inter-organization working routines and

³ Note that the sample size for the test of moderating effect based on duration is 102 because of some additional missing data.

information infrastructure. It seems to confirm that inter-partner learning should be based on knowledge exchange, in which human interface plays a significant role (McDermott, 1999). However, somewhat different from our conceptualization is the intertwined effect between joint action and competence building. The empirical results seem not to support the feedback effect from competence building to joint action, in which a virtuous cycle of synergistic interactions between transacting parties is hypothesized. This could be explained by the buyer's desire for a high level of external control in their strategic decision within our empirical context. In other words, although the buyer may want to have a capable supplier provide value-adding services, they have to prevent the case that a capable buyer becomes a potential competitor (Bettis et al., 1992; Markides and Berg, 1988). In other words, cooperation and competition between buyer and supplier seem to co-exist in our empirical context.

Limitations

One research limitation is the sample size. Although every effort was made to increase the response rate, the current sample size is just barely enough for conducting structural equation models (Bagozzi and Yi, 1988). Anderson and Gerbing (1988) suggested that a sample size between 100 and 150 is the minimum satisfactory level when conducting structural equation models whereas Bentler and Chou (1987) claimed that a ratio as low as 5 subjects per variable would be sufficient for normal distributions. Another limitation rests on the one-sided self-report data used in the study. The perceptions of a different party toward the same phenomenon can be very different. Relational capital, for instance, may be perceived differently from buyer's perspective. This may leave room for future research.

Conclusions and Implications

As strategic outsourcing and inter-firm specialization have evolved as important features of the modern industrial landscape (Hitt, Keats, and DeMarie, 1999), building up a value-creating

contractual alliance by both leveraging and elevating a partner's distinctive competence constitutes an indispensable element of competitive advantages (Dyer and Singh, 1998; Madhok and Tallman, 1998). The establishment of a value-creating contractual alliance not only lies in an *efficient* governance arrangement, which yields rents through lower transaction costs, but also an *effective* governance, which could realize relation-specific rents through value-creating initiatives that are unique to the partnership (Madhok, 2000: 280). By encompassing a dynamic capability perspective of inter-firm collaboration into existing transaction cost consideration on relation-specific investments, we have conceptually postulated and empirically evidenced that a supplier's commitment in relation-specific investments could enhance the likelihood of establishing joint initiatives and hence render benefits for the supplier's competence building. Specifically, our research highlights that the inter-organizational coordinating routines embedded in human and information technology infrastructure play a key role in facilitating knowledge transfer and hence the supplier's learning. Dedicated investments of this sort could become synergistic specificity⁴ in the sense that a potential virtuous cycle of synergistic complementarities can be established.

As our research investigation specifically takes a supplier perspective, this set of outcomes could serve as a constructive counterpart to previous literature that mostly focuses on a buyer perspective (e.g., Heide and John, 1990; Celly et al., 1999). Moreover, as Taiwanese manufacturing suppliers are comparatively resource-constrained in relation to their international buyers yet are able to provide time-to-market manufacturing services, the present results could render useful managerial implications to their pursuit of global competitiveness, which will be addressed in the following session.

⁴ The term "synergistic specificity" was adopted from Schilling (2000), in which he uses this as a construct of a model of inter-firm modularity.

Managerial Implications

Although they were established for providing original-equipment-manufacturing (OEM) subcontracting services, most Taiwanese manufacturers in the IT sector have successfully transformed themselves to provide post-architecture design and development services for enhancing manufacturability and meeting time-to-market requirements as the basis of their competitiveness. To sustain their competitiveness, it is imperative for these suppliers to remain updated with respect to cutting-edge product and process developments. However, given the division of specialization, branded buyers maintain their lead in the race of product innovation and standard setting, which makes suppliers' competence building inseparable from closely working with leading customers.

Taking the present research outcomes into strategic consideration, we therefore suggest that these suppliers can proactively set up partner-specific assets characterized with IT and process specificity. Such investments would not only signal their commitments to maintain an enduring relationship, but also facilitate more joint actions engaged with the buyers, under which knowledge exchange and organizational learning will be realized. A far-sighted firm should make its decision not only on the current potential risks involved with relation-specific investments, but also on the anticipated information sharing and learning effects that the IT and process investments would induce. In other words, the partnership management strategy can be shaped in such a way that joint action can be induced, common language and shared routines can be established, knowledge can be transferred and internalized, and finally the supplier's own competence can be enhanced.

Meanwhile, joint action is a behavioral element of relational exchange that can safeguard specialized assets (Kim, 1999; Heide and John, 1990). Yet, in addition to the knowledge sharing effects that joint action induces, working together spells a mutually dependent relationship between partners. The empirical finding can thus be put this way: considering the

pledge signaled by specialized investment, the leading customer will be more likely to work jointly with the supplier that made a special investment for the partnership. In other words, the pledge of supplier commitment through specialized investments such as dedicated equipment, people, IT and processes effectively changes the buyer-supplier relationship from being asymmetric dependent to mutually dependent.

