Available online at www.sciencedirect.com
ScienceDirect
Industrial Marketing Management 36 (2007) 458–469
INDUSTRIAL MARKETING MANAGEMENT

The environment and its impact on satisfaction with supplier performance: An investigation of the mediating effects of control mechanisms from the perspective of the manufacturer in the U.S.A.

Sungmin Ryu [a,*], Nermin Eyuboglu [b,1]

[a] School of Business, Sungkyunkwan University, Business School Building #412, 53 Myoungnyun-dong, 3-ga, Jongno-gu, Seoul, 110-745, South Korea
[b] Marketing Department, Zicklin School of Business, Baruch College/City University of New York, One Bernard Baruch Way 12-240, New York, NY 10010, USA

Received 1 June 2005; received in revised form 1 October 2005; accepted 1 December 2005
Available online 28 February 2006

Abstract

An important question for manufacturers relates to how to conduct exchanges with suppliers when the interaction is done in an uncertain environment. Existing literature suggests the use of unilateral control (i.e., vertical control over the supplier) to reduce the negative effects of environmental uncertainty, whereas recent research on relational norms suggests bilateral control mechanisms (i.e., the norm of information sharing) as an alternative. We propose that in order to secure satisfactory performance from suppliers, manufacturers rely on different control mechanisms depending upon the level of environmental uncertainty on one hand, and the nature of interdependence in the manufacturer–supplier relationship on the other. Our empirical results based on 162 manufacturers indicate the following: 1) manufacturers' reliance on vertical control increases as environmental uncertainty and power asymmetry increase; 2) by contrast, reliance on the bilateral information sharing increases as interdependence magnitude increases and as environmental uncertainty decreases; 3) suppliers' performance, as perceived by manufacturers, increases with the use of bilateral information sharing.

Keywords: Vertical control; Information sharing; Environmental uncertainty

1. Introduction

Uncertain environments pose problems for manufacturers. Volatile supply and unpredictable price of component parts, for instance, can create inventory and cost problems. In uncertain environments, manufacturers may try to use control mechanisms in order to influence supplier actions and to reduce costs (Klein, Frazier, & Roth, 1990). An important question for the manufacturer is: what kind of control mechanism is suitable for dealing with environmental uncertainty (Ouchi, 1979), given the nature of the power relationship with the supplier?

An approach derived from transaction cost theory is to reduce the effect of environmental uncertainty (Williamson, 1985). Transaction cost theorists view environmental uncertainty as a feature of market failure. Uncertain environments allow information asymmetries to develop between the manufacturer and the supplier, which afford opportunity for the better-informed partner to engage in opportunistic behavior, self-interest seeking behavior with guile (Williamson, 1975), when they deal with their partners (Klein et al., 1990). An exchange party's opportunistic behavior results in a safeguarding problem for its partner. Therefore, transaction cost theory suggests that a unilateral control mechanism, i.e., vertical control over the opportunistic partner, is the best solution to reduce opportunistic behavior of the partner under environmental uncertainty (e.g., Celly & Frazier, 1996; Klein et al., 1990; Sachdev, Bello, & Pilling, 1994).

However, transaction cost theory does not fully consider the bilateral control mechanism as an alternative in dealing with environmental uncertainty (Gundlach & Achrol, 1993). Williamson (1991) mentions some bilateral control mechanisms, e.g., contractual safeguards, information exchange, and dispute-settlement mechanisms. However, he does not fully explicate the characteristics of bilateral control mechanisms, such as a

* Corresponding author. Tel.: +82 2 760 0497; fax: +82 2 760 0440.
E-mail addresses: smryu@skku.edu (S. Ryu), Nermin_Eyuboglu@baruch.cuny.edu (N. Eyuboglu).
[1] Tel.: +1 646 312 3293; fax: +1 646 312-3271.

0019-8501/$ - see front matter © 2006 Elsevier Inc. All rights reserved.
doi:10.1016/j.indmarman.2005.12.006

shared set of implicit principles or mutual coordination of exchange parties.

More recent literature on relational norms has a different emphasis (e.g., Heide, 1994; Weitz & Jap, 1995). It suggests the use of bilateral control to leverage relational norms that may have developed in the course of past exchanges. An exchange party's reliance on relational norms is seen as a means of protecting one party against the opportunistic behavior of its partner (Brown, Dev, & Lee, 2000), therefore relational norms provide superior forms of social control (Thibaut, 1968).

In order to address these partial answers in the literature and to present a more complete view of the manufacturer's decision situation, we investigate in one single framework, how environmental uncertainty and inter-organizational dependence structures (power magnitude and asymmetry) affect the use of both unilateral and bilateral control mechanisms by manufacturers. Previous work has emphasized the importance of using control mechanisms best suited to the firm's external and internal environments (e.g. Sachdev et al., 1994). However, the literature has largely overlooked the effect of inter-organizational power structures on control mechanisms (Jap & Ganesan, 2000).

An additional goal of our work is to examine the effects of control mechanisms on supplier performance. The manufacturer uses control mechanisms to exert an influence over its supplier to enhance the latter's performance. To date, the performance effects of different control mechanisms within the manufacturer–supplier relationship have not been explored (Jap & Ganesan, 2000; Mentzer, Min, & Zacharia, 2000). The findings of this study will be very useful to practitioners who seek to determine the best way to manage their relationships with their suppliers.

In the next section, we will discuss the theoretical background for environmental uncertainty, control mechanisms, interdependence structures, and performance from the manufacturer's perspective. The research hypotheses are provided in that section as well. Subsequently, we describe our study and its methodology while results based on the responses of 162 purchasing managers in manufacturing firms will be discussed in the final section.

2. Theoretical background and hypotheses

2.1. Control mechanisms

The literature identifies two types of inter-organizational control mechanisms: unilateral control and bilateral (Heide, 1994; Ouchi, 1979; Weitz & Jap, 1995). While bilateral control is based on shared values or norms of both exchange parties, unilateral control refers to a manufacturer "forcing" its supplier to follow its directives. Bilateral control relies on shared norms that obviate the need to control the partner's behavior directly, as is the case with unilateral control (Heide, 1994).

Unilateral control involves the controlling party's effort to dictate its partner's actions (Bello & Gilliland, 1997; Celly & Frazier, 1996; Coleman, 1990; Heide & John, 1988; Spekman, 1988; Stump & Heide, 1996). For example, a manufacturer's unilateral control may involve vertical control over the supplier's activities such as the prescription of inventory levels and production processes.

Vertical control refers to the extent to which a firm has control over another firm's key decisions (Heide, 1994). Vertical control through frequent monitoring and enforcement of performance standards for engineering, product quality, delivery services, etc., enhances a manufacturer's ability to prevent the occurrence of opportunistic behavior on the supplier's part in the first place (Stump & Heide 1996; Leenders & Fearon, 1993).

Vertical control is based upon the premise that a manufacturer possesses the power to impose its dictates on the supplier (Heide, 1994; Ouchi, 1979; Weitz & Jap, 1995). For instance, a manufacturer should be able to force its supplier to deliver the products on time, or of a certain quality (Noordewier, John, & Nevin, 1990). While some authors (e.g., Weitz & Jap, 1995) treat power (dependence) as an authoritative governance mechanism, this study takes the typical view of power: it stresses the difference between dependence and its consequence (i.e., control) (e.g., Frazier & Antia, 1995; Gaski, 1984). Power reflects a party's potential to exert influence on another firm's behavior, whereas control is the exercise of power (i.e., control exchange partner's decision-making).

