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Environments and Performance:

The Mediating Effect of Unilateral and Bilateral Control Mechanisms

by

Sungmin Ryu

A dissertation submitted to the Graduate Faculty in Business in partial fulfillment of the requirements for the degree of Doctor of Philosophy. The City University of New York

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Abstract

Environments and Performance:

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Sungmin Ryu

Advisor: Professor Nermin Eyuboglu

There is a general problem facing the manufacturer in environmental uncertainty: how does one conduct exchanges with suppliers that possess power in that relationship? A hypothesis derived from transaction cost theory is that vertical control over the partner resolves the problem. However, recent research about relational norms suggests that bilateral control mechanisms could be an alternative to vertical control mechanisms. Therefore, the key question for the manufacturer is which control mechanism is more suitable in dealing with environmental uncertainty and the different power configurations in the relationship.

This dissertation proposes hypotheses for control mechanisms that deal with the internal and external environments. Furthermore, there are additional hypotheses concerning the effect of the control mechanism on the manufacturer's buying performance. Thus, a comprehensive model for control mechanisms in the buyer-seller relationship is proposed.

According to the statistical analysis, a manufacturer's reliance on the unilateral control mechanism increases as environmental volatility, interdependence asymmetry, and supplier's dependence increase. In contrast, the manufacturer's reliance on the

bilateral control mechanisms increases as the interdependence magnitude increases, and also as the interdependence asymmetry and environmental volatility decrease. A manufacturer's buying performance increases as a reliance on the bilateral control mechanism increases, and also as dependence on the unilateral control mechanism decreases.

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I. Introduction

Environmental uncertainty leads to difficulty in making accurate predictions about the state of an environment (Achrol and Stern 1988). A general problem faces the manufacturer in environmental uncertainty: how does one conduct exchanges with a supplier that possesses power in that relationship. Power is the degree to which one party can influence another party to undertake an action (Emerson 1962). Uncertain environments (e.g., a volatile supply of parts or the shortage of product supplied) should lead to difficulty achieving objectives, such as having a suitable inventory to meet a higher or lower demand. This difficulty induces the manufacturer to develop control mechanisms, i.e., ways to achieve control over the supplier, through which it reduces such costs (Klein, Frazier, and Roth 1990). However, the manufacturer is confronted with the question: what kind of control mechanism is suitable for dealing with the external environment (environmental uncertainty; Ouchi 1979) and the internal environment (power structures with a partner).

An approach derived from transaction cost theory is to reduce the effect of environmental uncertainty. 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, Frazier, and Roth 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. The unilateral control mechanism is one party's directives aimed at controlling the activities of another (Bello and Gilliland 1997).

However, transaction cost theory does not fully consider the bilateral control mechanism as an alternative in dealing with environmental uncertainty (Gundlach and Achrol 1993). The bilateral control mechanism is the reliance on a shared set of implicit principles that coordinate the activities of both exchange parties (Weitz and Jap 1995; Heide 1994). 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 shared set of implicit principles or mutual coordination of exchange parties. Heide and other transaction cost theorists (Rindfleisch and Heide 1997; Heide and John 1992) treat the bilateral control mechanism as a way of achieving unilateral control, i.e., the vertical integration of the partner. However, the unilateral control mechanism is based on the power of one party to control other exchange partners, whereas the bilateral control mechanism is based on voluntary cooperation for their mutual benefit (Weitz and Jap 1995). If a mechanism exists that protects each party's interest, then the parties do not have any reason to resort to unilateral control that results in the pursuit of only one party's interest (Ouchi 1979). Therefore, in short summary, transaction theorists have not considered the bilateral control mechanism as an alternative control mechanism for

resolving environmental uncertainty- as opposed to the unilateral control mechanism. To date, no one has systematically studied the relationship between environmental uncertainties and control mechanisms.

In addition to this gap in the literature, other theorists have overlooked the effect of power on control mechanisms, with the exception of Heide (1994). Heide (1994) shows that there is a positive relationship between the generation of a bilateral control mechanism and a symmetric, as well as a high interdependence structure. However, there is no explanation about which interdependence structure influences the adoption of unilateral control mechanisms. Thus, he does not portray the overall picture in terms of the power structures in which control mechanisms are appropriate.

The purpose of this paper is to enhance our understanding of how control mechanisms are used in the context of the manufacturer (buyer) and the supplier (seller) relationship. I will present a comprehensive model of a manufacturer's control mechanisms that explains control phenomena between the manufacturer and the supplier. In this model, I will extend the explanatory power of transaction cost theory to encompass the manufacturer's perspective.

I hope to contribute to the clarification of the conditions under which a specific control mechanism is developed. Exchange parties need to use the appropriate types of control mechanisms best suited to their environments (Sachdev, Bello, and Pilling 1994). On the basis of the existing literature, it is not clear which specific condition favors which control mechanisms (Heide 1994). My contention is that existing power structures

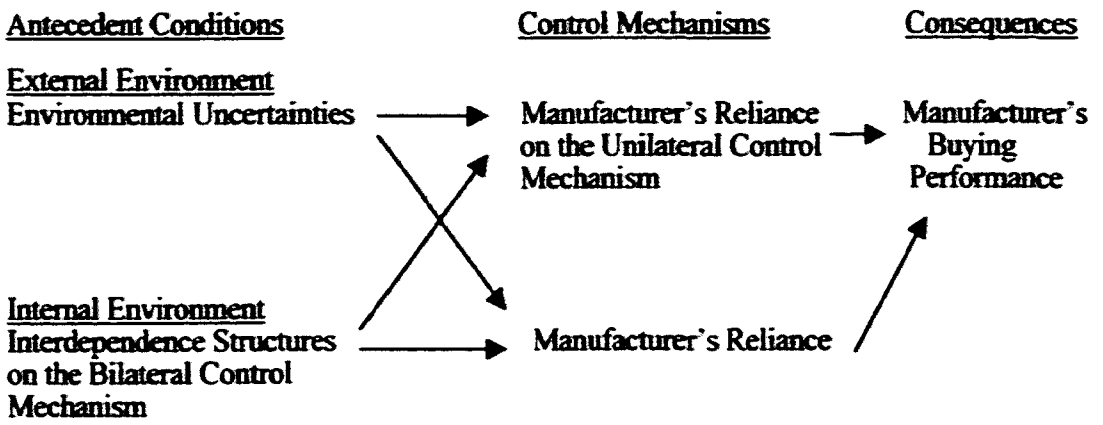
between manufacturer and supplier and environmental uncertainty are antecedents influencing the development of bilateral and unilateral control mechanisms.

