EFFECTIVENESS OF SUPPLIER GOVERNANCE: A TRANSACTION COST ECONOMICS ANALYSIS

ABSTRACT

This study examines how buying organizations govern supplier contracts to improve manufacturing competitiveness and financial performance. Two primary methods of governance, contractual governance and relational governance are examined. Based on the transaction cost economics literature, a conceptual model is developed to decipher the relationships between precontract conditions (transaction attributes), governance mechanisms, performance ambiguity, and performance. The SEM results indicate that governance of supplier contracts facilitates manufacturers to leverage their resources to improve their performance. Additionally, each of the three relational governance mechanisms affects plant performance differently. Managerial implications and research contributions are presented.

Keywords: Supplier governance, Transaction cost economics, Outsourcing, Supplier management, Supply chain management

1. Introduction

The theory of transaction cost economics (TCE) suggests that the buyer can closely govern the buyer-supplier relationship by two basic governances: contractual and relational governance (Rindfleish & Heide, 1997). For contractual governance, the buyer uses contractual clauses to specify and assess suppliers' performance. In contrast, for relational governance, the buyers govern through a social relationship with the suppliers based on trust. Typically, buyers govern by contractual as well as relational governance, referred to as hybrid governance (Williamson, 1979; 2008).

The two basic governance methods are implemented to ensure the buyer's performance for competitiveness and financial returns. If the supplier's performance can be completely specified, then contractual clauses can be clearly written to cover the specifics of supplier performance. When performance is difficult to measure due to uncertainties, the buyer does not have all the details of product specifications, in turn causing the suppliers' inability to deliver every

specification. This lack of contract/product specification is defined as performance ambiguity (Rabinovich et al., 2007). With the presence of performance ambiguity, contractual governance is not sufficient to assure the supplier's performance and relational governance mechanism must be applied (Rindfleish & Heide, 1997). Therefore, the key to ensuring the buyer's outsourcing performance is the proper utilization of the two governances to reduce supplier performance ambiguity. Yang et al. (2012) asserted that the effectiveness of relational governance and contractual governance depends on specific conditions or features associated with the contract, such as supplier investment and environmental risk. Understanding how these precontract conditions (transaction features) affect the choice of contractual and relational governances is important for effective supplier governance. Accordingly, this study's primary research issue is: *How do precontract conditions affect selection of governance mechanisms and how do these mechanisms improve buyer's competitiveness and financial returns through the reduction of performance ambiguity*.

This study is organized by first presenting a comprehensive governance model to illustrate the overall theoretical relationships among several key constructs of precontract conditions, contractual and relational mechanisms, performance ambiguity, and firm performance. The definitions and measures of those constructs are provided based on the literature. This study delineates the overall relational governance into three different aspects that affect the buyer's performance differently. Accordingly, a number of research hypotheses regarding the alignment with precontract conditions and governance mechanisms are developed. Next, the samples and statistical methods are presented, followed by the discussion of statistical results. Last, the managerial implications are offered to guide manufacturing managers in improving their outsourcing performance.

2. Literature Review

2.1 Firm performance, performance ambiguity and governance mechanisms

A conceptual overview of the theory is presented on Figure 1. It illustrates four different aspects of the research issue based on the TCE: plant performance, performance ambiguity, governance mechanisms and precontract conditions (transaction attributes). Beginning on the right of the figure, the desired end result of the outsourcing is manufacturing competitiveness (potential returns) that may lead to high financial returns (realized potential) (Peteraf &Barney, 2003). There is a very important conceptual distinction between these two performance measures: manufacturing competitiveness is the degree to which internal operations contribute to overall competitiveness, while financial returns are the monetary results that depend on the buyer's customers' perceptions. Manufacturing competitiveness is directly affected by supplier governance and supplier performance. On the other hand, financial returns are based on their customers' perceptions and are considered consumer surplus above normal returns (p. 314, Peteraf & Barney, 2003; Rindfleish & Heide, 1997).

(Insert Figure 1 about here)

Performance ambiguity is defined as the degree of difficulty of assessing supplier performance. It is measured by an inability to exactly specify supplier's product details and the difficulty in determining supplier performance (Poppo & Zenger, 1998; Rabinovich et al., 2007). The assessment of performance ambiguity is critical to understanding how firms utilize governance to improve their plant performance. Ideally, if all contract specifications can be measured and detailed in the contract clauses, there would not be any performance ambiguity. As a result, both the supplier and the buyer would have measurable performance factors detailed in the contract so that the failure of individual responsibilities would result in liquidated damages.

Other things being equal, high performance ambiguity encourages opportunism wherein unscrupulous decision-makers serve their self-interest, given an opportunity (Williamson, 1979). So, the higher the performance ambiguity is, the higher the probability of supplier opportunism that, in turn, is expected to have deleterious effects on buyer performance. Thus performance ambiguity reduction is an important goal of governance and it must be considered in the overall governance model.

The third box from the right on Figure 1 represents two basic governance mechanisms: contract governance and relational governance. Contractual safeguards are regarded as a primary alternative to vertical integration as a solution to the general problem of "opportunistic behavior" (Klein et al., 1978). Contractual governance is defined as the degree to which specific contractual clauses are enforced (Mesquita & Brush, 2008). These specific clauses' enforcements are: exclusivity, late delivery penalties, poor performance penalties, and termination penalties. In contrast, relational governance is based on a more ambiguous concept: trust. Under this context, trust can be defined as the confidence the buyers and sellers have in contract fulfillment, and it is this underlying confidence that underlies all relational governance. This study delineates relational governance into three dimensions: negotiation efficiency, problem solving relations, and information sharing. These constructs stand for three distinguishable governance relationships based on how the contract is negotiated, how it is implemented, and how buyer and seller work together through information sharing. We argue that buyer-supplier relations during negotiation are conceptually different from relationships during contract implementation, when problem solving relations and information sharing are involved.