Directions for Future Research

Several future research directions are worth pursuing. First, as an initial research attempt, we propose synergistic specificity, the relation-specific investments that facilitate knowledge transfer and inter-firm learning between partners, to illuminate the value aspect of relation-specific investments. While the present empirical outcomes imply an initial support of the existence of this construct, future research could further explore its nature and establish detailed content. Future research navigation on exploring the micro nature of inter-organization knowledge transfer and organization routines is strongly suggested. Using data from different sources, especially from the buyer side, we can further validate what the model proposed in the study. Meanwhile, it would be similarly rewarding to test the conceptualization in other industry context, which will surely enhance the generalization of our findings.

Second, inter-partner knowledge transfer in a competitive or cooperative relationship may exhibit different phenomenon. For example, from the buyer's perspective, a supplier which pursues its own brand manufacturing (OBM) policy and original equipment manufacturing (OEM) at the same time may potentially be more competitive than a supplier that runs OEM business only. The empirical finding of the study shows that competence has a weak, negative influence on joint action. We suspect that there might be a curvilinear relation between competence building and joint action. Thus, it is worthwhile to further investigate the link of

joint action and competence building under different stages in buyer-supplier relationship.

Finally, it would be fruitful to extend the existing conceptualization to performance impact. More specifically, one could examine the effects of asset specificity, mediated by competence building, on performance, such as customer satisfaction, new product development and duration of collaboration. Theoretically speaking, such an extension could divert the study from the evolutionary, collaborative process orientation to the outcomes of inter-firm learning.

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Table 1: TCE and RBV on Vertical Contractual Partnership

	Transaction Costs Economics (TCE)	Resource-Based View (RBV)
Unit of Analysis	Transaction (dyad)	Firm
Assumptions	Bounded rationality & opportunism	Firms as bundles of heterogeneous resources/ knowledge, bounded rationality
Motives for Partnership	Minimizing the sum of internal and external transaction costs, efficiency	Gaining access of external resources, learning, competence building
Primary Area of Focus	Transaction characteristics such as: asset specificity, uncertainty, frequency, complexity etc.	Resource leverage and resource building, learning, dynamic capability.
Core Concept of Relations	Safeguards	Resources exchange
Objective of Partnership	Economizing on transaction costs through choosing an appropriate governance structure	Maximizing long-run profits through exploiting and developing firm resources
Reasons for Asset Specificity	Safeguards are present	Resource building and synergistic rent
Coordination Mechanism	Price (market), fiat (hierarchy), mutual forbearance (hybrid)	Routines and capabilities
Temporal Orientation	Essentially static and equilibrium oriented	Essentially dynamic, learning and competence oriented

Table 2: Descriptive Statistics and Correlation

Variables	Mean	S. D.	1	2	3	4	5
1. Dedicated specificity	3.739	1.086	1.00				
2. IT specificity	2.899	1.010	0.44	1.00			
3. Process specificity	5.573	1.060	0.31	0.47	1.00		
4. Joint action	4.064	1.011	0.50	0.44	0.27	1.00	
5. Competence building	5.251	0.827	0.43	0.47	0.40	0.56	1.00

Table 3: Summary of the Final Scales and Reliabilities

Construct	Composite	Measurement Items	Cronbach r of Composite & Construct
Dedicated Specificity		Dedicated equipment Dedicated people Dedicated IT software and hardware	0.7399
IT Specificity		IT and on line information exchange IT compatibility IT investment on subcontractors	0.7996
Process Specificity		IT & people interplay Specialized routines and process	0.5561
Joint Action	JA	Joint new product design Joint cost reduction Joint delivery arrangement Joint personnel training Joint long-term planning	0.8277
Competence Building	CB	Improvement of yield rate Improvement of production process Improvement of product development speed Improvement of delivery speed Improvement of response and flexibility Improvement of overall managerial skill	0.9107
Relational Capital	RC	Friendship with all levels of the buyers' staff Reciprocity between partners Trustworthiness between partners Predictability of the buyer's future move	0.6030
Absorptive Capacity	AC	Knowing who knows what in the buyer's firm Overlapped technological background Knowing what can be learned from the foreign buyer Ability to learn from the foreign buyer	0.7915
Tacitness of Knowledge	TK	It takes time to imitate the buyer's management process Buyer's new product idea is difficult to be put into documentation Buyer's managerial idea is not easy to be expressed in oral words	0.8251