My research will provide researchers with a logical explanation of when and how power influence relationalism. In this sense, it could make a key contribution in the dialog between those who emphasize relationalism (e.g., Morgan and Hunt 1994) and those who emphasize power (e.g., Frazier 1999).

My research will also examine the effect of control mechanisms on performance. To date, how different control mechanisms perform in the buyer-seller relationship has not been explored (Jap and Ganesan 2000). The control mechanisms that are employed by a manufacturer will contribute to the manufacturer's buying performance. This study will also be very useful to practitioners who are trying to determine the best way to manage inter-firm relationships.

In the next section, I will discuss the theoretical background for control mechanisms, interdependence structures, environmental uncertainty, and performance. The research hypotheses are provided in the subsequent section. The methodology section follows the section on hypotheses.

Figure 1
A Model of Manufacturer's Control Mechanisms



II. Theoretical Background

II-A. Control Mechanisms between the Manufacturer and the Supplier

II-A-1. Introduction

Researchers have explored the control mechanisms that exist between organizations (Weitz and Jap 1995, Heide 1994) and within organizations (Ouchi 1979). They identify two types of organizational control mechanisms: the unilateral control mechanism and the bilateral control mechanism[1].

The distinction between unilateral and bilateral control mechanisms is based on whether both the manufacturer and the supplier participate in making decisions (Weitz and Jap 1995). While the bilateral control mechanism is based on both exchange parties' active participation in decision-making, the unilateral control mechanism relies on a manufacturer forcing its supplier to follow its decision-making.

The key characteristic of the unilateral control mechanism suggested by Heide (unilateral governance), Ouchi (bureaucratic control), and Weitz and Jap (authoritative control) is one party's reliance on its power over its partner to achieve its own goals. Under the unilateral control mechanisms, control over the partner is unilaterally achieved through the reliance on power (Celly and Frazier 1996; Stump and Heide 1996; Weitz

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[1]Although the price mechanism is offered as a third control mechanism, my research excluded it. Under price mechanism, an exchange relationship provides no foundation upon which a power structure develops because the suppliers could be replaced with prospective suppliers who offer lower prices in later exchanges. There is very little control over the activities of a partner with the non-existence of power in this discrete exchange (Noordewier, John, and Nevin 1990).

and Jap 1995; Cravens et al 1993; Etger 1978). For example, the process by which roles are specified is, by definition, unilateral in nature, in that sense one party forces roles and rules on its partner (Heide 1994). These roles and rules favor the more powerful party in terms of achieving its goals. In an intra-organization setting, Ouchi (1979) implies that a less powerful member gives up its autonomy to its superior who possesses power, thus permitting the superior to direct its performance.

According to social exchange theory (Emerson 1962), a party (A)'s power in a dyadic relationship with its partner (B) is based on its partner (B)'s dependence on the party (A). Dependence is the partner (B)'s need to maintain the relationship with the party (A) in order to achieve its desired goals. Whereas a party's power is its potential ability to influence its partner's decision making, control is an achieved influence (Frazier and Antia 1995).

A second control mechanism is the bilateral control mechanism. The common feature of the bilateral control mechanism provided by Heide (bilateral governance), Ouchi (clan), and Weitz and Jap (normative control) is the exchange parties' mutual adjustment based on norms between them. Ouchi (1979) suggests that clan control relies on a deep level of shared values or common agreements between members of an organization. Shared values constitute proper behavior that socially prescribes each member's behavior. The normative control proposed by Weitz and Jap (1995) involves a shared set of implicit principles or norms that regulate the activities performed by the parties. Control is achieved by both exchange parties' normative behavior that produces voluntary efforts for mutual benefits between them. Bilateral governance as provided by

Heide (1994) is also based on socialization processes that promote a self-control that is not possible without the pre-existence of common norms between the exchange parties.

II-A-2. The Unilateral Control Mechanism

The unilateral control mechanism is based on the controlling party's effort to influence its partner's action (Bello and Gilliland 1997; Celly and Frazier 1996; Stump and Heide 1996; Coleman 1990; Spekman 1988; Heide and John 1988). It is based on the use of external measurement, such as measuring output or monitoring behavior of the partner (Heide 1994; Celly and Frazier 1996). Thus, the unilateral control mechanism involves the influence of the supplier's production decisions, such as inventory level, production process, the selection of the supplier's subsuppliers. By tracking suppliers unilaterally, a manufacturer can keep its efforts focused on achieving meaningful outcomes (Rubin 1990).

The premise of the unilateral control mechanism is that a manufacturer should possess the power to force its supplier to do what it wants the supplier to do (Heide 1994; Weitz and Jap 1995; Ouchi 1979). For example, it can force its supplier to deliver the product on time, or to provide products of an expected quality. When the supplier fails to meet the manufacturer's demands, the manufacturer should be able to take action to force the supplier to keep its promises about product delivery and quality (Noordewier, John, and Nevin 1990). Without such power, a manufacturer may incur substantial losses due to late delivery or low quality of products.

Unilateral control mechanism requires substantial amount of time and resources that entail costs. The costs are connected with the possession and inspection of product and the processing of performance data (Stump and Heide 1996; Noordewier, John, and Nevin 1990). Delay in delivery and an inaccurate delivery may call for manufacturer's effort and time to put pressure on suppliers for accurate delivery (Noordewier, John, and Nevin 1990). Similar efforts are required when product quality is lower than expected.