The beginning of relational governance is when the buyer and supplier negotiate the contract details (Peterson et al., 2002). The extant literature defines the degree of buyer-seller cooperation

at this stage as negotiation efficiency (Mesquita & Brush, 2008). Negotiation efficiency is measured by no excessive agitation, no excess haggling, and no excess negotiation sessions. Next, during the contract implementation there is an ongoing buyer-supplier interaction to coordinate and resolve unexpected events to fulfill the contract. The extant literature suggests that the coordinating of problem solving during contract implementation is part of an overall broader concept of relational governance (Chen et al., 2004; Wang & Wei, 2007). It is during contract implementation that specifications are clarified through standard problem solving, not altering facts, and implicit agreements. In this study, these procedures used to clarify specifications are defined as "problem solving relations". Many similar terms have been used in academic literature to describe the buyer-supplier coordination required to carry out the transactions after the contract is signed. Among these terms are social exchange relationships (Liu et al., 2007); relational governance and relational embeddedness (Lawson et al., 2008); relational commitment (Anderson & Weitz, 1992); and, adaptive behavior (Ellram et al., 2008).

Another aspect of buyer-supplier relations during contract implementation is the sharing of production information (Rindfleish & Heide, 1997; Dyer & Nobeoka, 2000; Koka & Prescott, 2002; Hoetker, 2005, Lawson et al., 2008). Information sharing is measured by exchanging forecasts, feedback on specifications, fewer schedule changes, and joint master production schedule sharing. In conclusion, negotiation efficiency, problem solving relations, and information sharing are conceptually, empirically and pragmatically differentiated and they would mitigate the problem of performance ambiguity through contract clauses.

2.2 Precontract conditions

Finally, the box on the left of Figure 1 includes two factors that define precontract conditions or transaction features: supplier asset specificity and environmental risk. The supplier has a

financial commitment exhibited in the level of resource investment dedicated to the contract. The levels of supplier resources spent on the contract that cannot be transferred to other buyers are defined as supplier asset specificity (Williamson, 1979; 1999). In this study, supplier asset specificity is measured by its new physical assets and alteration of its manufacturing processes for the buyer's unique needs (Heide, 1994; Rindfleish & Heide, 1997).

Environmental risk is defined as the degree of uncertainty with market, behavior and technology (Rindfleish & Heide, 1997). Environmental risk affects almost all aspects of business transactions, causing difficulties in contractual and all three relational governances. It is expected to increase the use of contractual governance as well as negotiation efficiency, problem solving relations, and information sharing.

In summary, the precontract conditions directly affect the choice and implementation of governance mechanisms and therefore the degree of performance ambiguity. These five direct statistical relationships lead to indirect effects on manufacturing performance and financial returns through their effect on governances. However, the precontract conditions of supplier asset specificity and environmental risk may also affect the plant manufacturing performance and financial returns. Consequently, each dimension of contract condition has two direct effects and five indirect effects on performance.

3. Theoretical Background and Research Hypotheses

3.1 Buyer performance: manufacturing competitiveness and financial returns

There are two different levels of profit suggested to explain how firms effectively govern their suppliers: manufacturing competitiveness and financial returns. Competitive performance traditionally consists of five factors: Cost, Quality, Delivery, Flexibility, and New product development (Hayes & Wheelwright, 1984; Chen & Paulraj, 2004; Paulraj & Chen, 2008). These

five factors are incorporated to make a single competitiveness construct to simplify overall manufacturing competitiveness since the effectiveness of supplier governance is based on total competitiveness and not just on a single competitive factor. This plant overall manufacturing competitiveness is hypothesized to increase financial returns. Therefore:

Hypothesis 1: Manufacturing Competitive Performance has a direct positive effect on Financial Returns.

Performance ambiguity is a major source of transaction cost (Ellram et al., 2008; Stratman, 2008). Higher performance ambiguity leads to less satisfaction with the supplier (Dutta & John, 1995; Klein & Roth, 1993). Practically, performance ambiguity encourages opportunism for both supplier and buyer. The supplier can take advantage of poor specifications and not fulfill important requirements (Stratman, 2008; McIvor, 2009). On the other hand, poor specifications can provide the buyer the opportunity to claim that some specifications were implicit in the agreement. In either case, buyers and suppliers may sue for liquidated damages (Heide & Rindfleish, 1997). Overall, performance ambiguity is expected to have a direct negative effect on manufacturing performance and financial returns:

Hypothesis 2.A: Performance Ambiguity has a direct negative effect on Financial Returns.

Hypothesis 2.B: Performance Ambiguity has a direct negative effect on Manufacturing Competitiveness.

Contractual governance is the primary means to evaluate the success of the supplier performance (Brown et. al., 2000), and its governance purpose is to formally control buyer-supplier opportunism (Dahistrom & Nygaard, 1999; Liu et al., 2007; Handley and Benton, 2012). Studies have shown that contractual governance is a primary factor to enhance the competitiveness of the organization (Dahistrom & Nygaard, 1999; Liu et al., 2007). However, Wang and Wei (2007) found that contractual governance is statistically related to firm

performance, but not as strongly related as relational governance. Overall, contractual governance is expected to reduce performance ambiguity (Rindfleish & Heide, 1997) and to increase both financial returns and manufacturing competitive performance. Therefore, the following Hypothesiss are developed:

Hypothesis 3.A: Contractual Governance has a direct positive effect on Financial Returns.

Hypothesis 3.B: Contractual Governance has a direct positive effect on Manufacturing Competitiveness.

Hypothesis 3.C: Contractual Governance has a direct negative effect on Performance Ambiguity

Negotiation efficiency is relatively new to the supply chain literature but is being researched in the strategy literature. For instance, Mesquita and Brush (2008) found that negotiation efficiency is positively related to manufacturing competitiveness and financial performance. Additionally, negotiation efficiency could reduce performance ambiguity since it is an indication of agreement on performance standards. Therefore:

Hypothesis 4.A: Negotiation efficiency has a direct positive effect on financial returns.

