

The Impact of Buyer Specific Investments and Buyer Specific Control Investments on Hierarchical Governance in Supplier-Buyer Relationship

Arnt Buvik, Molde University College, Norway, arnt.buvik@himolde.no

Otto Andersen, Agder University, Norway, otto.andersen@uia.no

Abstract

Based on transaction costs analysis (TCA) and resource-dependence theory (RDT), this study examines the association between buyer specific investments, buyer specific control investments and hierarchical governance in industrial buyer-seller relationships and develops three hypotheses specifying these associations.

Data from a survey of 159 industrial buyer-seller relationships provide support for the hypotheses, and demonstrates that there is a strong and negative association between buyer specific investments and hierarchical buyer control, while the effect of buyer specific control investments is positively associated to hierarchical governance. Finally, in accordance with TCA predictions, the supplier's investments in specific control arrangements in the supplier plants increase their influence and control over the suppliers business substantially.

The outcome of the empirical analysis demonstrates that it is important to evaluate the nature and function of different kinds of buyer specific investments when considering the antecedents to governance mode in business-to-business relationships.

The Impact of Buyer Specific Investments and Buyer Specific Control Investments on Hierarchical Governance in Supplier-Buyer Relationship

Introduction, Conceptual Framework and Hypotheses

Buyer control is conceptualized as the extent of the buyer's authority and control over the supplier's decision making in a specific relationship (Heide, 1994). Departure from conventional market exchange implies that specific devices are introduced in business-to-business relationships to handle inter-firm co-ordination, enforcement of decisions, monitoring and control of activities and performance. This corresponds to the hierarchical planning dimension of inter-firm governance, conceptualized as a process which intends to specify tasks, duties and responsibilities of the transacting parties in more details (Heide, 1994). A key feature of hierarchical governance is proactive planning and centralization, where decisions and specifications of inter-firm issues are concentrated within one of the transacting parties.

When the supplier firm employs substantial specific assets, bilateral dependence will occur and impose the problem of information asymmetry and exposure to opportunism. Under such conditions, it is important for the buyer to exercise some control and influence over the supplier's production and logistic management in order to maintain an effective utilization of productive resources. From the buyer's point of view, it is important to exercise influence on quality assurance systems, standards and methods for product control, specific guidelines prescribing how to select tools and design production facilities at the supplier's plant. The important issue is that the implementation of such hierarchical governance intends to stabilize terms of trade and overcome the performance measurement difficulties associated to bilateral dependence (Williamson, 1985, 1991). Based on this reasoning, we propose:

H1: There is a positive association between the levels of supplier held specific investments and buyer control in industrial buyer-seller relationships.

Buyer specific investments (BUYSPEC) refers to the magnitude of the investments and/or adaptations made by the buyer in physical assets, production facilities and tools tailored to the relationship. Based on power-dependence considerations, several empirical studies (e.g. Heide and John, 1992) have demonstrated that employment of buyer specific investments will attenuate the buying firm's ability to exercise influence on terms on trade and the value adding process in purchasing relationships. Based on this reasoning, we propose:

H2: There is a negative association between buyer specific investments and buyer control in industrial buyer-seller relationships.

Buyer specific control investments refer to the buying firm's investments in a specific, administrative infrastructure that helps in enforcing influence and control over the supplier firms. Such investments represent a specific development and implementation of quality assurance systems, production control routines, training and competence development of personnel in the supplier's plant.

Such unilateral and idiosyncratic adaptations could make the buyer more vulnerable and dependent on the supplier since such investments are impossible to redeploy without a substantial loss of value.

We will argue that the implementation of such control investments is made for two purposes, first in order improve the coordination between the buyer and the seller (Bensaou and Anderson, 1999), and secondly to safeguard the substantial value of the production related to the economic exchanges with the supplier firm. In particular, such specific control investments are basically assigned to the quality assurance of supplier based activities that are critical for the buyer's customers and hence strongly related to the down stream actors in the buyer's supply chain. Based on this reasoning, we propose the following refutable hypothesis:

H3: There is a positive association between buyer specific control investments and buyer control in industrial buyer-seller relationships.