II-A-3. The Bilateral Control Mechanism

II-A-3-a. The Characteristics of the Bilateral Control mechanism

The bilateral control mechanism makes certain behaviors desirable or undesirable, rather than specifying and monitoring the relevant behavior directly (Heide 1994), as is the case under the unilateral control mechanism. Exchange parties relying on the bilateral control mechanism show flexibility in their response to their partners' requests and negotiate mutual adjustments to environmental changes (Noordewier, John, and Nevin 1990). Their mutual adjustments are based on shared values, like relational norms to control their activities (Weitz and Jap 1995; Heide 1994). Thus, the bilateral control mechanism relies on relational norms (Gundlach and Achrol 1993; Weitz and Jap 1995; Lusch and Brown 1996) which stimulate the efforts for mutual benefits between the manufacturer and the supplier (Weitz and Jap 1995).

Relational norms have two characteristics. First, they prescribe and regulate proper and acceptable behavior of a manufacturer and its supplier (Heide and John 1992; Macneil 1980). Thus, relational norms provide order and meaning to what otherwise

might be ambiguous, uncertain, or even threatening situations. They set limits with which individual parties may seek alternative ways to achieve their goals. Therefore, each party's roles are more integrated with those of the exchange partner. Second, they relate to the collective rather than the individual goals of the two parties (Gundlach and Achrol 1993; Cartwright and Schwartz 1973). Thus, relational norms act as a control mechanism that influences both a manufacturer and its supplier to behave well for their collective goals.

Relational norms evolve as a manufacturer interacts with its supplier (Gundlach and Achrol 1993). Over time and across repeated transactions, each party learns and understands the internal and external environments of the other. Thus, relational norms respond to the needs and benefits of both parties. They contribute to better coordination and stability in the relationship between a manufacturer and its supplier (Gundlach and Achrol 1993).

Relational norms provide adaptive solutions or functional advantages that are superior to other forms of social control (Thibaut 1968). Specifically, relational norms help govern exchange relationships in ways that are not provided by unilateral control mechanism. The unilateral controlling over a partner is likely to offend the partner's sense of autonomy and of self-control and, as a result, might result in complaints from the partner (Aulakh, Kotabe, and Sahay 1996; Ouchi 1979). In contrast, exchange parties' observing relational norms do not incur those negative responses from partners because relational norms make exchange parties feel that they are behaving on their own initiative (Lusch and Brown 1982) and have self control (Heide 1994). Thus, when exchange

parties share relational norms, they attribute less influence to the partner (Lusch and Brown 1982) than they do under the unilateral control mechanism, so they tend to complain less.

II-A-3-b The Dimensions of Relational Norms

Relational norms are multidimensional in the sense that they may relate to a range of behavior. Since Macneil (1980) introduced the multidimensional relational norms, several researchers (e.g. Lusch and Brown 1996; Gundlach and Achrol 1993; Heide and John 1992; Kaufman and Dant 1992; Kaufman and Stern 1988) have employed relational norms which manifest in the context of the relationship between exchange parties.

Role integrity is a person's expected behavior based on a given social position when s/he interacts with those who occupy other given positions (Macneil 1978). Each individual's behavior, which reflects his/her specialization, represents his/her party's role in the relationship with his/her partner.

Roles develop in a range of obligations that build interdependence between exchange parties (Macneil 1980). In the relationship between exchange parties, the exchange parties assume that their partners are willing to play the expected role because of the obligations that both parties meet. Thus, role integrity is a function required of the exchange parties to achieve necessary level of task completeness.

Solidarity is the preservation of the unique and continuing relationship that is arising from common responsibilities and interests (Kaufman and Stern 1988). The norm of solidarity directs exchange parties to behave for the continuation of the exchange.

Therefore, the norm of solidarity acts as a safeguard to exchange parties because it deters one party from acting in its interest only (Heide and John 1992).

Mutuality is the extent to which the surplus of individual transactions is evenly divided (Macneil 1980). According to Macneil (1980), exchange does not happen without a mutual perception of benefit. Therefore, exchange parties must decide how the total gain should be divided. In the division of benefit, the norm of mutuality calls for some kind of evenness that generates adequate returns to each party (Kaufman and Stern 1988).

Flexibility is the expectation that each party will be willing to make adaptations as circumstances change (Heide and John 1992). The need for flexibility arises partly because of bounded rationality and the limits of the human mind to handle the appropriate amount of information, and partly because the exchange environment is constantly changing (Macneil 1980). Thus, the norm of flexibility is necessary for the continuation of relations between exchange parties that encounter unexpected situations frequently.

Information sharing refers to the expectation that both parties will provide information to the partner (Heide and John 1992). The norm of information sharing helps both exchange parties to deal with environmental uncertainty since the information from the partner will help a party to prepare for unusual contingencies. Thus, the norm of information sharing contributes to a better relationship performance between the exchange parties.

Harmonization of Conflict is the extent to which conflict resolution mechanisms incorporate situation appraisals to temper conflicts (Kaufman and Dant 1992). If a

conflict between exchange parties is not resolved, the relationship becomes worse and, in the end, will be terminated. Thus, the norm of harmonization of conflict deals with conflicts that threaten the relationship between exchange parties, and contributes to the preservation of exchange.

II-A-3-c The Norm of Flexibility and the Norm of Information Sharing

Two relational norms appear to have particular relevance under environmental uncertainty: the norm of flexibility and the norm of information sharing (Macneil 1980; Kaufmann and Stern 1988; Heide and John 1992; Gundlach and Achrol 1993). The two relational norms share a common feature since both norms are appropriate for dealing with environmental uncertainty. A party who is experiencing difficulty in making decisions under an uncertain environment needs a certain degree of information from its partner to mitigate the difficulty of decision making. Furthermore, because of unexpected changes in demand and supply under high environmental uncertainty, both manufacturer and supplier are required to adapt flexibly to changing circumstances (Lusch and Brown 1996).

The rest of the relational norms mentioned above are close to basic requirements for the continuation or development of exchange relationship. They are not directly related to dealing with an uncertain environment. For these reasons, these two relational norms are appropriate to my research.