Hypothesis 4.B: Negotiation efficiency has a direct positive effect on manufacturing competitiveness.

Hypothesis 4.C: Negotiation efficiency has a direct negative effect on performance ambiguity.

Additionally, during contract negotiations the supplier-buyer cooperation may reduce the need for contract specification enforcement. Therefore:

Hypothesis 4.D: Negotiation efficiency has a direct negative effect on contractual governance.

Problem solving relations are the degree of cooperation during contract implementation. They are expected to lower performance ambiguity since they increase understanding of contract

fulfillment and improve manufacturing performance (Dyer & Noboeka, 2000: Hoektker, 2005; Zhang et al., 2009). Grover & Maholtra (2003) and Wang & Wei (2007) suggested that problem solving is not related to contractual governance. Consequently, the following Hypothesiss are developed.

Hypothesis 5.A: Problem Solving Relations have a direct positive effect on Financial Returns.

Hypothesis 5.B: Problem Solving Relations have a direct positive effect on Manufacturing Competitiveness.

Hypothesis 5.C: Problem Solving Relations have a direct negative effect on Performance Ambiguity.

There is a trade-off between contractual specifications and reliance on relationship to work out the details during contract implementation. Therefore, problem solving relations are expected to have a direct negative effect on contractual governance.

Hypothesis 5.D: Problem Solving Relations have a direct negative effect on Contractual Governance.

Similar to the other two dimensions of relational governance, information exchange or inter-organizational communication reduces information asymmetry and monitoring costs, leading to better manufacturing and financial performance (Casson & Wadeson, 1998; Sahin & Robinson, 2005; Wang & Wei, 2007). To share information with suppliers, buyers are expected to have contractual clauses to prevent opportunism. Consequently, it is expected that information sharing increases the likelihood of having contract clauses enforced. Additionally, information sharing should reduce performance ambiguity since it gives feedback on specification fulfillment. Therefore, the related Hypothesiss are:

Hypothesis 6 A: Information Sharing has a direct positive effect on Financial Returns.

Hypothesis 6.B: Information Sharing has a direct positive effect on Manufacturing Competitiveness.

Hypothesis 6.C: Information Sharing has a direct negative effect on Performance Ambiguity.

Hypothesis 6.D: Information Sharing has a direct positive effect on Contractual Governance.

Asset specificity is the degree to which the supplier has to invest in assets to modify its resources to meet the buyer's requirements (Heide & Rindfleish, 1997). This investment is the supplier asset specificity. From buyers' perspective, they outsource to a supplier without having to purchase, plan, and control resources that are inconsistent with their core competencies. Therefore, supplier asset specificity is positively related to buyer's competitiveness and financial returns. The related Hypothesiss are:

Hypothesis 7.A: Supplier Asset Specificity has a direct positive effect on Financial Returns.

Hypothesis 7.B: Supplier Asset Specificity has a direct positive effect on Manufacturing Competitiveness.

Yet, supplier asset specificity potentially induces both buyer and supplier opportunism. This opportunism is exhibited in the inability to specify contract details defined as performance ambiguity. Both buyers and suppliers wish to have specific clauses to avoid opportunistic behavior (Williamson, 1979). Consequently, there should be less performance ambiguity when supplier asset specificity is high.

Hypothesis 7.C: Supplier Asset Specificity has a direct negative effect on Performance Ambiguity.

On the other hand, the supplier may sell its specific products to the buyer's competitors. Current evidence suggests that asset specificity increases contract details due to both buyer and supplier requiring contractual protection against opportunism (Van Hoek, 2000). Therefore, supplier asset specificity directly increases contractual governance.

Hypothesis 7.D: Supplier Asset Specificity has a direct positive effect on Contractual Governance.

Moreover, there is a general agreement that supplier asset specificity is positively related to both contractual and relational governances (Heide & John, 1990, 1992; Joskow, 1987; Parkhe, 1993; Zhang & Aramyan. 2009). Therefore:

Hypothesis 7.E: Supplier Asset Specificity has a direct positive effect on Negotiation Efficiency.

Hypothesis 7.F: Supplier Asset Specificity has a direct positive effect on Problem Solving Relations.

Hypothesis 7.G: Supplier Asset Specificity has a direct positive effect on Information Sharing.

Environmental risk has negative effects on overall manufacturing and financial performance through increasing performance ambiguity, increasing contractual governance, and decreasing negotiation efficiency, problem solving relations, and information sharing (Buvik, 1998; Ellram et al., 2008). In general, contractual safeguard is the primary mechanism to reduce environmental risk (Klein et al., 1978). However, environmental risk induces uncertainty and is expected to decrease the negotiation efficiency, decrease problem solving relations and decrease information sharing.

Hypothesis 8.A: Environmental Risk is negatively related to Financial Returns.

Hypothesis 8.B: Environmental Risk has a direct negative effect on Manufacturing Competitiveness.

Hypothesis 8.C: Environmental Risk has a direct positive effect on Performance Ambiguity.

Hypothesis 8.D: Environmental Risk has a direct positive effect on Contractual Governance.

Hypothesis 8.E: Environmental Risk has a direct negative effect on Negotiation Efficiency.

Hypothesis 8.F: Environmental Risk has a direct negative effect on Problem Solving Relations.

Hypothesis 8.G: Environmental Risk has a direct negative effect on Information Sharing.

4. Statistical Analysis and Results

The data used in this study were gathered by the Global Manufacturing Research Group (GMRG). GMRG is an international organization of academic researchers studying the effectiveness of manufacturing practices worldwide in the supply chain (www.gmrg.org). The GMRG developed its database using a common survey instrument for many countries. This survey was developed to empirically test specific research issues (Whybark et al., 2009). All versions of the questionnaire were translated and back translated in each language using multiple academics. This study uses the data from the Round 4.0 Survey with 987 samples from 17 countries and 22 industry classifications (See Table 1 for distribution statistics).