A common feature of bilateral control is the exchange parties' mutual adjustment based on shared norms (Heide, 1994; Ouchi, 1979; Weitz & Jap, 1995). Thus, bilateral control relies on relational norms (Gundlach & Achrol, 1993; Lusch & Brown, 1996; Weitz & Jap, 1995) that stimulate efforts with mutual benefits (Weitz & Jap, 1995).

Relational norms possess two characteristics: they prescribe and regulate proper and acceptable behavior of a manufacturer and its supplier (Heide & John, 1992; Macneil, 1980) also, they relate to the collective rather than the individual goals of the two parties (Cartwright & Schwartz, 1973; Gundlach & Achrol, 1993).

Relational norms evolve in the course of repeated exchanges between a manufacturer and its supplier (Gundlach & Achrol, 1993). Over time, each party learns to understand the internal and external environments of the other, relational norms therefore respond to the needs and benefits of both parties. They contribute to better coordination and stability within the relationship (Gundlach & Achrol, 1993). Among the various relational norms, the norm of information sharing appears to have particular relevance to environmental uncertainty (e.g., Heide and John, 1992; Lusch & Brown, 1996; Noordewier et al., 1990). Since environmental uncertainty generates information asymmetry (Klein et al., 1990), the norm of information sharing is an appropriate mechanism for manufacturers faced with uncertain environments.

The norm of information sharing refers to the expectation that both parties will not withhold information from each other (Heide & John, 1992): it implies that both the manufacturer and the supplier develop conventions to volunteer information to each other.

2.2. Transaction cost theory and environmental uncertainty

Transaction cost theorists view environmental uncertainty as a cause of market failure. Highly uncertain environments develop a

condition in which the information about the environment is asymmetrically distributed between exchange parties (Klein et al., 1990). The information asymmetry between exchange parties allows the holder of the information to behave opportunistically in dealing with its partners (Klein et al., 1990). Transaction cost theory assumes that human beings behave opportunistically if they are given the chance. Therefore, the solution transaction cost theory proposes to a party in an uncertain environment is vertical control over the exchange partner.

Rindfleisch and Heide (1997) argue that vertical control can be achieved by relying on bilateral hybrid governance, such as relational norms. However, vertical control is a unilateral control mechanism. It is based on power of one party to control other exchange partners, and relational norms are not based on the power but rather on voluntary cooperation for mutual benefits (Weitz & Jap, 1995). Thus, one needs to treat the bilateral control mechanism as an alternative control mechanism to vertical control.

In sum, transaction cost theory suggests vertical control to guard against a partner's opportunistic behavior under environmental uncertainty. Thus, transaction cost theory, with its emphasis on the unilateral control mechanism, has not embraced the bilateral control mechanism as an alternative to the unilateral control mechanism. Therefore, it shows a limited ability to account for the behavior of active information provisions and flexible adaptation between exchange parties, which are the characteristics of the bilateral control mechanism.

2.3. Environmental uncertainty and control mechanisms

Environmental uncertainty is a characteristic of the environment (Achrol & Stern, 1988; Lawrence, 1981) that cannot be ignored (Stump & Heide, 1996). A manufacturer experiences uncertainty when relevant information is missing (Argote, 1982) or when contingencies are too numerous or unpredictable to be specified (Stump & Heide, 1996). Environmental uncertainty therefore makes it difficult for a manufacturer to make accurate predictions about the actual status of the environment (Achrol & Stern, 1988; Frazier & Antia, 1995; Jaworski, 1988).

Amongst the various dimensions of environmental uncertainty, we focus on uncertainty in input environments, since the context of this study is the relationship between a manufacturer and its supplier. Input environments consist of all sources of resources a manufacturer needs for manufacturing products. A manufacturer may encounter many input sources of environmental uncertainty (Scott, 1992) such as the shortage of raw materials or the unexpected price increase of component parts, which in turn create problems for the manufacturer. When such unforeseen contingencies arise, exchange parties need to develop control mechanisms (John & Weitz, 1988; Ryu & Eyuboglu, 2004) because opportunistic behaviors may ensue (Klein et al., 1990). For instance, when a manufacturer faces an unstable supply of parts in the market, its supplier may take advantage of the situation. The supplier may sell the parts to other buyers who offer higher prices and may feign short supply. Thus, environmental uncertainty encourages the manufacturer to strive for a high level of control over the supplier in order to prevent opportunistic behavior.

Exchange parties respond differently depending on whether the environment is stable or unstable. A stable environment allows organizations to develop a fixed set of routines for dealing with the environmental elements (Thomas & Grashof, 1982). By contrast, in uncertain environments relational norms are difficult to develop (Ouchi, 1979) because they grow out of repeated transactions (Gundlach & Achrol, 1993) that are unlikely under volatile conditions. A manufacturer might switch back and forth among different suppliers as it experiences unstable supply, and prevent the opportunity for repeat transactions with a given supplier. Thus, the manufacturer does not have a chance to cultivate relational norms. Although the literature suggests the use of information sharing norms in uncertain environments to curb opportunistic behavior, our view is that dyads are not able to institute such norms in uncertain environments. Therefore, our first hypothesis is:

H1. As environmental uncertainty increases, the manufacturer's reliance on the norm of information sharing control decreases.

When there is uncertainty in the input environment such as the unstable supply of parts, manufacturers cannot tell for sure when resources are intended to arrive and in what quantity. In contrast, suppliers will have an information advantage, which might tempt them to engage in opportunistic behavior (Klein et al., 1990) when, for instance, there is an unpredicted shortage of parts in the market, the supplier might inflate prices. Manufacturers in turn will be tempted to vertically control its supplier by monitoring the suppliers' inventory to prevent the latter's misrepresentation of the supply situation in price negotiations. These arguments lead to our second hypothesis:

H2. As environmental uncertainty increases, the manufacturer's reliance on vertical control increases.

2.4. Interdependence magnitude and asymmetry

Interdependence between exchange parties refers to their interest in maintaining a relationship to achieve their respective goals (Emerson, 1962). Interdependence presents the manufacturer with a problem of control over its supplier (Aiken & Hage, 1968) when the goals of the manufacturer differ from those of the supplier. Discrepancies of goals are common, hence manufacturers will often see a need to develop control mechanisms to resolve these differences.

Interdependence is characterized by two dimensions: the first is the overall magnitude of the two parties' interdependence, that is, the sum total of their need for each other (Eyuboglu, Ryu, & Tellefsen, 2003; Kumar, Scheer, & Steenkamp, 1995); the second is the asymmetry of the two parties' interdependence, that is, interdependence asymmetry is the difference between the supplier's dependence on the manufacturer and the manufacturer's dependence on the supplier (Jap & Ganesan, 2000). Asymmetry means that one party needs the other less and is hence more powerful.