The norm of flexibility implies that the relationship will be subject to good faith modification by both parties if a particular practice proves detrimental to either in the

light of changed circumstances (Heide and John 1992). For example, if a supplier cannot meet the deadline for providing equipment parts because of a strike or a flood, the supplier would ask its buyer (a manufacturer) to accept late delivery. Manufacturers usually have guidelines about the minimum inventory of part supplies they should keep on a daily basis. Though the supplier's request results in a number of part supplies below the minimum inventory level, its manufacturer is likely to accept the supplier's request for delayed delivery as long as the manufacturer can go on with the shortage of equipment. This tolerance is an outcome of relational norm of flexibility that both parties develop.

The norm of information sharing implies that both a manufacturer and a supplier develop a convention to provide information voluntarily to the partner. For instance, a manufacturer might share information about demand forecasts or its structural planning information, including future product design information and production planning schedules, with its supplier. This information helps the supplier prepare for the quantity and attributes of future products. The supplier might also share information about raw materials such as an expected short supply of certain materials, or the current price of raw materials. Thus, both the manufacturer and the supplier are supposed to inform each other in advance by following the norm of information sharing.

II-A-4 Empirical Findings: Control Mechanisms and Performance

Even though many studies have been done on control mechanisms, only a few studies involve the performance outcomes of the mechanisms (Aulak, Kotabe, and Sahay

1996; Lusch and Brown 1996). Aulak, Kotabe, and Sahay (1996), in their study of international partnerships between U.S. manufacturers and their foreign distributors, find a positive relationship between the relational norm of flexibility and the performance of the international partnership. They show that a high degree of flexibility produced a better performance with respect to sales growth and market share. Lusch and Brown (1996) also show a positive relationship between relational norms and wholesale-distributor performance, such as sales growth, profit growth, overall profitability, liquidity, labor productivity, and cash flow.

Aulach, Kotabe, and Sahay (1996) also demonstrate that the use of unilateral control by the focal firms over a foreign distributor is inversely related to the market performance of the partnership. This result comes from the fact that a bilateral control mechanism is a win-win game, whereas a unilateral control mechanism is a win-lose game, since the unilateral control mechanism is mainly used in the powerful party's interest. Self-interested behavior from one party will only bring about retaliation from the partner (Lawler and Bacharach 1987), or at least generate non-cooperation from the partner. However, the latter finding could be interpreted in the opposite way. As Ouchi (1979) predicted, unilateral control over a partner might negatively affect the partner. In contrast, there is a possibility that a focal firm can increase unilateral control over the partner due to low performance.

II-B. Environments: External and Internal Environments

II-B-1 External Environment: Environmental Uncertainty

II-B-1-a. Introduction

Exchange parties face many sources of environmental uncertainty in decision-making (Scott 1992). An organization feels uncertainty when it does not have relevant information (Argote 1982) or when the relevant contingencies are too numerous or unpredictable to be specified (Stump and Heide 1996). Environmental uncertainty makes it difficult for a manufacturer to make accurate predictions about the state of environments (Frazier and Antia 1995; Jaworski 1988; Achrol and Stern 1988). Thus, environmental uncertainty is a characteristic of environments (Achrol and Stern 1988; Lawrence 1981) which forces the manufacturer to adapt to it (Stump and Heide 1996). Environmental uncertainty is a key factor that strongly influences the relationship between exchange parties (Klein, Fraizer, and Roth 1990; Dwyer and Welsh 1985).

An environment is divided into input and output sectors (Achrol, Reve, and Stern 1983). Input environments consist of all sources of resources a manufacturer needs for manufacturing products. The resources strongly influence the manufacturer. For instance, price turbulence of a part in the market forces manufacturers to find a way to purchase the part with low price, since the price of obtained resources is one of key success factors to the manufacturers. Thus, resources are an external environment which has an effect on manufacturers (Aldrich 1979). In contrast, output environments consist of the number of customers for whom a manufacturer produces products. As my research is about the

manufacturer's control mechanism over its supplier, I will mainly discuss the manufacturer's external input environment.

II-B-1-b. The Multiple Dimensions of Environments

Researchers have studied several environmental dimensions (e.g., Scott 1992; Achrol and Stern 1988; Achrol, Reve, and Stern 1983; Aldrich 1979; Pfeffer and Salancik 1978). Aldrich (1979), relying on resource dependence theory, developed a group of environmental dimensions that influence exchange parties. In contrast, Achrol and his colleagues (Achrol and Stern 1988; Achrol, Reve, and Stern 1983) developed environmental dimensions that lead to exchange parties' decision-making uncertainty and that influence the relationship between exchange parties. Several researchers have used some of these environmental dimensions (Klein, Frazier, and Roth 1990; Dwyer and Oh 1987; Dwyer and Welsh 1985).

Environmental diversity is defined as the extent of dissimilarity between different environmental factors that manufacturers face (Klein, Frazier, and Roth 1990; Achrol and Stern 1988; Dwyer and Welsh 1985; Achrol, Reve, and Stern 1983; Aldrich 1979). In high environmental diversity, a manufacturer has to deal with various types of resources to produce products. A manufacturer facing diverse environments is more likely to find it difficult to obtain information about the environments, which leads to uncertainty for the manufacturer. (Klein, Frazier, and Roth 1990).

Environmental munificence is defined as the availability and abundance of critical resources available to a manufacturer in its environment (Scott 1992; Dwyer and Oh

1987; Achrol and Stern 1988; Pfeffer and Salancik 1978). It involves the rich/lean environment of resources (Achrol, Reve, and Stern 1983; Aldrich 1979). When resources for a manufacturer are rich, the manufacturer can access the resource it needs without difficulty. In this case, the manufacturer faces a favorable environment to do business in a rich environment. In contrast, in a lean environment, the manufacturer needs to accumulate resources to survive (Aldrich 1979), since the components needed to produce products are not enough for the manufacturer.

Environmental volatility refers to the extent to which environments change rapidly and the difficulty of making accurate prediction about the environments (Klein, Frazier, and Roth 1990; Achrol, Reve, and Stern 1983; Aldrich 1979). For example, when a supplier does not provide enough materials to a manufacturer due to a labor strike or natural disaster, such as earthquake or flood, the manufacturer feels the difficulty of getting enough components to finish completing the assembly of the final product.