Table 4: Summarized Results of Hypothesis Testing

Causal Path	Hypotheses	Expected Sign	Standardized Solution	t value
Dedicated Specificity → Joint Action	H1a	+	0.55**	2.46
IT Specificity → Joint Action	H1b	+	0.37*	1.57
Process Specificity → Joint Action	H1c	+	0.13	0.44
Process Specificity → Competence Building	H2	+	0.36**	2.06
Joint Action → Competence Building	H3a	+	0.63***	2.96
Competence Building → Joint Action	H3b	+	-0.07	-0.13

*p<.1 **p<.05 ***p<.01

Chi-Square=49.68, d.f.= 28, p=0.007; CFI= 0.94; GFI=0.92; AFGI=0.85; NFI=0.88; RMSEA=0.084; RMR= 0.072.

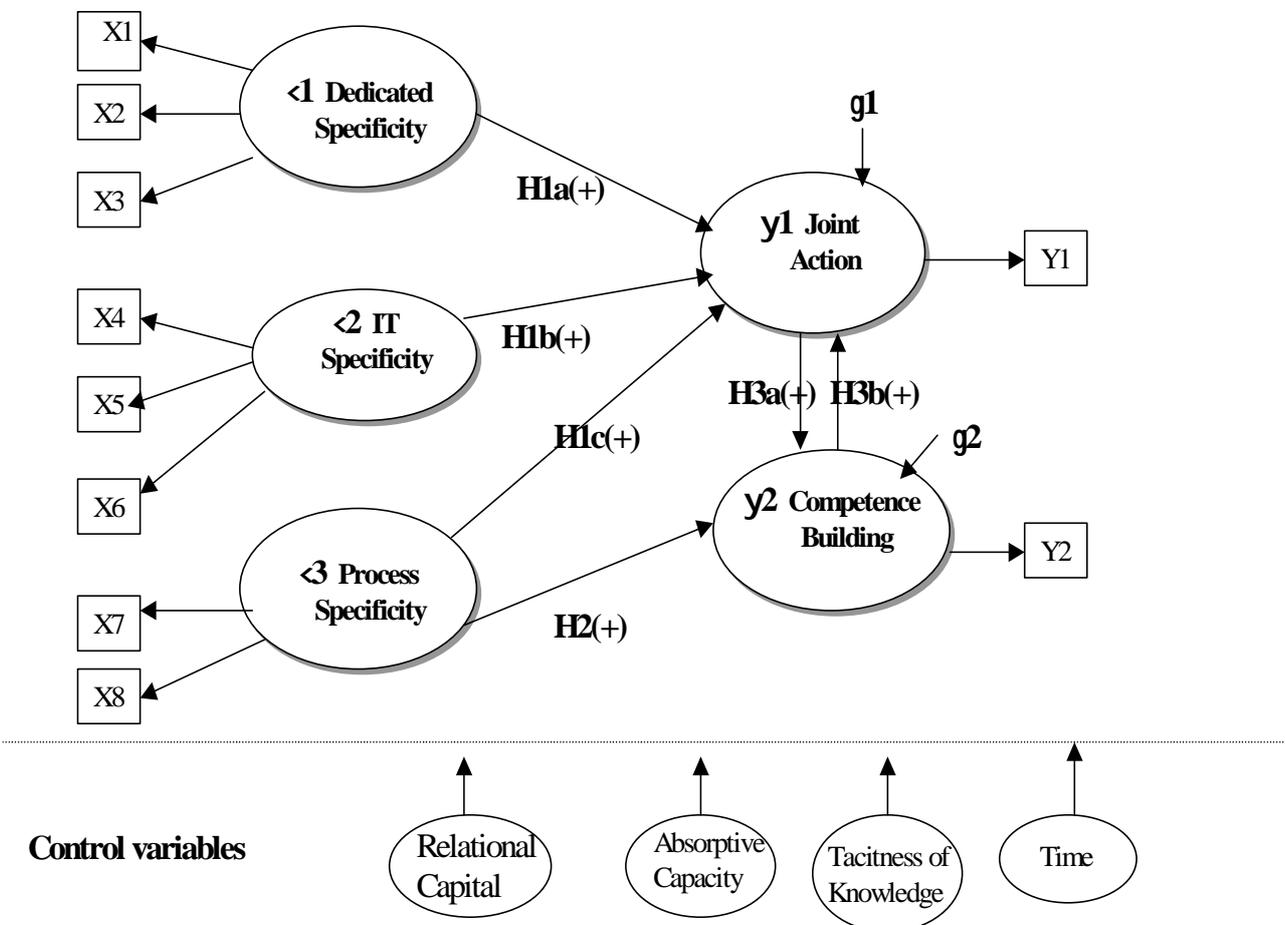


Figure 1.
Path Diagram of Conceptual Model