Minimal interdependence between exchange parties leads easily to relationship dissolution (Dwyer, Schurr, & Oh, 1987) because neither party expects much profit from the relationship. By contrast,

in situations of high interdependence, the partners share interests, rely on each other, and accept the dependence on the other. The more powerful party in such relationships will be less tempted to use its power in controlling its partner because the partner wields a substantial amount of power to retaliate (Bacharach & Lawler, 1981; Lawler & Bacharach, 1987). Therefore, as interdependence magnitude between a manufacturer and its supplier increase, the manufacturer is less likely to try to control its supplier, since the attempt to control brings a higher likelihood of retaliation through the increase in the price of supplied parts for instance or by not meeting the requirements of the manufacturer for a certain level of inventory. Our third hypothesis is therefore:

H3. Given a constant degree of interdependence/power asymmetry, as power magnitude increases, the manufacturer's reliance on vertical control decreases.

High interdependence signifies that each party needs the other for the achievement of business profits. Exchange parties are therefore more likely to be committed (Kumar et al., 1995) and are less likely to use power for self-interest (Lawler & Bacharach, 1987; Foa & Foa, 1974). Thus, they are more likely to continue their relationship to secure the large interest coming from the relationship (Emerson, 1962; Lusch & Brown, 1996). Relational norms evolve as exchange parties continue and repeat transactions (Gundlach & Achrol, 1993). Thus, a manufacturer with high interdependence magnitude in the relationship with its supplier is likely to have the opportunity to develop the norm of information sharing. Therefore:

H4. Given a constant degree of interdependence/power asymmetry, as interdependence magnitude increases, the manufacturer's reliance on the norm of information sharing increases.

Interdependence asymmetry between exchange parties indicates one party's relative power over the other party. The relative power of one party influences its deterrence ability over the other. Deterrence refers to one party's threat to use its power to prevent the other from using its power (Morgan, 1977). Thus, deterrence involves a party's restriction of its partner's behavior by the employment of threat.

Bilateral deterrence theory suggests the following, assuming a constant degree of interdependence magnitude across dyads: the more asymmetrical interdependence is, the more likely the party with greater power would be to use its relative power (Lawler & Bacharach, 1987). This is so because the more powerful party in an asymmetrical relationship can more easily obtain the other's compliance (Kumar et al., 1995), and the less powerful party has a lower ability to deter its partner from exercising its own power (Lawler & Bacharach, 1987). Therefore, the more asymmetric power the manufacturer has over the supplier, the more the manufacturer can wield its power to force its supplier to meet its requirements for inventory level or price of supplied parts. These arguments lead to our fifth hypothesis:

H5. Given a constant degree of interdependence magnitude, as interdependence asymmetry increases in favor of the manufacturer, its reliance on vertical control increases.

2.5. Control mechanisms and performance

A manufacturer relying on vertical control provides guidelines to its supplier such as quality control procedures, production processes and inventory levels. The presence of such prescriptions fixes expectations from the supplier and improves its performance (Munro & Beamish, 1987; Rosson & Ford, 1982; Stern, El-Ansary, & Coughlan, 2002). Especially when the manufacturer closely monitors the supplier actions, the standards are better attained and the manufacturer extracts the desired terms from the supplier. For example, when a manufacturer observes by warehouse checks that the supplier's inventory of component parts is low, the manufacturer may try to force the supplier to increase the inventory levels in order to receive the desired amount of parts in a timely fashion. Thus our sixth hypothesis is:

H6. As the manufacturer's use of vertical control increases, the supplier's performance increases.

In a relationship where the norm of information sharing has developed, the parties are supposed to exchange pertinent information such as expected shortage of parts and expected changes in price and demand. With such information, both a manufacturer and its supplier can prepare for the changes in the market. For example, if the supplier obtains information from its manufacturer in advance about an upcoming high demand for the manufacturer's product, it can increase its inventory to prepare for the shortage of component parts. Also, if the manufacturer passes information about evaluations of received parts to the supplier as a matter of course and not by coercion, the latter could adjust the quality of its parts accordingly. In both cases, the changes in supplier strategy benefit the manufacturer. Therefore, we state our last hypothesis as:

H7. The dyad's reliance on the norm of information sharing will increase the supplier's performance.

3. Research methodology

3.1. Research setting and data collection

The context chosen for this study is the relationship between a manufacturer and its major supplier. The major supplier is the one from which the informant's company made the largest amount of purchases during the past year. This major supplier served as the referent for all questions in our mail survey. We selected the setting for reasons that are evident from theory: the major supplier is the one with whom the manufacturer is likely to have the most intense interactions, the highest degree of dependence, and the greatest need as well as opportunity to develop control mechanisms, be they unilateral or bilateral.

3.1.1. Sample and respondents

We conducted systematic random sampling of 806 companies from a mailing list of all Dun and Bradstreet in nine 2-digit SIC codes whose population is about 120,000 manufacturers. About half of the manufacturers were drawn from the electric

and electronic industries where companies experience uncertain environments, such as an unpredictable supply and parts prices (Heide & John, 1990; Terwiesch & Lock, 1999; Weiss & Heide, 1993). The rest of the companies belonged to industries such as leather and rubber products, which have relatively constant environments. In this way, we expected to create significant variance in environmental uncertainty and eliminate industry specific influences on governance.

In order to test for homogeneity of data between industries (electric and electronic companies versus the rest of group), *t*-tests comparing regional location of company, number of employees were performed. The *t*-tests indicated that there were no significant differences on these variables, suggesting that there is no difference between the electronic and electric industries and the rest of the industries.

As this research is focused on buyers' control mechanisms, we chose as key informants, the heads of purchasing departments of the manufacturing companies. Purchasing managers are responsible for securing materials from suppliers, hence they can be expected to be knowledgeable about the materials bought and to have a close relationship with suppliers (Hutt & Speh, 2000).

After the sampling frame for this study was set, 100 manufacturers were randomly selected for a pre-test. We conducted a pretest out of 37 purchasing managers who responded to pre-test questionnaire. Pre-test respondents were asked whether they felt competent enough to respond to the survey questions (e.g., Kumar, Stern, & Achrol, 1992). Informants were evaluated by their responses to the following questions: how long they have been (a) doing business with the supplier (14 years) and (b) working in their company (9 years). The informants were also asked how well they knew their suppliers in terms of their supplier's level of dependence on the informant's company—i.e. how much they knew about (d) supplier's costs of switching to other customers (5.8 out of 7), (e) their supplier's sales volume and profits generated from the relationship with the informant's company (5.9 out of 7). Finally, the informants were asked about (f) their knowledge of the supplied product (6.1 out of 7). This compares very well with the ratings that Kumar et al. (1992) reported on similar items. We therefore believe that the purchasing manager possessed sufficient knowledge regarding the constructs and relationship studied.

3.1.2. Procedure

Each purchasing manager in our sample was mailed 1) a questionnaire, 2) a cover letter with a request to complete the enclosed questionnaire, and 3) a postage paid return envelope. Two weeks after the first mailing, a second mailing was conducted.