Environmental concentration is defined as the extent to which a manufacturer perceives that resources are controlled by a few suppliers (Achrol and Stern 1988; Achrol, Reve, and Stern 1983; Aldrich 1979). In high environmental concentration, few suppliers provide most of resources to many manufacturers. Since few suppliers control most of resources in the market, manufacturers (buyers) strongly depend on their suppliers. Thus, dealing with few suppliers can be expected to create dependence for the manufacturers.

II-B-1-c. Environmental Volatility and Diversity

Two dimensions of environments for the manufacturer are at issue for my research: environmental volatility and environmental diversity. These two environment dimensions are considered for the following reasons. First, volatility and diversity represent a different view than that of munificence and interconnectedness. Volatility and diversity are associated with perspectives that consider environment as a source of information, whereas environmental munificence and interconnectedness are linked to a perspective that treats environment as a source of resources that affect the power structure between exchange parties (Scott 1992). Since power structures between a manufacturer and its supplier are addressed in the internal environment in my research, environmental munificence and interconnectedness are excluded. Second, volatility and diversity are the most frequently discussed sources of environmental uncertainty in the buyer-seller researches (e.g., Klein, Frazier, and Roth 1990; Achrol and Stern 1988; Dwyer and Welsh 1985; Achrol, Reve, and Stern 1983), and are among the most important factors that influence the structure of relationship (Scott 1992).

II-B-1-c-1. Environmental Volatility

Environmental volatility is a principle source of environmental uncertainty to exchange parties (Klein, Frazier, and Roth 1990; Achrol and Stern 1988). Under a volatile environment, achieving stability in the supply of a resource is problematic for manufacturers that require steady resource exchanges to operate (Pfeffer and Salancik 1978). A supplier's unstable provision makes it difficult for the manufacturer to produce

the appropriate amount of products in time to match the consumer demand for the product.

As John and Weitz (1989) indicate, when unforeseen contingencies arise, exchange parties need to develop control mechanisms. Such uncertainties usually lead to opportunistic behavior since each exchange party takes advantage of the uncertain situation for its own interest only (Klein, Frazier, and Roth 1990). For instance, when a manufacturer is not sure it can acquire the necessary amount of components due to an uncertain supply of parts in the market, its supplier takes advantage of the uncertain situation. The supplier sells the parts to other buyers who could offer high prices for the parts, and lies to the current manufacturer that the parts are still in short supply. Thus, environmental volatility that leads to the opportunistic behavior of its partner encourages a manufacturer to achieve a high level of control over the partner in order to prevent the opportunistic behavior.

Exchange parties respond differently depending on whether the environment is stable or unstable. In an intra-organization setting, a stable environment allows organizations to develop a fixed set of routines for dealing with environmental elements (Thomas and Grashof 1982; Aldrich 1979). In contrast, in an inter-organization setting, an unstable environment causes exchange parties to increase unilateral control over the partner (Klein, Frazier, and Roth 1990; Dwyer and Welsh 1985; Etgar 1977). Thus, rule-based mechanisms are used to deal with a stable environment, whereas power-based mechanisms are used in a volatile environment.

II-B-1-c-2. Environmental Diversity

Environmental diversity represents greater uncertainty for exchange parties since the parties have difficulty in gathering information about heterogeneous environmental factors (Klein, Frazier, and Roth 1990). Environmental diversity causes exchange parties to suffer from the lack of information, and deeply affects the behavior of exchange parties (Klein, Frazier, and Roth 1990). To resolve the lack of information about a diverse environment, exchange parties need to develop mechanisms to gather information. As we will see later, these mechanisms will be the initiation of norms of flexibility and information sharing.

Environmental diversity stimulates a party to demand information to deal with heterogeneous requirements (Galbraith 1977). However, if information is too numerous, a hierarchical structure is quickly overloaded (Scott 1992). Thus, a party facing a greater information requirement develops mechanisms to deal with the information, such as increasing capacity to handle the information (Galbraith 1977). A close and greater interaction between parties who are related to the required information can be used for increasing information-processing capacity (Scott 1992).

Another reaction by exchange parties to environmental diversity is that parties develop a highly decentralized decision-making structure, which leads to a flexible exchange relationship between them (Klein, Frazier, and Roth 1990). Dwyer and Welsh (1985) suggest that when a party is not certain as to how to deal with heterogeneous environments due to the lack of information, the party allows its partner to participate in its decision-making.

II-B-1-d. Suggestions of Transaction Cost Theory: How to Deal with 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, Frazier, and Roth 1990). The information asymmetry between exchange parties allows the holder of the information to behave opportunistically in dealing with its partners (Klein, Frazier, and Roth 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 integration.

Recent extension of transaction cost theory has shown that the effect of vertical integration can be achieved by vertical control in the context of interfirm relationships (Heide 1994; Heide and John 1992; Gundlach and Achrol 1993). To date, some of the studies about control in the relationship between exchange parties (Stump and Heide 1996, Celly and Frazier 1996; Sachdev, Bello, and Pilling 1994; Guiltinan et al 1980; Etgar 1977) have focused on the exercise of vertical control over the exchange partner. They support the proposition of transaction cost theory and demonstrate a positive relationship between environmental uncertainty and the reliance on unilateral control mechanisms.

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 and 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, fails to embrace 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.

II-B-1-e. Empirical Findings: Environmental Uncertainty and Control Mechanisms

Most of the studies of the relationship between exchange parties demonstrate that environmental volatility is positively related to the unilateral control of an exchange party over its partner (Celly and Frazier 1996; Sachdev, Bello, and Pilling 1994; Klein, Frazier, and Roth 1990; Dwyer and Oh 1987; Dwyer and Welsh 1985; Etgar 1977). Environmental diversity has a negative relationship with unilateral control (Klein, Frazier, and Roth 1990; Dwyer and Welsh 1985).