(Insert Table 1 about here)

Structural equation modeling (SEM) is used to test the theoretical model and examine how and why various exogenous factors directly and indirectly affect final performance outcomes. Specifically, the empirical results give both the direct and indirect step evaluation of specific causal variables' effects on performance variables. The direct results are provided in the truncated structural model. The indirect effects are estimated using the truncated structural model to derive the standardized indirect effects among variables to compare the relative effect of each governance factor.

4.1 Construct validity

The seven latent variables are: Manufacturing Competitiveness (MC), Performance Ambiguity (PA), Contractual Governance (CG), Negotiation Efficiency (NE), Problem Solving Relations

(RC), Information Exchange (IS), and Environmental Risk (ER). Since the multi-attributed variables are defined by the literature they have face validity. The multiple-item variables are tested for using Cronbach α for construct reliability. As shown in Table 2, except for performance ambiguity, the Cronbach α coefficients are satisfactory, ranging from 0.677 to 0.797. These results indicate there is internal consistency of measurement indicators (Bagozzi & Yi, 1988). Yet, the poor Cronbach α for performance ambiguity is problematic. From a conceptual perspective, the literature defines the performance ambiguity as the difficulty of measuring supplier performance (Williamson, 1979 and numerous others). The two reflective indicators chosen from the definition are: the lack of careful detailing of the specifications before contract signing and the difficulty of performance measurement. Both measures are logically and conceptually sound since they capture two important conceptual domains of performance ambiguity: detail level and performance difficulty. This problem is evident in the factor loadings where the performance ambiguity indicators load negatively on the problem solving relations construct indicators presumably caused by the problem solving relations causing lower performance ambiguity. This result is discussed next in divergent validity.

(Insert Table 2 about here)

The divergent validity of the constructs is tested in three ways: 1) by factor analyses loadings; 2) by Campbell-Fiske (1957) divergent validity coefficients and by factor scores from the measurement model. Factor scores that multiply Kaiser normalized factor loadings times the estimated standardized coefficients determine if the constructs pass the empirical test for meaningful interpretation. All Campbell-Fiske coefficients are below the recommended absolute value of +/-0.85 level indicating there is divergent validity (SEM overall fit statistics are discussed next). Next, Table 3 presents the measurement model's factor scores inside of the

theoretical model. The white font on black fill indicates the factor score loadings. Recall that the measurement model represents the overall theoretical model. These estimates indicate that inside the conceptual model all constructs are conceptually divergent. Evidently, the performance ambiguity construct is not only divergently valid but theoretically valid inside the model. It is important to remember that the theory must be the deciding rationale for the use of statistical estimates (Bunge, 1967; Bollen, 1989; Wacker, 1998). In short, these results indicate that the constructs are valid constructs for testing the theoretical hypotheses.

(Insert Table 3 about here)

The conclusion of the validity of the constructs measurement is that these constructs represent the conceptual domain of the defined abstract concepts. Consequently, the face, convergent, and divergent validity of these constructs is confirmed.

4.2 SEM results

The overall fits for the full structural and truncated structural models are very good (Table 4) since the $\chi^2_{(1)} = 0.026$, $\chi^2_{(15)} = 10.64$; $p>0.872$, $p<0.777$; $\chi^2_{(5)\ /d.f.} = 0.6153$, $\chi^2_{(30)\ /d.f.} = 0.8133$; RMSEA =0.000 and 0.000; CFI = 1.000 and 1.000 (Bollen, 1989); NFI = 1.000 and 0.978 (Hu & Bentler, 1998), and the PRATIO = 0.0222 and 0.3333. Although both models have extremely good fits, the truncated model is more parsimonious as indicated by the higher PRATIO. Since the theoretical model hypothesizes specific directional effects, the removal of insignificant paths uses the $p<0.05$ one-tail test.

(Insert Table 4 about here)

The full structural estimates provide the direct effects of theoretical hypotheses. The truncated model estimates are presented in the last three columns where white with black background indicates a positive direct effect of the explanatory construct on the dependent

variable using the critical ratio. Similarly, the italicized black on grey background indicates a negative direct effect. The light grey print and white background indicate there is no statistically significant effect between the variables. The last two columns are the standardized effect between the variables. The next to last column of the truncated structural estimates represents the standardized coefficient (Std. Coef.) of direct effect on dependent variables.

4.1 Manufacturing competitiveness and financial returns

The direct relationship between manufacturing competitiveness and financial returns is statistically insignificant and therefore Hypothesis 1 is not supported. This result is not inconsistent with previous studies where there was no statistically significant relationship between manufacturing competitiveness and financial returns (Bozarth & Edwards, 1997; Ketokivi & Schroeder, 2004; Broedner et al., 2009). Coff (1999) noted that high level of performance does not necessarily mean high level of profits, and our results support this argument. Possible reasons for its insignificance are many, such as the implementation of accounting practices regarding transfer pricing, nonmarket-based transfer prices, etc. (Li & Atkins, 2002; Cooper & Kaplan, 1988).

4.2 Performance ambiguity and governance mechanisms

Although performance ambiguity is not significantly correlated with Financial Returns (r=-0.018, *p*=0.996), it is significantly negatively correlated with plant competitive performance (r=-0.134, ***p***=0.001). Note that the literature generally suggests performance ambiguity is a major transaction cost (Klein & Roth, 1993; Dutta & John, 1995; Ellram et al., 2008; Yang et al., 2011) and should have a negative effect on manufacturing performance. This result was expected since it is similar to results found in other research studies that indicated performance ambiguity causes poor plant competitive performance.