Of the 806 questionnaires that were mailed, 24 (2.98%) were undeliverable. Of the remaining 782 delivered questionnaires, 163 were completed and returned for a response rate of 21%. All returned questionnaires were reviewed for completeness. One questionnaire with numerous missing answers was dropped from the sample. The remaining 162 questionnaires were used in our analysis. Since a conservative response rate in channels of distribution literature is 20% (Celly & Frazier, 1996), the 21% response rate of this study is reasonable. Furthermore, the effective response rate of 21% compares favorably with those obtained in prior channel research whose response rates from the sample of US manufacturers are between 14% and 29% (e.g., Buvik & John, 2000; Cannon, Achrol, & Gundlach, 2000; Doney & Cannon, 1997; Heide & John, 1992; Lusch & Brown, 1996; Noordewier, John, & Nevin, 1990).

3.1.3. Nonresponse bias

This was tested by comparing early respondents with late respondents (Armstrong & Overton, 1977). The respondents were divided into two equal groups based on the date of response (i.e., early respondents, late respondents). The mean values for each scale and characteristics of company and key informants (i.e., years of relationship with the supplier, years of experience as a purchasing manager in the company, vertical control, environmental uncertainty) were compared across the two groups. The results of this comparison indicated no significant differences between the two groups on those scales and characteristics, suggesting that the data are not skewed by nonresponse bias (The *p*-values for these comparisons ranged from .25 to .65).

3.2. Measure development

Measure development was carried out in two stages. In the first stage, existing measures for our constructs were gathered from the literature. In-depth interviews were conducted with three purchasing managers in the second stage. The convenience sampling technique was used to select interviewees. The purpose of these interviews was to check the relevance of the items developed in the first stage. Based on the inputs from the interviewed purchasing managers, we next revised the wording of some of the items. All items used a 7-point Likert scale where 1 meant "strongly disagree" and 7 meant "strongly agree".

The measurement scale for *environmental uncertainty* mainly captured the manufacturer's perception of uncertainty in several aspects of the supplied parts and components: price, production, availability, and provision of the supplied product (Noordewier et al., 1990). In order to compute the variables of *interdependence magnitude and interdependence asymmetry*, we measured supplier's dependence on the manufacturer and manufacturer's dependence on the supplier, as perceived by the manufacturer (see Table 1). Interdependence magnitude was obtained by taking the sum of both dependencies, whereas interdependence asymmetry (favoring the manufacturer) was calculated by subtracting the supplier's dependence from its buyer's dependence (Kumar et al., 1995). Thus, interdependence asymmetry reflects power in favor of the manufacturer (Jap & Ganesan, 2000). Manufacturer's dependence on the supplier was assessed by replacibility, switching costs, difficulty in changing partner, and overall dependence (Frazier, Gill, & Kale, 1989; Kumar et al., 1995, and Lusch & Brown, 1996). The supplier's dependence on the manufacturer was measured by the same four items, as perceived by the manufacturer.

Manufacturer's *vertical control* measured the extent to which a responding firm has influence on its supplier's production

Table 1
Construct measurement and validity assessment

Model: $\chi^2(192)=294.21$, $p=.00$; CFI=.92, IFI=.92, NNFI (Delta 2)=.91, RNI=.93, RMSEA=.058

Environmental uncertainty	CR: .73	SFL
Availability of major product in the market is highly uncertain.		.71
Uncertainty in the production of major product is a real problem in the market.		79
The supply of major product is not stable.		.54
Price for major product in the market is volatile.		*
Manufacturer's dependence on the supplier	CR: .79	
It would be difficult for your firm to replacemajor supplier's products with another supplier's product line.		70
The total costs of switching to a comparable supplier would be prohibitive for your firm.		.94
Your company could find other suppliers to replace current supplier.		*
Your company is strongly dependent on major supplier.		.53
Supplier's dependence on its manufacturer	CR: .76	
It would be difficult for major supplier to replace the sales and profits realized from your firm with another customer.		.71
Major supplier's total costs of switching to another comparable customer would be prohibitive.		.77
Major supplier could find other buyers to replace your company.		*
Major supplier is strongly dependent on your company.		.52
The vertical control mechanism	CR: .81	SFL
Major supplier's production processes are to a large extent determined by your firm's requirements.		.81
Major supplier's engineering changes are to a large extent determined by your firm's requirements.		.59
Major supplier's level of inventory is to a large extent decided by your firm.		57
Your firm influences to a large extent major supplier's part-price.		.52
Major supplier's quality control procedures are to a large extent decided by your firm.		.65
The norm of information sharing	CR: .80	
It is expected that both your firm and major supplier share information that might help the other company.		.73
Your firm is supposed to exchange information with major supplier regularly.		.72
It is expected that both your firm and major supplier provide proprietary information if it can help the other company.		.46
It is expected that both your firm and major supplier keep each other informed about changes that may affect the other company.		.72
Supplier's performance	CR: .78	
Your firm is satisfied with major supplier's product quality.		.75
The service provided by major supplier is satisfactory.		.63
Your firm is satisfied with the overall supplying of major supplier.		.75
Your firm is satisfied with the on-time delivery performance of major supplier.		.66

*Items deleted from further analysis due to low factor loadings or high cross-loadings.
SFL = standardized factor loading, CR = composite reliability.

processes, engineering changes, level of inventory, price of supplied parts, and quality control process (Heide & John, 1992). *The norm of information sharing* assesses the extent to which the manufacturer expects that both the manufacturer and the major supplier will share information to help each other (Heide & John, 1992). Finally, *supplier performance* was defined as the manufacturer's overall satisfaction with the supplier's performance, and measured with the respondents' evaluation of their suppliers' product quality, services, and speed of delivery (Doney & Cannon, 1997).

3.3. Construct validity

This study consists of two-step approach. In the first stage, we purified and formed the 6 constructs. In the second stage, we tested our hypotheses using the seven scales, including power magnitude and power asymmetry. This multistage approach was necessary because of the special nature of the power/interdependence constructs. An alternative approach would have been to derive the constructs from the item pools based on the measurement part of a LISREL model and simultaneously test the structural part that linked the constructs to each other. This approach would have been possible if we entered manufacturer's and supplier's dependence as separate constructs in our conceptual model. The theory of this study, however, is not built on manufacturer's and supplier's dependence, but instead on total interdependence magnitude and interdependence asymmetry. These latter constructs can be calculated only after two dependence factors (buyer's dependence and supplier's dependence) were formed. For instance, interdependence magnitude was obtained by taking the sum of the factor of buyer's dependence and the factor of supplier's dependence, whereas interdependence asymmetry is calculated by the deduction of the factor buyer's dependence from the factor of supplier's dependence (Kumar et al., 1995). A multistage approach was therefore necessary to test our model including interdependence magnitude and interdependence asymmetry.

In the first stage, exploratory factor analysis of responses to items was performed. Based on the results, some of the items with low loadings with intended factors were removed from the scales. For example, for one item, the ease of replacing the current supplier with another, did not correlate well with the other items measuring manufacturer's dependence. The same item used for supplier's dependence also did not converge with the rest of the items. One item for environmental uncertainty, price for major product in the market is volatile, was dropped due to low factor loading. Thus, three items were dropped from their respective scales (see Table 1). Then, reliability analyses were run for each construct to see if all the measures show satisfactory reliability. The scale reliabilities ranged between .73 and .81. The subsequent reduced sets of items were subjected to confirmatory factor analysis using LISREL 8.72.