Gundlach and Achrol (1993) find that firms facing volatile environments rely more on legal contracts that are a simulation of unilateral control over their partners than those in less volatile environments. Their definition of legal contracts is much like a hierarchy

through which a party gains the control of decision-making from its partner. Firms in volatile environments reduce uncertainty through legal contracts that specify the behavior of their partners. This result is in line with the prescriptions of transaction cost theory. Another researcher Etgar (1977) finds that unilateral control is positively related to a volatile environment. He shows that unilateral control over a partner is greater when demand is unstable, when marketing technology is not routine, and when inter-channel competition is high. He concludes that the high level of risk that is related to environmental uncertainty may increase the importance of unilateral control over the partners for survival. The same evidence is presented by Walker and Wever (1984), Dwyer and Welsh (1985), and Celly and Frazier (1996).

In a cross-border (international) setting, Klein, Frazier, and Roth (1990) investigate the relationship between environmental volatility in a foreign market and the degree of vertical control over the foreign market. They show that as environmental volatility in a foreign market increases, a manufacturer's subsidiary in a foreign country increases vertical control over the foreign markets. Sachdev, Bello, and Pilling (1994) have similar findings that as environmental uncertainty in a foreign market increases, the manufacturer's monitoring over the foreign distributor increases.

While the above studies confirm the propositions of transaction cost theory, Noordewier, John, and Nevin (1990) find a result that is not in accordance with transaction cost theory prescription. They demonstrate that a bilateral control mechanism (relationalism) between the manufacturer and the supplier produces a high purchasing performance by the manufacturer under high environmental uncertainty. However, the

bilateral control mechanism is not related to purchasing performance under low environmental uncertainty. Thus, Noordewier, John, and Nevin (1990) show that the bilateral control mechanism is highly efficient in dealing with environmental uncertainty.

One of the problems in the research of Noordewier, John, and Nevin (1990) is that 'relationalism' consists of relational norms and monitoring, and is treated as one variable. However, as monitoring is a unilateral control mechanism, and relational norms are a bilateral control mechanism (Aulakh, Kotabe, and Sahay 1996; Weitz and Jap 1995; Heide 1994), monitoring is distinct from the bilateral control mechanism. Therefore, it is necessary to differentiate the effect of relational norms on the manufacturer's performance from the effect of monitoring on performance.

Dwyer and Welsh (1985) investigate the relationship between environmental diversity and decentralized decision-making structure between a retailer and its supplier. They find that as environmental diversity increases, suppliers let their retailers participate in their decision-making. That is, exchange parties develop a less unilaterally controlled structure as environments diversify.

In a cross-border (international) setting, Klein, Frazier, and Roth (1990) show a similar finding. They investigate the relationship between environmental diversity in a foreign market and the degree of vertical control over the foreign market. Firms with a highly heterogeneous market rely on local intermediaries to deal with the market. This result indicates that a firm with diverse environments decreases vertical control over the foreign markets.

II-B-2. Internal Environment: Interdependence Structure between the Manufacturer and the Supplier

II-B-2-a. Introduction

Interdependence between exchange parties is related to their interest in maintaining a relationship with their partners to achieve their desired goals (Emerson 1962). However, this interdependence presents a manufacturer with the problem of control over its supplier (Aiken and Hage 1968). Since the goals of a manufacturer are different from those of its supplier, the manufacturer needs to develop control mechanisms to iron out the differences between them.

Interdependence between exchange parties can be broken down into the interdependence magnitude between a manufacturer and its supplier and interdependence asymmetry between them (Frazier and Antia 1995; Lawler and Bacharach 1987, 1981). Interdependence magnitude is the sum of both exchange parties' dependencies on one another, and interdependence asymmetry is the difference between the supplier's dependence on the manufacturer and the manufacturer's dependence on the supplier (Gap and Ganesan 2000). Thus, interdependence asymmetry reflects the manufacturer's power over its supplier.

These two dimensions reflect the view that a change that increases one party's power does not necessarily decrease its partner's power (Bacharach and Lawler 1981). That is, two exchange parties can increase their total power without affecting the relative power asymmetry between them through the same amount of increased dependence on each other. Therefore, there is not any fixed level of interdependence magnitude between

exchange parties, so the interdependence magnitude can change (Bacharach and Lawler 1981). This approach has been adopted by several researchers such as Kumar, Scheer and Steenkamp (1995), Frazier and Antia (1995), and Lawler and Bacharach (1987). They suggest that both interdependence magnitude and interdependence symmetry deeply affect the relationship between exchange parties.

II-B-2-b. Interdependence Asymmetry

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

According to bilateral deterrence theory (Bacharach and Lawler 1981), interdependence asymmetry results in a greater use of power by the more powerful party than interdependence symmetry does. Given a constant degree of interdependence magnitude, the less powerful party does not possess enough power to deter its powerful partner, so the more powerful party can use its power for its interest only. Thus, the more powerful party does not need to consider the less powerful party and it can always use its relative power to obtain its partner's compliance (Kumar, Scheer, and Steenkamp 1995). Therefore, exchange parties that have the relationship of interdependence asymmetry with their partners are involved in a relationship characterized by less cooperation and greater conflict (Dwyer, Schurr, and Oh 1987).

II-B-2-c. Interdependence Magnitude

According to bilateral deterrence theory (Bacharach and Lawler 1981), interdependence magnitude will be inversely related to the more powerful party's exercise of power over the less powerful party. Given a constant degree of dependence asymmetry, the greater the amount of interdependence between exchange parties, the greater one party's fear of retaliation from its partner if that party uses power for its interest only or against its partner's interest (Lawler and Bacharach 1987; Bacharach and Lawler 1981). Foa and Foa (1974) illustrate that greater total interdependence leads to less use of self-interested power because exercising power for its interest only breaks the goal compatibility between exchange parties. Therefore, the greater interdependence magnitude, the less the more powerful party exercises power over its less powerful partner due to the deterrence power of the partner (Lawler and Bacharach 1987).

The greater interdependence magnitude lays the groundwork for a more cooperative or integrated relationship (Bacharach and Lawler 1981). The greater interdependence magnitude between exchange parties, the more the parties expect interest from the relationship with the partner (Lusch and Brown 1996). Therefore, the parties pursue a cooperative relationship with their partners to keep their interest. Thus, greater interdependence magnitude fosters cohesion in relationships between parties (Emerson 1972).