Empirical Setting, Research Methodology and Measurements

Buyer-seller dyads constitute the unit of analysis in this research, and 158 industrial purchasing relationships compose our empirical setting. Data were collected from manufacturing firms (buyers) from several different two-digit SIC groups with highest representation from engineering production (45%) and chemical production (25%).

The final questionnaires were then mailed to a census of 684 industrial procurement professionals with memberships in the National Association of Purchasing and Logistics in Norway. Among these, 114 reported that they fell out of the scope of the study because their firm had gone out of business or were no longer engaged in manufacturing. Among the remaining 570 informants, 28% responded to the questionnaire after two call backs. Among the non-responders, 67% reported busy work schedules or lack of time as the main reason for not participating in our research.

Non-response bias was measured by comparing early and late responders (Armstrong & Overton, 1977). No significant differences with respect to the length of the relationship, firm size, purchasing volume or key informants' knowledge and involvement with the selected informants were found between these two groups. Finally, firm size was compared between the responding firms and a sample of non-responders. No significant difference was detected.

Measurements

Buyer control (BUYCON) describes to which extent key decisions in the relationship are concentrated with the buyer (Heide, 2003), and represents the buyer's degree of vertical control (Heide and John, 1992).

Supplier specific assets (SUPPLSPEC) refers to which specific investments and adaptations made by the supplier that are tailored to the specific purchasing relationship (Anderson and Weitz, 1992).

Buyer specific investments (BUYSPEC) refers to the magnitude of the investments and/or adaptations made by the buyer in physical assets, production facilities, tools and knowledge tailored to the relationship (e.g. Heide and John, 1990, 1992).

Buyer specific control investments (CONTSPEC) was defined as idiosyncratic employment of resources in quality assurance systems, production control routines, training and competence development of personnel at the supplier's plant.

Prior length of the relationship (TIME). Several research contributions emphasize long-term ties in industrial purchasing (Heide and Miner, 1992) and its positive effect on relational norms (Buvik and John, 2000). The IMP-studies carried out by Hakansson and his associates (e.g., Hakansson, 1982) assign primary importance to time as the enabler of relationship development. Long-term relationships offer better opportunities to reduce waste, and promote quality in business-to-business relationships. Kalwani and Narayandas (1995) in particular

demonstrated that supplier relationships with low turnover over a certain period of time reduced inventories more than a matched set of ties with a higher turnover. Their work ties in with the TCA- perspective since it is observed that the threat of opportunism and subsequent transaction costs diminishes over time (Ring and Van de Ven and Ring, 1992).

Environmental Uncertainty (UNCERT) is expected to be a significant antecedent to inter-firm governance. In particular, changing demand conditions call for comprehensive adjustments, communication of new information, realignment of resources and the re-negotiation of terms of trade (Malone 1987; Williamson 1985). To account for this effect, a single item measure focusing on the degree of marked demand unpredictability of the product bought from the focal supplier was incorporated in our research model.