Confirmatory factor analyses were run to assess the convergent and discriminant validity of the measures. We put all the constructs and items into a model (e.g., Bentler & Chou, 1987). The model fits the data satisfactorily (Model: $\chi^2(192)=294.21$, $p=.00$; CFI=.92, IFI=.92, NNFI (Delta 2)=.91, RNI=.93,

Table 2
Assessment of discriminant validity

	UNCERT	BUYDEP	SUPDEP	UCONTR	INFOR	PERF
UNCERT	–					
BUYDEP	143.43	–				
SUPDEP	92.30	49.56	–			
UCONTR	99.68	144.56	70.72	–		
INFOR	142.80	127.04	115.88	88.32	–	
PERF	76.86	158.48	105.82	168.22	60.92	–

χ^2 differences between the fixed and free solution (significant at the $p<.01$ level (for 1 *df*).

Table 3
Correlation matrix

	UNCERT	BUYDEP	SUPDEP	UCONTR	INFOR	PERF
UNCERT	1.00					
BUYDEP	.24	1.00				
SUPDEP	.26	.48	1.00			
UCONTR	.41	.24	.42	1.00		
INFOR	−.23	.10	.14	.03	1.00	
PERF	−.36	−.04	−.17	−.09	.47	1.00
Mean	11.72	11.71	10.79	12.02	20.81	23.08
Sdev	4.32	4.23	3.92	5.60	4.39	3.17
Num items	4	3	3	5	4	4

RMSEA = .058). All the factor loadings were highly significant ($p<.01$), which shows unidimensionality of the measures (Gerbing & Anderson, 1988).

Convergent validity was assessed by comparing the coefficient and standard error of each item in the model. Convergent validity is supported if an item's coefficient is more than twice its standard error (Anderson & Gerbing, 1988). In this study, the item coefficients were 4 to 12 times larger than their standard errors, which provided evidence of convergent validity.

Discriminant validity of all 6 latent constructs was tested through χ^2 difference tests. All the constructs in pairs were tested if the restricted model (in which the correlation was fixed as one) was significantly worse than the freely estimated model (in which the correlated was estimated freely). All the χ^2 differences were significant ($p<.05$), which shows the evidence for discriminant validity (Gerbing & Anderson 1988) (see Table 2). The results of CFA such as goodness-of-fit index, factor loadings, and reliability coefficients are reported in Table 1.

In the second stage, power magnitude and power asymmetry were derived from the dependence scales. Next, we tested our hypotheses using the six scales, including power magnitude and power asymmetry.

4. Analysis and results

The structural model that incorporates the hypothesized relationships was tested with LISREL (see Fig. 1). The three exogenous variables were environmental uncertainty (UNCERT), interdependence magnitude (TOTPOW), and interdependence asymmetry (ASYPOW). The four endogenous variables were vertical control (UCONTR), the norm of information sharing (INFOR), and supplier's performance (PERF). The correlations among these variables are presented in Table 3.

4.1. Test of the hypotheses

The results in Table 4 show that environmental uncertainty negatively influences manufacturer's reliance on the norms of information sharing and positively influences its reliance on vertical control ($\gamma_{21}=-.30$, $t=-3.76$) ($\gamma_{11}=.32$, $t=4.55$). Thus, we found support for H1 and H2.

We did not find that interdependence magnitude negatively influences manufacturer's reliance on vertical control, as was hypothesized in H3. The results in Table 4 show that interdependence magnitude actually increases manufacturer's dependence on vertical control ($\gamma_{12}=.29$, $t=4.11$). In order to find a possible explanation, we performed a regression analysis where we separately regressed vertical control on manufacturer's power and supplier's power. The results showed that only manufacturer's power had a significant and positive relationship with vertical control (.39, $p=.00$), whereas the supplier's power did not have any relationship with vertical control (.05, $p=.58$). Therefore, the link between power magnitude and vertical control is strongly influenced by the manufacturer's power and not by the total power magnitude in the relationship. This explains the unexpected positive relationship between vertical control and power magnitude. When it comes to a decision on the use of

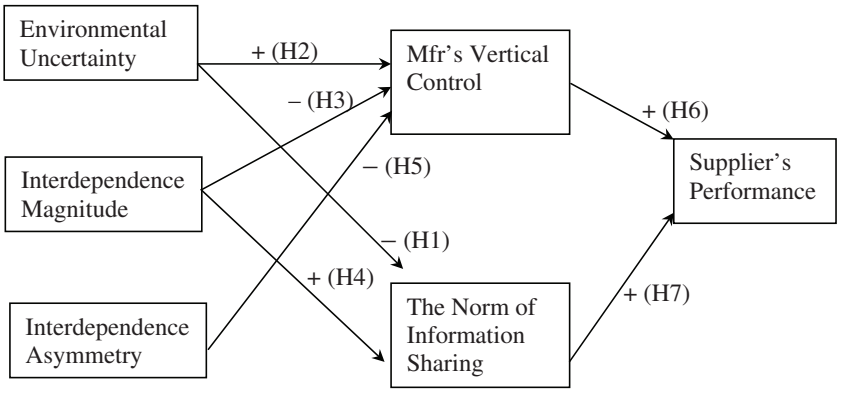

Fig. 1. Hypothesized model: effects of environments on control mechanisms and performance.

Table 4
Results of LISREL analysis

Description	Hypotheses		Hypothesized model		Revised model	
	Number	Sign	Coefficient	*t*-value	Coefficient	*t*-value
VOLAT→INFOR	H1	−	−.30	−3.76	−.30	−3.75
VOLAT→UCONTR	H2	+	.32	4.55	.32	4.55
TOTPOW→UCONTR	H3	−	.29	4.11	.29	4.11
TOTPOW→INFOR	H4	+	.23	2.92	.23	2.92
ASYPOW→UCONTR	H5	+	.17	2.47	.17	2.47
UCONTR→PERF	H6	−	−.10	−1.45*	−.00	−0.05*
INFOR→PERF	H7	+	.47	5.72	.29	3.66
VOLAT→PERF					−.27	−3.56
			χ^2=20.38		χ^2=9.32	
			df=5		*df*=4	
			p<.001		*p*<.053	
			GFI=.96		GFI=.98	
			CFI=.87		CFI=.96	
			IFI=.88		IFI=.96	
			NNFI (Delta 2)=.86		NNFI (Delta 2)=.90	
			RNI=.88		RNI=.97	
			RMSEA=.14		RMSEA=.092	

*Nonsignificant.

vertical control, the manufacturer gives more weight to its own power than to the supplier's power. The manufacturer appears to be unafraid of using its power for its own benefit and is not threatened by the supplier's retaliation.

We found, as was hypothesized in H4, that power magnitude increases manufacturer's reliance on the norm of information sharing (γ_{22}=.23, t=2.92). Regarding H5, we found support that manufacturer's asymmetrical power over its supplier positively influences the adoption of vertical control (γ_{13}=.17, t=2.47).

Findings indicated that H6 was not supported (β_{41}=−.10, t=1.45). We had hypothesized that vertical control would enhance supplier performance. However, statistical results suggest that the use of vertical control fails to influence supplier performance. Regarding H7, the statistical results indicated that the norm of information sharing improves supplier's performance (β_{42}=.47, t=5.72), which supported our hypothesis (see Table 4).