Resource dependence theory suggests an empirical generalization that, as exchange parties' dependence on one another increases, the parties tend to develop a more flexible structure which is characterized by less standardized procedures (Aldrich 1979). This generalization implies that a greater stake in interdependence magnitude encourages exchange parties to be adaptable to their partner's requests to secure their interest from the relationship.

II-B-2-d Empirical Findings: Interdependence Structure and Control Mechanisms

Heide (1994) demonstrates a positive relationship between the norm of flexibility and a symmetric, as well as a high interdependence structure. When the relationship between exchange parties exhibits high symmetry and greater interdependence, the exchange parties show highly flexible behavior to cope with changing circumstances.

Lusch and Brown (1996) show similar results as Heide (1994). They demonstrate that the norm of role integrity is positively related to the interdependence symmetry between exchange parties. Lusch and Brown (1996) also test the relationship between dependence and relational norms. However, they fail to show a significant relationship between one party's dependence on its partner and relational norms between the parties. One of the reasons why they fail to clarify this relationship is that they overlook the fact that relational norms grow from the repeated exchange between exchange parties (Gundlach and Achrol 1993). One party's dependence on its partner does not reflect both parties' interdependence between them. It only demonstrates one party's dependence, no matter whether its partner depends on the other or not. However, relational norms are

developed during the interaction between the two exchange parties (Ouchi 1979). Thus, knowing the extent of one party's dependence on its partner is not enough information to infer the existence of relational norms. It is more reasonable to test the relationship between interdependence asymmetry and relational norms, or between interdependence magnitude and relational norms.

Several studies show a strong relationship between power and the reliance on the unilateral control mechanism. Skinner and Guiltinan (1985) demonstrate that an exchange party's dependence on its partner is positively related to its partner's reliance on the unilateral control mechanism. A similar result is found by Yan and Gray (1994) in a cross-border setting.

II-3 Performance

A manufacturer's buying performance is formed through its relationship with its supplier. When the supplier's performance is excellent, the manufacturer can enjoy a high buying performance. For example, when a supplier provides a manufacturer with a low price and the least defective components on time, the manufacturer's buying performance in relation with the supplier will be great. Thus, the manufacturer's buying performance is closely related to the supplying performance of the supplier.

Exchange parties' performance can be measured by multidimensional measures. In studies of the buyer-seller relationship, various output measures have been used in the evaluation of exchange parties' performance. Outcome-based performance can be

assessed by considering several dimensions including profitability, effectiveness, and efficiency (Mohr and Nevin 1990).

Profitability is the financial information that can be easily obtained and compared with the performance of other parties. Companies use return on investment (e.g., Brown, Lusch, and Nicholson 1995), and profits (e.g., Reve and Stern 1986) as performance measures. *Effectiveness* is how well an exchange party can achieve its goals (Kumar, Stern, and Achrol 1992). In the buyer-seller relationship, buyers try to decrease the rate of defective parts delivered (Casumano and Takeishi 1991; Noordewier, John, and Nevin 1990), and increase the rate of on-time delivery (Noordewier, John, and Nevin 1990). *Efficiency* is the maximizing of outputs relative to costs (Quinn and Rohrbaugh 1983). Manufacturers try to improve their efficiency in terms of profits and sales in comparison with the their effort (Kumar, Stern, and Achrol 1992).

In addition to this outcome-based measurement for performance, there is another approach to assessing performance (e.g. Bello and Gilliland 1997; Yan and Gray 1994): evaluation of the partner's performance. Evaluation of the partner's performance is a cognitive-based performance measure since a party evaluates the performance with its degree of contentment with the performance. While an outcome based performance measure is an objective measure, cognitive-based measure is more subjective approach. In studies of buyer-seller relationships, buyers are satisfied with the partner's overall performance (Yan and Gray 1994) or evaluate the partner's performance (Bello and Gilliland 1997).

Among these various indicators for measuring performance, the effectiveness of buying performance and satisfaction with the supplier's performance are considered here for the following reasons. First, since my research broadens the scope of the control mechanism on which manufacturers rely to increase purchasing effectiveness, the effectiveness of buying performance is relevant to this research. Second, the effectiveness of the partner is the reason why an exchange party interacts with its partner (Kumar, Stern, and Achrol 1992). For example, an effective supplier provides what their buyers want. Thus, the supplier's effective performance increases the manufacturer's buying performance. Third, since the effectiveness of buying performance is an objective measure for performance, it is best to supplement this objective measure with a subjective measure to tap the performance better. While arithmetic numbers used for objective measure might not reflect comparative factors such as the increased effectiveness of overall supplying performance, a subjective measure could reflect that factor. The respondents will consider that factor when they evaluate the buying performance. For example, even though the arithmetic number of a supplier's delivery performance is high, the buyer could devalue its performance when other competing vendors' supplying performance is higher than that of the supplier. For these reasons, these two indicators are included in this research.

III. Hypotheses

III-A. The Relationship between Environmental Uncertainty and Control Mechanisms

A manufacturer who is facing a volatile environment, such as the unstable supply of parts, causes the manufacturer to experience difficulty predicting an accurate supply of resources from its supplier. The manufacturer is likely to make an inaccurate forecast about resources, so it cannot tell for sure when resources arrive or the quantity that arrives. This volatile environment allows the supplier to behave opportunistically for its interest only by taking advantage of the uncertainty that manufacturer faces (Klein, Frazier, and Roth 1990). For example, when there is an unpredicted shortage of parts in the market, the supplier might charge the manufacturer an over-inflated price. Thus, the manufacturer needs to rely on the unilateral control mechanism to prevent its supplier from acting opportunistically either by forcing the supplier to provide components on time, or by checking the supplier's inventory of parts. In sum, the manufacturer is highly motivated to depend on the unilateral control mechanism over its supplier to reduce uncertainty.

H1: Given a constant degree of environmental diversity,
the manufacturer's reliance on a unilateral control mechanism increases
as environmental volatility increases.