Yet from structural equation results, performance ambiguity did not have any statistical total direct effects on either financial returns or manufacturing competitiveness. Therefore, Hypotheses 2.A and 2.B are not supported. This result suggests that governances ameliorate performance ambiguity's negative effects on financial returns and manufacturing competitiveness.

The total and direct effects of contractual governance on financial returns are insignificant and Hypothesis 3.A is not supported. Yet, contractual governance does have a positive statistically significant effect on manufacturing competitiveness and Hypothesis 3.B is supported. This result supports the previous academic findings (Dahistrom and Nygaard, 1999; Liu et al., 2007; Yang et al., 2011). The significant direct positive effect suggests a pragmatic hypothesis. Namely, firms that are able to completely identify enforceable specifications have a better understanding of how they use suppliers to improve their competitive performance through contract clause enforcement.

Contractual governance has a significant direct negative effect on performance ambiguity, suggesting that contractual governance reduces performance ambiguity. Hypothesis 3.C is supported. Evidently, contractual governance enforcement is very important for reducing negative effects of performance ambiguity as found in previous research (Grover & Maholtra, 2003; Morgan et al., 2007).

This study delineates relational governance into three dimensions: Negotiation efficiency, Problem solving relations and Information sharing. These three different dimensions are hypothesized to have significant effects on contractual governance and competitiveness. Yet as discussed above, underlying all three relational governances is trust. Since negotiation efficiency is the first buyer-supplier contact, it can be an indicator for the other two relational governances.

If negotiations are difficult, it implies that problem solving relations and information sharing will not be easily attained. Similarly, if problem solving relations are difficult, it is unlikely that the firms will exchange information.

Negotiation efficiency does not have a statistically significant direct effect on financial returns and Hypothesis 4.A is not supported. Negotiation efficiency has a positive direct effect on manufacturing competitiveness and 4.B is supported. Negotiation efficiency does not have significant direct negative effect on either performance ambiguity or contractual governance. Hypotheses 4.C and 4.D are not supported. Negotiation efficiency has no significant indirect effects on any variables.

Problem solving relations is the degree of cooperation during the execution of the contract. Problem solving relations do not have any significant direct effects on financial returns or manufacturing competitiveness, and Hypotheses 5.A and 5.B are not supported. Next, problem solving relations are strongly negatively related to performance ambiguity, which indicates problem solving relations reduces the negative effects of performance ambiguity. Hypothesis 5.C is strongly supported.

Information sharing is positively statistically related to both financial returns and manufacturing competitiveness. Therefore, both Hypotheses 6.A and 6.B are supported. Additionally, information sharing is negatively related to performance ambiguity, supporting Hypothesis 6.C. Last, information sharing is positively related to contractual governance, supporting Hypothesis 6.D.

4.3 Precontract conditions

Supplier asset specificity is not directly related to financial returns but is significantly related to manufacturing competitiveness. Therefore, Hypothesis 7.A is not supported and 7.B is

supported. Supplier asset specificity is positively related to contractual governance, information sharing, and relational problem solving relations. Hypotheses 7.D, 7.F, and 7.G are supported but not Hypotheses 7.C and 7.E. These results are generally consistent with the large body of empirical evidence (Joskow, 1987; Heide & John, 1990, 1992; Heide, 1994; Rabinovich et al., 2007; Verwaal et al., 2008; Yang et. al., 2012).

Supplier asset specificity has positive indirect effects on financial returns, derived from its positive relationship with information sharing. The high dedication of resources of supplier asset specificity is indirectly related to effective governances (contractual governance, problem solving relations, negotiation efficiency) and is negatively related to performance ambiguity. Since the buyer's primary reason for using suppliers is to leverage resources, this result indicates that both buyer and supplier desire the use of hybrid governance (contractual and relational) to reduce performance ambiguity.

The direct effects of environmental risks are very pervasive throughout supplier governance, affecting all but two factors (financial returns and problem solving relations). Hypothesis 8.A (direct negative association with financial returns) is not supported, but Hypothesis 8.B (direct negative association with manufacturing competitiveness) is supported. Environmental risks are positively directly associated with performance ambiguity and contractual governance, supporting both Hypotheses 8.C and 8.D. Environmental risks are negatively associated with negotiation efficiency, problem solving, and information sharing, supporting Hypotheses 8.E, 8.F, and 8.G. When environmental risks are high, firms rely more on contractual clauses; contract negotiations are difficult and there is less likelihood of engaging in problem solving and sharing information (Rindfleish & Heide, 1997, p.33-39; Grover & Maholtra, 2003; Ellram et al., 2008). Evidently, the presence of environmental risk reveals important implications regarding

how firms govern their suppliers (Narasimhan & Talluri, 2009). Namely, when environmental risk is high, firms reduce the application of relational governances to alleviate uncertainties. Instead, contractual governance is used to protect asset specificity and assure the buyer performance.

5. Conclusions

Overall, the statistical results suggest that manufacturing firms are able to strategically reduce performance ambiguity through hybrid governance of contractual governance and relational governance. The following is a summary of key findings regarding the alignment of precontract conditions and governance mechanisms.

- Relational governance. This study breaks down relational governance into three separate mechanisms: *negotiation efficiency, problem solving relations, and information sharing.* While relational governance is implemented based on buyer-supplier relationship, the nature of interactions during contract negotiation is conceptually different than during contract implementation when problem solving relations and information sharing are involved. Among three relational governance mechanisms, information sharing directly increases both manufacturing competitiveness and financial returns. Negotiation efficiency's primary effect is on manufacturing competitiveness. Problem solving relations' primary effect is to reduce performance ambiguity. Hence, each of three relational governance mechanisms affects plant performance differently. Overall, the statistical results indicate *they are conceptually, empirically, and pragmatically different on plant performance.* Future studies should not treat them as one single construct.