4.2. Discussion of the revised model

In the initial test of the hypothesized model, the LISREL modification indices suggested that adding a path linking environmental uncertainty to supplier's performance would improve the fit of the model to the data (see Table 4). The negative sign of the path suggests that an increase in environmental uncertainty would lead to a decrease in the supplier's performance (t=−3.24, p<.01). The path was added because there is a substantive reason for the direct link. Under high uncertainty the strongest forces could be totally external to the dyad and not under either's control. For instance, uncertain environments such as an unpredicted shortage of raw materials in the market or volatile prices force suppliers to increase price or do not allow the supplier to supply the parts on time. If these forces are such that even the manufacturer's vertical control over the supplier cannot enhance the supplier's performance, then uncertainty influences supplier's performance directly and negatively, unmediated by manufacturer's attempts at control.

Before the path between uncertainty and supplier's performance was added, the path from vertical control to the supplier's performance had shown a negative relationship, even though it was weak (β_{41}=−.10, t=−1.43). However, the path from vertical control and supplier's performance disappeared (β_{41}=.00, t=.05) when the path from uncertainty to performance was added. This suggests that environmental uncertainty directly influences manufacturer's perception of the supplier's performance as opposed to indirectly through manufacturer's vertical control (see Fig. 2).

The revised model provided a good fit for the data. The model χ^2 was 9.32 with 4 degrees of freedom (*df*). This yielded χ^2/df ratio of 2.33. This was below the usual cutoff of 3 (Mueller, 1996), so it was satisfactory. In addition, the comparative fit index (CFI) was .96. In general, CFI values of .9 and higher indicates an acceptable fit (Bentler, 1990).

5. Discussion

This study proposed and tested control mechanisms in the relationship between a manufacturer and its supplier: the influence of environment uncertainty and inter-organizational dependence on control mechanisms; and the effect of control mechanisms on the performance. The model we arrived at, shown in Fig. 2, supports most of our hypotheses with a few exceptions and some additional specifications that are highly interpretable as we will now discuss.

We found that manufacturers' reliance on vertical control increases as environmental uncertainty and power asymmetry increase. In contrast, manufacturers' dependence on the norm of information sharing increases as interdependence magnitude increases and as environmental uncertainty decreases. Finally, the manufacturer's reliance on the norms of information sharing enhances the suppliers' performance. The results are consistent

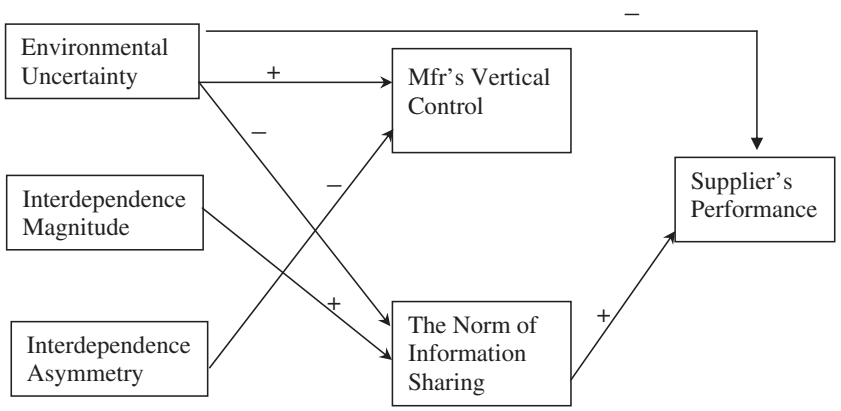

Fig. 2. The revised model.

with the prediction of TCA (Williamson, 1991), which foretell the adoption of unilateral control under environmental uncertainty. However, the positive influence of bilateral control on performance implies that TCA need to consider bilateral control mechanism as an alternative to unilateral control mechanism that might influence interfirm performance.

The introduction of a link between uncertainty and supplier's performance affects some aspects of interpretation of our model: the links between the norm of information sharing control and supplier's performance take on a stronger meaning. Namely, the norm of information sharing has a positive effect on supplier's performance after adjustment for uncertainty. In other words, at each level of uncertainty, the norm of information sharing has a positive effect. This underscores the effectiveness of bilateral control mechanisms: while the model says that norm of information sharing is less likely under conditions of high uncertainty, if it is used, it does have a positive effect on the supplier's performance.

Among the unsupported hypotheses was the cited negative relation between interdependence magnitude and vertical control, for which in fact the opposite was true ($p<.01$). We indicated that it is the manufacturer's power that determines the use of vertical control: if it has the power, it will use it. We showed this by a direct regression analysis of vertical control on interdependence magnitude (and control variables), but an intuitive argument can be derived from the original LISREL analysis: Denoting by manufacturer's power (MPOW) and supplier's power (SPOW), respectively, the equation for UC ONTR becomes UCONTR=.29 TOTPOW+.17 ASY POW+ …=.29 (MPOW+SPOW)+.17 (MPOW−SPOW)+…=.46 MPOW+.12 SPOW+…, which shows a significant dependence of UCONTR on MPOW, but an insignificant one on SPOW, although .12 SPOW is still big enough not to be ignored. In our context, this finding contradicts some of the predictions of bilateral deterrence theory; the constructs of interdependence magnitude and asymmetry appear less useful for predicting vertical control than the raw dependence of the supplier on the manufacturer or the manufacturer's dependence on the supplier.

The other major unsupported hypothesis was the negative relationship between vertical control and supplier's performance. Against our expectations, supplier performance is unrelated to manufacturer's attempts at vertical control. Here is a possible explanation: vertical control is a preventive measure used by the manufacturer to control potential opportunistic behaviors. However, the vertical control mechanism is likely to insult the supplier's sense of autonomy, which would result in a less cooperative response from the supplier when the buyer urgently needs the supplier's support (Green, 2000). Thus, the negative feeling prohibits the supplier from actively responding to the manufacturer's request, which could incur non-negligible enforcement costs to the manufacturer. Further research is needed to verify this alternative explanation.

There are several limitations. First, this study did not employ a longitudinal design, although most of the hypotheses suggest an evolutionary relationship between the dependent and independent variables. For instance, a certain amount of time needs to pass for a control mechanism to take effect on performance. A certain amount of time also needs to pass for exchange parties to develop relational norms (Gundlach & Achrol, 1993). Thus, the models of control mechanisms could get a more robust test from a longitudinal study.

Another limitation is that this research explores only a subset of the vertical control mechanisms. Manufacturers might use other types of control mechanisms whose effect on supply performance might differ from vertical control. For instance, a manufacturer may have a vertical contract that favors the manufacturer over the supplier. Since the contract legally binds exchange parties to implement a specific action, its effect on supply performance might be opposite to the one produced by the power based vertical control. Therefore, other types of control mechanisms should be included in future research to observe their relationships with environments and performance.

Our understanding of control mechanisms could be increased by studying the cultural influence (i.e., national culture, or industrial culture) on the manufacturer's reliance on different types of control mechanisms. Among the dimensions of national culture (Hofstede, 1991), collectivism and long-term orientation culture may induce manufacturers to rely on the norm of information sharing, because relational norms relate to collective rather than individual goals, and they evolve through repeated exchanges over extended periods of time. Unique industry

culture (Thomas & Soldow, 1988) could influence inter-organizational control mechanisms. Thus, future research should investigate the influence of national and industry culture on interfirm control mechanisms.