TABLE 1: Measures of constructs and validity statistics

Scales	Sample of items. <i>Response format: 7-point Likert-type scale with end points inaccurate description and accurate description.</i>
Buyer Control: BUYCON: 4 items $\chi^2(2) = 2.90, p=0.23$ CFI=0.99, GFI=0.99 $\alpha = .68$	BUYCON1: Our firm determines all aspects of the implementation of quality assurance at our supplier's plant. BUYCON2: Our firm determines in detail the methods and standards to be used for control of the products we purchase from this supplier. BUYCON3: Our firm determines completely which sub-contractors to employ for the production of products delivered to our firm by this supplier. BUYCON4: Our firm has significant greater influence than our supplier on terms of trade.
Buyer Specific Control Investments: CONTRSPEC: 3 items CFI=1.00, GFI=0.99 Trivial fir for 3 items $\alpha = .73$	CONTRINV1: Our firm has committed substantial time and resources to the training and competence development of personnel in this supplier's firm. CONTRINV2: We have committed substantial time and resources to develop acceptable quality assurance program at this supplier's plant. CONTRINV3: Our firm has committed a lot of resources to developing special equipment and routines for product control at this supplier's plant.
Supplier Specific investments: SUPPLSPEC: 4 items $\chi^2(2) = 1.24, p=0.54$ CFI=1.00 GFI=1.00 $\alpha = .71$	SUPPLSPEC1: This supplier has committed a lot of time and resources to meet our requirements for specific routines and equipment for product control. SUPPLSPEC2: This supplier has made comprehensive product adjustments in order to meet our requirements. SUPPLSPEC3: This supplier has to a great extent adapted the execution and follow-up orders to the existing ordering routines in our firm. SUPPLSPEC4: Our supplier has carried out extensive investments in storage and transportation equipment in order to deal with deliveries to our company.
Buyer Specific investments: BUYSPEC: 5 items $\chi^2(5) = 4.18, p=0.53$ CFI=1.00 GFI=0.99 $\alpha = .70$	BUYSPEC1: Our firm has completely adjusted our product specifications in accordance with this supplier's production technology and product range. BUYSPEC2: our firm has committed a lot of time and resources to achieving insight and adaptation to the technical standards of this supplier. BUYSPEC3: Our firm has completely restructured our production in order to improve the efficiency of the further processing of the products that we buy from this supplier. BUYSPEC4: Our firm has to a great extent adapted our ordering routines to this supplier's expediting routines. BUYSPEC5: Our firm has made substantial investments in information technology dedicated to the transactions with this supplier.
Environmental Uncertainty: UNCERT: 1 item	UNCERT1: The demand for the product we buy from this supplier is very unpredictable.
Buyer's manufacturing technology: TECHNO: 1 item	TECHNO1: The work-flow of our firm's manufacturing department is strongly pre-programmed.

Annual purchasing volume (\$PURCHASE). Most discussions of inter-firm relations find the size of business to business trade to reflect a significant stake and leverage (e.g. Spekman, 1988), and hence effect the governance structure of business relationships. The natural logarithm of the buyer's annual dollar purchases from the focal supplier was used to control for these effects.

Buyer's manufacturing technology. Several inter-organizational studies have examined the effect of the buyer's manufacturing technology (Johanson, 1982, Heide, 1994) and found that the rigidity of buyer's manufacturing technology increased the formalization of purchase contracts in industrial channel dyads. We applied a one-item construct to control for possible effect of the buying firms manufacturing technology (confer Table 1).

Validation of constructs

First, each of the four multi-item measures (buyer control, supplier specific investments, buyer specific investments and buyer specific control investments) was analyzed by inspecting item-to-total correlations. Then, each of the constructs was examined by a confirmatory factor analysis to verify unidimensionality an assessment of internal consistency. A single-factor representation was used for each of the item-sets representing these constructs and the estimates and the fit statistics for these three models showed an adequate fit to the data set (confer Table 1).

Discriminant validity of the three basic TCA-constructs was then assessed by estimating a three-factor measurement model based on EQS (Bentler, 1989). The overall chi-square statistics indicate a reasonable fit to the four-factor solution ($\chi^2(98) = 60.72, p < 0.01$), and several fit indexes confirmed satisfactory fit of the four-factor model, Bentler's Comparative Fit Index, CFI=0.99, the goodness-of-fit index, GFI=0.91 and the root mean square measures, RMSEA=0.04. Table 1 presents the items, reliability measures and fit indexes; Appendix 1 contains the correlation matrix and descriptive statistics.

Statistical Analysis and Empirical Findings

In order to test our research hypotheses, the following OLS-regression model was estimated:

$$\text{BUYCON} = b_0 + b_1 \text{SUPPLSPEC} + b_2 \text{BUYSPEC} + b_3 \text{CONTRSPEC} + b_4 \text{TIME} + b_5 \text{UNCERT} + b_6 \text{\$PURCHASE} + \varepsilon$$

The overall goodness of fit for the model is good with $F(7,151) = 10.59 (p < 0.01)$ and $R^2_{\text{Adj}} = 0.30$ which indicates that the model provides an adequate description of our data. Table 2 provides the outcome of the empirical analysis and collinearity statistics.