- Contractual governance. Contractual governance plays an important role in outsourcing. It directly reduces performance ambiguity and enhances manufacturing competitiveness. Due to its effectiveness at controlling buyer-supplier opportunism, contractual safeguard also effectively mediates the impact of asset specificity, environmental risk, and relational governance. In summary, effective contracting practices could mitigate the risks associated with market uncertainty and opportunism and lead to better outsourcing performance.

- Asset specificity and risk. Precontract conditions affect the choice of governance mechanisms and therefore the degree of performance ambiguity. First, supplier asset specificity directly improves manufacturing competitiveness and indirectly improves financial returns by encouraging contractual safeguard and information sharing. Next, when facing environmental risk, firms rely primarily on contract mechanism but not relational governance to alleviate performance ambiguity. The contractual safeguard is

> not sufficient to reduce the negative effect of uncertainty, and ultimately environmental risk leads to lower competitiveness and financial performance. This is consistent with the concepts of "vested outsourcing" and "transformational outsourcing," within which supply chain partners work closely to develop network competence (Hatonen and Eriksson, 2009). The recent challenges that Apple Computers has had with its foreign suppliers seem to support the need for going beyond enforcing contractual clauses to ensure successful supplier governance.

With the large number of constructs involved in the analysis, it may seem difficult to explain in simple terms what the results are. However, there is one underlying principle for buyer's effective supplier governance: Buyers must know the exact product specifications to ensure plant performance. First, buyers should do their best to clearly specify their requirements on supplier performance (including delivery and quality specifications). These requirements facilitate contractual safeguard to reduce the negative effects of performance ambiguity. Second, prior to the signing of contracts, buyer-supplier negotiation helps to identify and agree upon the specifications that are critical for plant performance. Third, when product specifications cannot be completely identified, there must be an understanding of how the uncertainties and ambiguity can be resolved by problem solving relations of implicit agreement and by information sharing. Information sharing is the most important supplier governance factor for achieving financial returns. Other governance factors have only indirect effects on financial returns, resulting from their association to information sharing. The contribution of information sharing to outsourcing performance will continue to increase in light of emerging supply chain risk. Specifically, in response to the natural disasters in Japan and Thailand, both researchers and managers have begun to advocate the development of "supply chain visibility" in global sourcing activities (Bowersox & LaHowchic, 2007; Wang & Wei, 2007). Future outsourcing research should continue to review how supplier governance can improve outsourcing performance and ultimately lead to sustainable competitive advantage.

Finally, this study contributes to the existing TCE literature by empirically testing the mediating effects of governance mechanisms on manufacturing competitiveness and financial returns. The theory of resource-based view suggests that manufacturing competitiveness provides *potential* sustainable competitive advantage, and financial returns provide *sustainable* competitive advantage (Peteraf & Barney, 2003; Ray et al., 2004). Our results indicate that manufacturing competitiveness does not lead directly to financial returns. This finding needs future investigation with measures focused on differentiating the maintaining competitiveness (producer surplus) with financial returns (consumer surplus). This differentiation may explain the poor empirical results from other studies regarding insignificant relationships among internal performance activities and financial measures (Peteraf & Barney, 2003; Ray et al., 2004; Bozarth & Edwards, 1997; Ketokivi & Schroeder, 2004; Broedner et al., 2009 and others).

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Figure 1 Overview of Transaction Cost Governance framework

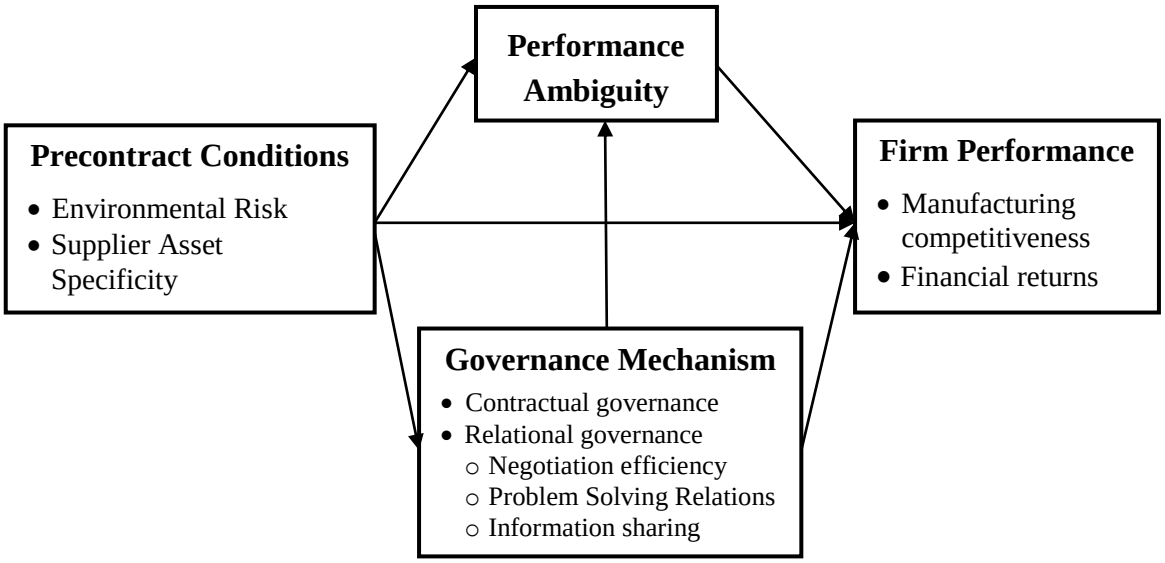

Table 1. Distribution of countries

Country	Frequency	Country	Frequency
(1) Albania	15	(12) South Korea	115
(2) Australia	30	(13) Macedonia	39
(3) Austria	17	(14) Mexico	105
(4) Brazil	30	(15) New Zealand	23
(4) China	57	(14) Poland	57
(5) Croatia	103	(15) Sweden	32
(7) Germany	59	(16) Switzerland	34
(8) Ghana	63	(17) Taiwan	50
(9) Hungary	53	**Total**	**987**
(10) Ireland	51		
(11) Italy	54		