5.1. Managerial implication

This study has several managerial implications. Most importantly it shows that the development of a bilateral control mechanism, the norm of information sharing, is one of the key factors for the manufacturer to achieve a high level of performance from the supplier. Thus, manufacturers should find a way to increase the norm of sharing information in the relationship with their suppliers.

This study shows that the norm of sharing information develops when both manufacturer and its supplier are highly dependent on each other. Hence, manufacturers should select suppliers with an eye towards the likely evolution of inter-organizational dependence: everything else being equal, those suppliers with whom high mutual dependence can be expected in the future are preferable.

In existing relationships, manufacturers may want to work towards increased interdependence, so that the norm of sharing information is more likely to develop. This could be achieved by increasing the portion of purchasing volume from a given supplier. Likewise, the manufacturer could try to increase the demand for its products in the output market by increasing its marketing effort, improving product quality, or increasing production efficiency. This would give the manufacturer a chance to eventually increase its dependence on the supplier.

A manufacturer can increase total dependence by increasing its supplier's dependence. For example, the manufacturer can ask the supplier to participate in the manufacturer's new product development (Green, 2000). This will allow the supplier to develop parts that are compatible with the manufacturer's product. Since the time and effort spent by a supplier on developing the new parts are dedicated to the relationship with the manufacturer, the supplier's dependence on the manufacturer increased (Heide & John, 1988).

Surprisingly, vertical control is not as beneficial as it is often thought to be: we were unable to establish a positive relationship with supplier's performance. On the other hand, our data does not suggest any relationship either. This result might be due to the mixed nature of vertical control (i.e., Ouchi, 1979; Williamson, 1991). While vertical control can always be used to prevent opportunistic behaviors of suppliers (Williamson, 1991), it requires a substantial amount of time and resources from the manufacturer and hence high costs (Stump & Heide, 1996). For example, delay in delivery and a lower product quality may require the manufacturer to spend significant time and resources to put pressure on suppliers for improvements (Noordewier et al., 1990). Thus, although manufacturer's vertical influence on the supplier's decision-making provides the manufacturer with a certain level of control over the supplier, it generates costs. Manufacturers therefore should be cautioned against assuming that their vertical control decisions on supplier strategies are always optimal. Our findings suggest that manufacturers better avoid using power in their relationships with suppliers, and instead develop relational norms for better supply performance.

Manufacturers must be mindful of the strength of the forces from the external environment. This was brought home to us by the need to introduce in our model, a direct link between environmental uncertainty and supplier's performance. Supplier's unsatisfactory performance may be caused by market forces outside of its control. Unsatisfactory performance under conditions of high uncertainty therefore should not be automatically attributed to supplier's ill-will or ineptitude. Although uncertain environments allow suppliers to engage in self-interest seeking behavior, it might be that they increase price to manufacturers due to the high price they have to pay for raw materials. Or it might be that they cannot supply the component parts on time because they themselves face a shortage of materials. Thus, manufacturers should be tuned to these issues, or else they might make unwarranted and costly decisions to switch to other suppliers.

Our results concerning interdependence magnitude show that when the manufacturer has the power (i.e., when the supplier is dependent), it is not afraid of using it in the form of vertical control. However, our findings also show that there is no effect of vertical control on supplier performance. Taken together, these results suggest that vertical control is more of an effective preventive mechanism to curb opportunistic tendencies by fixing rules and expectations. Or alternatively, manufacturers are not the best qualified to unilaterally shape supplier decisions to guarantee best possible supply performance. Bilateral mechanisms that involve both parties and that aim for mutual benefit are more successful for that purpose.

Acknowledgement

The authors thank Dr. Elizabeth Wilson (Suffolk University) and Dr. Stephen Kim (Oregon State University) for valuable comments.

References

Achrol, R., & Stern, L. (1988, February). Environmental determinants of decision-making uncertainty in marketing channels. *Journal of Marketing Research*, *25*, 36−50.

Aiken, M., & Hage, G. (1968). Organizational interdependence and intra-organizational structure. *American Sociological Review*, *33*, 912−930.

Anderson, J. C., & Gerbing, D. W. (1988). Structural equation modeling in practice: A review of recommended two-step approach. *Psychological Bulletin*, *103*(3), 411−423.

Argote, L. (1982, September). Input uncertainty and organizational coordination in hospital emergency units. *Administrative Science Quality*, *27*, 420−434.

Armstrong, S., & Overton, T. (1977, August). Estimating non-response bias in mail surveys. *Journal of Marketing Research*, *14*, 396−402.

Bacharach, S., & Lawler, E. (1981). *Bargaining: Power, tactics, and outcomes* San Francisco: Jossey-Bass.

Bello, D., & Gilliland, D. (1997, January). The effect of output controls, process controls, and flexibility on export channel performance. *Journal of Marketing*, *61*, 22−38.

Bentler, P. (1990). Comparative fit indices in structural equation modeling. *Psychological Bulletin*, *107*(2), 238−246.

Bentler, P., & Chou, C. P. (1987, August). Practical issues in structural modeling. *Sociological Methods and Research*, *16*, 78−117.

Brown, J., Dev, C., & Lee, D. -J. (2000). Managing marketing channel opportunism: The efficacy of alternative governance mechanisms. *Journal of Marketing*, *64*(2), 51−65.

Buvik, A., & John, G. (2000, October). When does vertical coordination improve industrial purchasing relationships? *Journal of Marketing*, *64*, 52−64.

Cannon, J., Achrol, R., & Gundlach, G. (2000). Contracts, norms, and plural form governance. *Journal of the Academy of Marketing Science*, *28*(2), 180−194.

Cartwright, B., & Schwartz, R. (1973). The invocation of legal norms: And empirical investigation of Durkheim and Weber. *American Sociological Review*, *38*, 340−354.

Celly, K., & Frazier, G. (1996, May). Outcome-based and behavior-based coordination efforts in channel relationships. *Journal of Marketing Reseatch*, 33, 200-210.

Coleman, J. (1990). *Foundations of social theory.* Cambridge, MA: Harvard University Press.

Doney, P., & Cannon, J. (1997, April). An examination of the nature of trust in buyer–seller relationships. *Journal of Marketing*, *61*, 35−51.

Dwyer, R., Schurr, P., & Oh, S. (1987, April). Developing buyer–seller relationships. *Journal of Marketing*, *51*, 11−27.

Emerson, R. M. (1962). Power-dependence relations. *American Sociological Review*, *27*, 31−41.

Eyuboglu, N., Ryu, S., & Tellefsen, T. (2003). Current and future interdependence: Effects on channel relationship. *Journal of Marketing Channels*, *11*(1), 3−26.

Foa, U. G., & Foa, E. B. (1974). *Societal structures of the mind.* Springfield, IL: Charles C. Thomas.

Frazier, G., & Antia, K. (1995). Exchange relationship and interfirm power in channels of distribution. *Journal of the Academy of Marketing Science*, *23* (4), 321−326.

Frazier, G., Gill, J., & Kale, S. (1989, January). Dealer dependence levels and reciprocal actions in channel of distribution in a developing country. *Journal of Marketing*, *53*, 50−69.

Gaski, J. (1984, Summer). The theory of power and conflict in channels of distribution. *Journal of Marketing*, *48*, 9−29.