TABLE 2: Regression Analysis. Dependent Variable: Buyer Control

Independent variables:	Unstandardized Coefficients	t-values	Collinearity Measure, VIF
Supplier specific assets (SUPPLSPEC), b_1	0.39	4.10 ^a	0.96
Buyer specific assets (BUYSPEC), b_2	-0.41	-3.94 ^a	0.85
Buyer specific control investments (CONTRSPEC) b_3	0.41	3.80 ^a	0.94
Relationship Duration (TIME), b_4	-0.12	-0.96	0.82
Environmental Uncertainty (UNCERT) b_5	0.14	2.24 ^b	0.53
Annual purchasing volume ($\text{\$PURCHASE}$), b_6	0.10	1.22	0.61
Manufacturing Technology (TECHNO), b_7	0.07	1.23	0.63
Constant(b_0)	1.40	2.99 ^a	
Model Fit: $F(7, 151) = 10.59^a$ $R^2_{\text{Adj}} = 0.20$, $n = 159$, a indicates significant at $p < 0.01$ and b indicates significant at $p < 0.05$			

As suggested by H_1 , we observe a significant and positive effect of supplier specific assets on buyer control ($b_1 = 0.39, p < 0.01$). Furthermore, the empirical analysis supports H_2 and verifies a significant and negative association between buyer specific investments and buyer control ($b_2 = -0.41, p < 0.01$), and we observe a positive and association between buyer specific control investments and buyer control ($b_3 = 0.41, p < 0.01$) in accordance with H_3 .

The effects of the control variables. As expected from relational exchange theory, the prior length of the relationship (TIME) shows a negative association with buyer control, but the association is not significant ($b_4 = -0.12, p > 0.05$). Furthermore, environmental uncertainty seems to foster higher hierarchical governance to cope with unpredictable terms of trade and

the prospects of frequent renegotiations ($b_5 = 0.14$, $p < 0.05$). Stakes and leverage considerations seem to function as antecedent to hierarchical governance, and the annual purchasing volume absorbed by the buying firm is positively associated to buyer control, but the association is insignificant ($b_6 = 0.10$, $p < 0.10$). Finally, the rigidity of the buyer's manufacturing technology is positively related to buyer control. The association is however rather modest ($b_7 = 0.07$, $p > 0.05$). Taken together, the analysis demonstrates that the TCA based predictor variables maintain explanatory power when relevant control variables are accounted for in the model, and indicates a satisfactory robustness of the model.

Discussion and Implications

Williamson (1996) maintains that asset specificity is the most important dimension in predicting governance form. Actually, he concludes that asset specificity "is the big locomotive to which transaction cost economics owes much of its predictive content" (Williamson, 1998). As the supplier dedicates substantial relation-specific resources in a business relationship, this gives rise to a governance mode that is hypothesized to be unilateral; that is, the powerful partner (e.g., the buyer) has the leverage to formulate rules and instructions and to impose decisions on the weaker partner. Our empirical findings give support to this reasoning and demonstrate that the level of supplier held specific investments is positively associated with the exercise of buyer control. When specific investments are employed by the supplier, this will normally lead to a situation where the buyer has the leverage to formulate specification of routines, procedures and requirements regulating the relationship.

The present study illustrates that it is important to evaluate the nature and function of different kinds of buyer specific investments as antecedents to governance mode in business-to-business relationships. First of all, buyer specific investments (BUYSPEC) refers to the magnitude of the investments and/or adaptations made unilaterally by the buyer in physical assets, production facilities, tools and knowledge tailored to the relationship in his/her own organization. Based on power-dependence considerations, several empirical studies (e.g. Heide and John, 1992) have demonstrated that employment of buyer specific investments will attenuate the buying firm's ability to exercise influence on terms on trade and value creation at the supplier's plant and the empirical findings of this research provides strong support for this reasoning.

The most significant issue concerns the buyer's employment of specific control investments integrated to the value adding processes at the supplier's plant, like quality assurance systems, production control routines, and training and competence development of personnel in the supplier firm. We will argue that when the buying firm risks unilateral dependence by tailoring administrative routines to operate specifically with one supplier, they will relate such administrative investments to other specific investments already done in order to improve the coordination between the buyer and the seller (Bensaou and Anderson, 1999).