Table 2 Factor Analyses of Constructs

	MC	PA&RC	CG	IS	NE	ER
Quality Competitiveness	**.719**	.088	-.067	.094	.041	.069
Cost Competitiveness	**.673**	.054	.155	.095	.126	-.066
Delivery Competitiveness	**.748**	-.047	.032	.123	.107	-.032
Flexibility Competitiveness	**.790**	.101	.167	.016	-.045	.015
New Product Competitiveness	**.596**	.031	.193	.154	.025	-.096
Specifications before signing	-.061	***-.531***	-.178	-.056	-.003	.084
Performance Measurement ease	.025	***-.578***	-.322	-.017	-.242	.154
Implicit Agreement Contingent	.023	**.662**	-.019	.163	-.211	.086
Does not alter facts	.065	**.713**	-.092	.072	.033	.042
Standard Problem Solving	.066	**.747**	.027	.116	.055	-.083
Termination penalty	.059	.024	**.824**	.119	.057	.018
Exclusivity clause	.183	.056	**.649**	.096	.051	.264
Poor technical performance	.086	.121	**.794**	.168	.032	-.049
Late Delivery penalty	.155	.057	**.812**	.154	-.019	-.037
Exchange Info forecasts	.197	.133	.041	**.586**	.134	.028
Feedback on Specs	.160	.029	.179	**.753**	.089	-.082
Joint efforts MPS	.106	.162	.157	**.812**	.030	-.076
Fewer Schedule changes	.031	.132	.170	**.787**	.094	-.136
Excessive Neg Sessions	.048	-.067	-.013	.004	**.801**	-.020
Excessive Haggling	.076	.054	.135	.182	**.800**	-.044
Agitation	.104	.057	-.004	.138	**.775**	-.087
Technology Risk	.033	-.106	.164	.077	.037	**.815**
Behavioral Risk	-.087	.051	-.012	-.238	-.144	**.742**
Market Risk	-.050	-.077	-.041	-.100	-.067	**.822**
Cronbach α	.750	***.571*** *	.797	.724	.782	.723
		.677				

*Performance ambiguity loaded negatively due to high negative relationship with relational coordination.

Table 3. Factor score analyses from measurement model for divergent validity

	Environmental Risk ER	Negotiation Efficiency NE	Information Sharing IS	Problem Solving Relations RP	Performance Ambiguity-PA	Contractual Governance CG	Manufacturing Competitiveness MC
Financial Returns	-0.01839	-0.00552	**0.07125**	-0.03375	0.0033	-0.01366	-0.03987
New product design time	-0.00242	0.00211	0.00334	0.00027	0.00084	0.00289	**0.06265**
Cost Competiveness	-0.00351	0.00306	0.00485	0.00039	0.00121	0.00419	**0.09096**
Flexibility Competiveness	-0.00703	0.00613	0.0097	0.00079	0.00243	0.00839	**0.18197**
Delivery Competitiveness	-0.00701	0.00611	0.00968	0.00079	0.00242	0.00837	**0.18156**
Quality Average	-0.00435	0.00379	0.006	0.00049	0.0015	0.00519	**0.11252**
Performance Measurement ease	0.03316	-0.02382	-0.01658	-0.11238	**0.3035**	-0.02407	0.00649
Specifications before signing	0.00947	-0.0068	-0.00473	-0.03209	**0.08665**	-0.00687	0.00185
Exclusivity clause	0.00273	-0.00032	0.00377	-0.00084	-0.00126	**0.06621**	0.00117
Poor technical performance	0.00958	-0.00111	0.0132	-0.00296	-0.00442	**0.23206**	0.00412
Late Delivery penalities	0.0135	-0.00157	0.01861	-0.00417	-0.00622	**0.32706**	0.0058
Termination penality	0.0048	-0.00056	0.00661	-0.00148	-0.00221	**0.11622**	0.00206
Excessive Neg Sessions	-0.00906	**0.20522**	0.01365	0.00066	-0.00965	-0.00246	0.00663
Excessive Haggling	-0.01592	**0.36067**	0.024	0.00116	-0.01695	-0.00432	0.01165
Agitation	-0.01004	**0.22734**	0.01512	0.00073	-0.01069	-0.00272	0.00735
Standard Problem Solving	-0.01172	0.00106	0.01678	**0.35289**	-0.07268	-0.01042	0.00136
Does not alter facts	-0.00628	0.00057	0.00899	**0.18904**	-0.03893	-0.00558	0.00073
Implicit Agreement Contingent	-0.00546	0.00049	0.00782	**0.16442**	-0.03386	-0.00486	0.00063
Exchange Info forecasts	-0.00336	0.00502	**0.09308**	0.00387	-0.00247	0.01072	0.00386
Feedback on Specs	-0.00804	0.01201	**0.22245**	0.00924	-0.0059	0.02562	0.00923
Joint efforts MPS	-0.00558	0.00833	**0.15438**	0.00641	-0.0041	0.01778	0.00641
Fewer Schedule changes	-0.01058	0.0158	**0.29268**	0.01216	-0.00777	0.03371	0.01215
Technology Risk	**0.18033**	-0.00686	-0.00693	-0.00556	0.01017	0.01601	-0.00577
Behavioral Risk	**0.29639**	-0.01128	-0.01139	-0.00914	0.01672	0.02631	-0.00948
Market Risk	**0.17399**	-0.00662	-0.00668	-0.00536	0.00982	0.01545	-0.00556
Asset Specificity AS	0.02285	-0.00854	0.02707	**0.10912**	-0.03463	0.03308	0.03663