Gerbing, D., & Anderson, J. (1988, May). An updated paradigm for scale development incorporating unidimensionality and its assessment. *Journal of Marketing Research*, *25*, 186−192.

Green, J. (2000, October). Tight squeeze at Chrysler. *Business Week*, *9*, 54.

Gundlach, G., & Achrol, R. (1993). Governance in exchange: Contract law and its alternatives. *Journal of Public Policy and Marketing*, *12*(2), 141−155.

Heide, J. B. (1994, January). Interorganizational governance in marketing channels. *Journal of Marketing*, *58*, 71−85.

Heide, J. B., & John, G. (1988, January). The role of dependence balancing in safeguarding transaction-specific assets in conventional channels. *Journal of Marketing*, *52*, 20−35.

Heide, J. B., & John, G. (1990, February). Alliance in industrial purchasing: The determinants of joint action in buyer–supplier relationships. *Journal of Marketing Research*, *27*, 24−36.

Heide, J. B., & John, G. (1992, April). Do norms matter in marketing relationships? *Journal of Marketing*, *56*, 32−44.

Hofstede, G. (1991). *Cultures and organizations: Software and mind.* London: McGraw-Hill.

Hutt, M., & Speh, T. (2000). *Business marketing management: A strategic view of industrial and organizational markets.* Orlando, FL: Harcourt College Publisher.

Jap, S., & Ganesan, S. (2000, May). Control mechanisms and the relationship life cycle: Implications for safeguarding specific investments and developing commitment. *Journal of Marketing Research*, *37*, 227−245.

Jaworski, B. J. (1988, July). Toward a theory of marketing control: Environmental context, control types, and consequences. *Journal of Marketing*, *52*, 23−39.

John, G., & Weitz, B. (1988, Fall). Forward integration into distribution: An empirical test of transaction cost analysis. *Journal of Law, Economics, and Organization*, *4*, 337−355.

Klein, S., Frazier, G., & Roth, V. (1990, May). A transaction cost analysis model of channel integration in international markets. *Journal of Marketing Research*, *27*, 196−208.

Kumar, N., Scheer, L., & Steenkamp, J. -B. E. M. (1995, August). The effect of perceived interdependence on dealer attitudes. *Journal of Marketing Research*, *32*, 348−356.

Kumar, N., Stern, L. W., & Achrol, R. (1992, May). Assessing reseller performance from the perspective of the supplier. *Journal of Marketing Research*, *29*, 238−253.

Lawler, E., & Bacharach, S. (1987). Comparison of dependence and punitive forms of power. *Social Forces*, *66*(2), 446−462.

Lawrence, P. R. (1981). Organization and environment perspectives. In A. H. Van de Ven & W.F. Joyce (Eds.), *Perspectives in organization design and behavior*. New York: John Wiley.

Leenders, M. R., & Fearon, H. E. (1993). *Purchasing and materials management.* Homewood, IL: Richard D. Irwin.

Lusch, R., & Brown, J. (1996, October). Interdependency, contracting, and relational behavior in marketing channels. *Journal of Marketing*, *60*, 19−38.

Macneil, I. R. (1980). *The new social contract.* New Haven, CT: Yale University.

Mentzer, J. T., Min, S., & Zacharia, Z. G. (2000). The nature of interfirm partnering in supply chain management. *Journal of Retailing*, *76*(4), 549−568.

Morgan, M. P. (1977). *Deterrence: A conceptual analysis.* Beverly Hills, Califonia: Sage.

Mueller, R. (1996). *Basic principles of structural equation modeling.* New York: Springer.

Munro, H. J., & Beamish, P. W. (1987). Distribution methods and export performance. In P. J. Rosson S.D. Reid (Eds.), *Market entry and expansion models* (pp. 316−331). New York, NY: Praeger Publishers.

Noordewier, T., John, G., & Nevin, J. (1990, October). Performance outcomes of purchasing arrangements in industrial buyer–vendor relationships. *Journal of Marketing*, *54*, 108−122.

Ouchi, W. G. (1979). A conceptual framework for the design of organizational control mechanisms. *Management Science*, *25*(9), 833−848.

Rindfleisch, A., & Heide, J. B. (1997, October). Transaction cost analysis: Past, present, and future applications. *Journal of Marketing*, *61*, 30−54.

Rosson, P. J., & Ford, I. D. (1982, Fall). Manufacturer–overseas distributor relations and export performance. *Journal of International Business Studies*, 57−73.

Ryu, S., & Eyubolgu, N. (2004). Environments and performance: The mediating effect of unilateral and bilateral control mechanisms in buyer–seller relationships. *2004 AMA Winter Educator's Conference, Scottsdale, AZ*.

Sachdev, H., Bello, D., & Pilling, B. (1994). Control mechanism with export channels of distribution. *Journal of Global Marketing*, *8*(2), 31−50.

Scott, W. R. (1992). *Organizations: Rational, natural, and open systems.* New Jersey: Prentice Hall.

Spekman, R. E. (1988). Strategic supplier selection: Understanding long-term buyer relationships. *Business Horizons*, *31*(4), 75−81.

Stern, L., El-Ansary, A., & Coughlan, A. (2002). *Marketing channels.* Upper Saddle River, NJ: Prentice Hall.

Stump, R., & Heide, J. B. (1996, November). Controlling supplier opportunism in industrial relationships. *Journal of Marketing Research*, *33*, 431−441.

Terwiesch, C., & Loch, C. (1999). Measuring the effectiveness of overlapping development activities. *Management Science*, *45*(4), 455−465.

Thibaut, J. (1968). The development of contractual norms in bargaining: Replication and variation. *Journal of Conflict Resolution*, *12*(1), 102−112.

Thomas, G. P., & Grashof, J. (1982). Impact of internal and external environmental stability on the existence of determinant buying rules. *Journal of Business Research*, *10*, 159−168.

Weiss, A., & Heide, J. B. (1993, May). The nature of organizational search in high technology markets. *Journal of Marketing Research*, *30*, 220−233.

Weitz, B., & Jap, S. (1995). Relationship marketing and distribution channels. *Journal of the Academy of Marketing Science*, *23*(4), 305−320.

Williamson, O. (1975). *Markets and hierarchies.* New York: The Free Press.

Williamson, O. (1985). *The economic institutions of capitalism.* New York: The Free Press.

Williamson, O. (1991). Comparative economic organization: The analysis of discrete structural alternatives. *Administrative Science Quality*, *36*, 269−296.

Dr. Ryu is Associate Professor of School of Business at Sungkyunkwan University. He specializes in the areas of channels of distribution, business-to-business marketing, and global supply chain management. He has publications in Journal of Business Research, Organization Science, Journal of Business and Industrial Marketing, Journal of Business-to-Business Marketing, and Journal of Marketing Channels.

Nermin Eyuboglu is Associate Professor of Marketing at the Zicklin School of Business, Baruch College. She received her Ph.D. in Marketing from the University of North Carolina at Chapel Hill. Her research interests include behavioral aspects of distribution channels, business to business marketing, measure development and assessment, and survey methodology. Her research has appeared in Multivariate Behavioral Research, Journal of Personal Selling and Sales Management, Psychology and Marketing, Journal of Marketing Channels, and others.