Our empirical findings demonstrate that the establishment of an administrative infrastructure at the supplier plant really helps the buying firm in enforcing influence and control over the supplier firms. This concerns the problem of multiple coordination value adding processes in both the upstream and downstream parts of the supply chain networks (Wathne and Heide, 1994), and specific control investments function as an administrative infrastructure that enhances the buying firm's ability to carry out quality assurance activities in the supplier's plant for the purpose of ensuring that the performance of the supplier firm matches the evaluation criteria of the buying firm's customers.

References:

- Armstrong, J. S., Overton, T. S., 1977. Estimating Non-response Bias in Mail Surveys. *Journal of Marketing Research*, 14 (August), 396-402.
- Anderson, E., Weitz, B., 1992. The Use of Pledges to Build and Sustain Commitment in Distribution Channels. *Journal of Marketing Research*, 23, 18-32.
- Bensaou, M., Anderson, E., 1999. Buyer-Supplier Relations in Industrial Markets: When Do Buyers Risk Making Idiosyncratic Investments? *Organization Science: A Journal of the Institute of Management Science*, 10, 4, 1471-1492.
- Bentler, P. M., 1989. EQS Structural Equations Program Manual. Los Angeles: BMDP Statistical Software.
- Buvik, A., John, G., 2000. When does vertical coordination improve industrial purchasing relationships? *Journal of Marketing*, 64, 4, 52-65.
- Ghosh, M., John, G., 1999. Governance Value Analysis and Marketing Strategy. *Journal of Marketing* 63, October, Special Issue, 131-145.
- Heide, J. B., 1994. Inter-Organizational Governance in Marketing Channels: Theoretical Perspectives on Forms and Antecedents. *Journal of Marketing*, 58 (January), 71-85.
- Heide, J. B., 2003. Plural Governance in Industrial Purchasing. *Journal of Marketing*, 67, 4, 18-30.
- Heide, J. B., John, G., 1990. Alliances in Industrial Purchasing: The Determinants of Joint Action in Buyer-Supplier Relationships. *Journal of Marketing Research*, 27, February, 24-36.
- Heide, J. B., John, G., 1992. Do Norms matter in Marketing Relationships? *Journal of Marketing*, 56, 32-44.
- Heide, J. B., Miner, A. S., 1992. The Shadow of The Future: Effects of Anticipated Interaction and Frequency of Contact on Buyer-Seller Cooperation. *Academy of Management Journal*, 35, 2, 265 -291.
- Håkansson, H., 1982. *International marketing and purchase of industrial goods*. New York: Wiley.
- Johanson, J., 1982. Production Technology and user-Supplier Interaction, in Håkansson, H. (Ed.), *International Marketing and Purchasing of Industrial Goods*. New York. John Wiley and Sons.
- Kalawani, M. U., Narayandas, N., 1995. Long-term manufacturer-Supplier relationships: Do They Pay Off for Supplier Firms? *Journal of marketing*, 59, January, 1-16.
- Malone, T., W., 1987. Modelling coordination in organizations and markets. *Management Science*, 33, 1317-1332.
- Spekman, R. E., 1988. Strategic supplier selection. Understanding long-term buyer relationships. *Business Horizon*, 31, 75-81.
- Ring, S. P., Van de Ven, A. H. 1992. Structuring Cooperative Relationships Between Organizations. *Strategic Management Journal*, 13, 7, 483-498.
- Watne, K. H., Heide, J. B., 2004. Relationship Governance in a Supply Chain Network. *Journal of Marketing*, 68 (January), 73-89.
- Williamson, O. E., 1985. *The Economic Institutions of Capitalism*. New York: The Free Press
- Williamson, O. E., 1991. Comparative Economic Organization: The Analysis of Discrete Structural Alternatives. *Administrative Science Quarterly*, 36, 269-296.
- Williamson, O. E., 1993. Calculativeness, Trust, and Economic Organization. *Journal of Law & Economics*, 36 (April), 453-486.
- Williamson, O. E., 1996. *The Mechanisms of Governance*. New York: Oxford University Press.
- Williamson, O. E., 1998. Transaction Cost Economics: How it Works; Where it is Headed. *Economists*, 146, 1, 23-58.