Table 4. Structural equation estimates with truncated direct effects

				Full Structural Model					Truncated Structural Model		
				EST Coef	S.E.	C.R.	P	Std. Coef	C.R.	P	Std. Coef
P1	Financial Returns FR	<---	Manufacturing Competiveness MC	-0.0195	0.0122	-1.6066	0.0541	-0.0620			
P2.A	Financial Returns FR	<---	Performance Ambiguity PA	0.0038	0.0041	0.9220	0.1783	0.0424			
P2.B	Manufacturing Competiveness MC	<---	Performance Ambiguity PA	0.0060	0.0126	0.4734	0.3180	0.0212			
P3.A	Financial Returns FR	<---	Contract Governance CG	0.0023	0.0081	0.2849	0.3878	0.0121			
P3.B	Manufacturing Competiveness MC	<---	Contract Governance CG	0.0793	0.0250	3.1728	0.0008	0.1314	**3.1333**	0.0009	0.1258
P3.C	Performance Ambiguity PA	<---	Contract Governance CG	-0.3572	0.0802	-4.4562	0.0000	-0.1668	***-5.0115***	0.0000	-0.1773
P4.A	Financial Returns FR	<---	Negotiation Efficiency NE	0.0078	0.0189	0.4141	0.3394	0.0209			
P4.B	Manufacturing Competiveness MC	<---	Negotiation Efficiency NE	0.1180	0.0557	2.1179	0.0171	0.0990	**2.1931**	0.0142	0.1021
P4.C	Performance Ambiguity PA	<---	Negotiation Efficiency NE	0.0588	0.1770	0.3321	0.3699	0.0139			
P4.D	Contract Governance CG	<---	Negotiation Efficiency NE	-0.0558	0.0916	-0.6089	0.2713	-0.0283			
P5.A	Financial Returns FR	<---	Problem Solving Relations PSR	0.0000	0.0093	0.0032	0.4987	0.0002			
P5.B	Manufacturing Competiveness MC	<---	Problem Solving Relations PSR	0.0091	0.0279	0.3251	0.3725	0.0197			
P5.C	Performance Ambiguity PA	<---	Problem Solving Relations PSR	-0.6638	0.0753	-8.8213	0.0000	-0.4056	***-11.379***	0.0000	-0.4397
P5.D	Contract Governance CG	<---	Problem Solving Relations PSR	-0.0533	0.0406	-1.3124	0.0947	-0.0697			
P6.A	Financial Returns FR	<---	Information Sharing IS	0.0287	0.0145	1.9703	0.0244	0.0801	**2.4792**	0.0066	0.0859
P6.B	Manufacturing Competiveness MC	<---	Information Sharing IS	0.1631	0.0453	3.5969	0.0002	0.1436	**3.6192**	0.0001	0.1434
P6.C	Performance Ambiguity PA	<---	Information Sharing IS	-0.2737	0.1484	-1.8439	0.0326	-0.0680	***-2.1181***	0.0171	-0.0748
P6.D	Contract Governance CG	<---	Information Sharing IS	0.6323	0.0702	9.0073	0.0000	0.3364	**9.1771**	0.0000	0.3306
P7.A	Financial Returns FR	<---	Asset Specificity AS	0.0249	0.0207	1.2040	0.1143	0.0825			
P7.B	Manufacturing Competiveness MC	<---	Asset Specificity AS	0.1174	0.0608	1.9321	0.0267	0.1228	**2.4007**	0.0082	0.1296
P7.C	Performance Ambiguity PA	<---	Asset Specificity AS	-0.2876	0.1871	-1.5378	0.0621	-0.0848			
P7.D	Contract Governance CG	<---	Asset Specificity AS	0.2557	0.0966	2.6462	0.0041	0.1614	**2.2048**	0.0137	0.1174
P7.E	Negotiation Efficiency NE	<---	Asset Specificity AS	0.0591	0.0440	1.3432	0.0896	0.0736			
P7.F	Problem Solving Relations PSR	<---	Asset Specificity AS	0.9266	0.1003	9.2381	0.0000	0.4470	**8.9178**	0.0000	0.4339
P7.G	Information Sharing IS	<---	Asset Specificity AS	0.1887	0.0433	4.3557	0.0000	0.2239	**3.9516**	0.0000	0.2043
P8.A	Financial Returns FR	<---	Environmental risk ER	-0.0117	0.0125	-0.9301	0.1761	-0.0351			
P8.B	Manufacturing Competiveness MC	<---	Environmental risk ER	-0.1112	0.0391	-2.8414	0.0022	-0.1055	***-2.8054***	0.0025	-0.1025
P8.C	Performance Ambiguity PA	<---	Environmental risk ER	0.5080	0.1268	4.0059	0.0000	0.1359	**3.8205**	0.0001	0.1291
P8.D	Contract Governance CG	<---	Environmental risk ER	0.2905	0.0618	4.7013	0.0000	0.1664	**5.0356**	0.0000	0.1747
P8.E	Negotiation Efficiency NE	<---	Environmental risk ER	-0.1207	0.0426	-2.8309	0.0023	-0.1364	***-2.8803***	0.0020	-0.1390
P8.F	Problem Solving Relations PSR	<---	Environmental risk ER	-0.2068	0.1029	-2.0111	0.0222	-0.0905	***-2.0791***	0.0188	-0.0935
P8.G	Information Sharing IS	<---	Environmental risk ER	-0.1300	0.0315	-4.1277	0.0000	-0.1400	***-4.0979***	0.0000	-0.1393

Standardized Direct Effects (last column) are derived from the truncated SEM estimate for effect comparisons. (SEM Statistics for Structural Model& Truncated Structural Model respectively: CMIN $\chi 2$=0.026&10.64; P>0.872&0.777; DF=1&15; CMIN/DF=0.026&0.7096;CFI=1.000&1.000; NFI=1.000&0.978;PRATIO=0.0222&0.3333;RMSEA=0.000& 0.000.)