In a study of intra-organization settings, Thomas and Grashof (1982) imply that regulations of the proper behavior of members are difficult to develop in volatile environments. In the context of inter-organizational relationship, a manufacturer in a volatile environment might switch to a different supplier as it experiences unstable supply, and there may not be an opportunity for repeat transactions. Thus, the manufacturer has not had a chance to cultivate relational norms with the current supplier. The chances of flexible behavior and information sharing could decrease as the two exchange parties face a volatile environment.

A manufacturer in a constant environment faces a favorable environment for relying on the bilateral control mechanism. In an intra-organizational setting, the existence of buying rules within a firm's buying center depends on a stable external environment (Thomas and Grashof, 1982). A stable environment provides a certain level of predictability. Thus, a stable environment allows exchange parties to develop a fixed set of routines for dealing with environmental elements (Aldrich 1979). Thus, relational norms grow out of a stable environment in which a manufacturer and its supplier can transact repeatedly (Gundlach and Achrol 1993). For instance, when a manufacturer has to cancel an order of components due to an unexpected decrease in consumer demand for its product, the supplier is more likely to accept the manufacturer's request for cancellation when the supplier has had the experience of that manufacturer accepting the supplier's request for the late delivery of components. This flexibility comes out of prior experience of flexible behavior in the relationship with the partner, and the experience of

flexibility is repeated in a stable environment. In sum, the greater the environmental volatility, the less the manufacturer relies on the bilateral control mechanism.

H2A: Given a constant degree of environmental diversity,
the manufacturer's reliance on the norm of information sharing decreases
as environmental volatility increases.

H2B: Given a constant degree of environmental diversity,
the manufacturer's reliance on the norm of flexibility decreases
as environmental volatility increases.

Diverse environments present a barrier to the manufacturer to rely on unilateral control mechanisms. The reasons are related to the difficulty associated with obtaining the necessary information in order to effectively control and monitor the partner's activities.

In a diverse environment, a manufacturer buys dissimilar kinds of components from many suppliers. This means the manufacturer faces a challenge to gather and process massive amounts of information about the components (Dwyer and Welsh 1985). The task is not only complex, but also requires a greater time from the manufacturer than may be the case in a more homogenous environment. Accordingly, the manufacturer is not likely to have all the necessary information to monitor the supplier's decisions such as

inventory and quality control. Therefore, the greater the environmental volatility, the less the manufacturer relies on the unilateral control mechanism.

H3: Given a constant degree of environmental volatility,
the manufacturer's reliance on a unilateral control mechanism decreases
as environmental diversity increases.

The difficulty in getting information leads to a manufacturer's need for flexible structure with its supplier (Klein, Frazier, and Roth 1990). A manufacturer in a diverse environment allows its partner to participate in its decision-making (Dwyer and Welsh 1985). Thus, the exchange parties develop a highly decentralized decision-making structure, which gives the partner latitude in dealing with a diverse environment. Thus, environmental diversity contributes to the development of the norm of flexibility between a manufacturer and its supplier.

One mechanism to facilitate the manufacturer's need for information about a diverse environment is to rely on the norm of information sharing. A party who needs information tries to develop a closer interaction with its partner to get the information (Scott 1992), which leads to the development of relational norms between the parties. Thus, a party can obtain a large amount of information by relying on the norm of information sharing. A manufacturer can give its supplier information, such as changes in consumer preference for products using the supplier's components. The supplier presents the manufacturer with information about resource availability or expected changes in

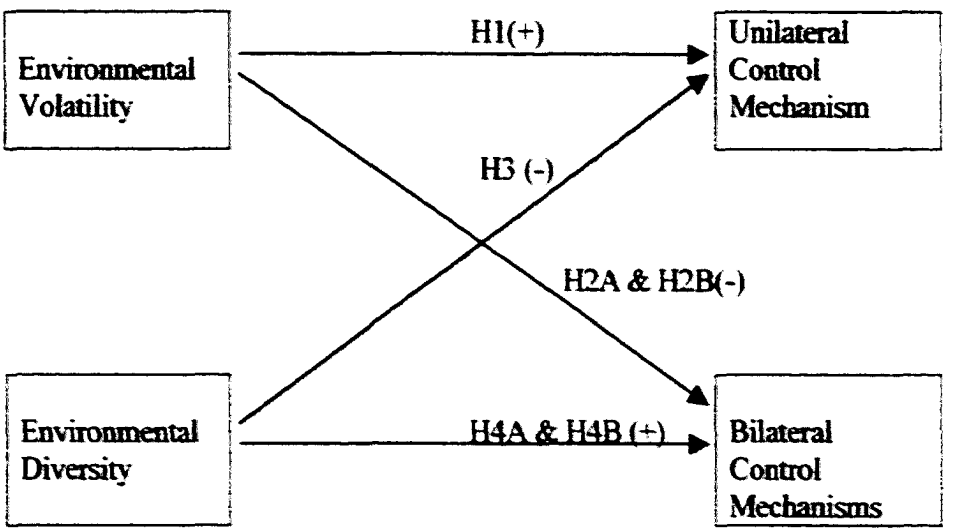
component price. Thus, exchange parties develop the norm of information sharing through information exchange behavior. Based on these arguments, the hypotheses are offered.

H4A: Given a constant degree of environmental volatility, the manufacturer's reliance on the norm of information sharing increases as environmental diversity increases.

H4B: Given a constant degree of environmental volatility, the manufacturer's reliance on the norm of flexibility increases as environmental diversity increases.

Figure 2

A Model of the Impact of Environmental Uncertainty On the Exchange Party's Control Mechanisms



III-B. Interdependence Structures and Control Mechanisms

According to bilateral deterrence theory, given a constant degree of interdependence magnitude, the more powerful party is likely to use its relative power over the less powerful partner (Lawler and Bacharach 1987), and less likely to contribute to the relationship (Buchanan 1992) because it can use its power to obtain the weak partner's compliance (Kumar, Scheer, and Steenkamp 1995). The less powerful party does not possess any deterrence power to prevent its partner from using power (Lawler and Bacharach 1987). Therefore, the more asymmetric power the manufacturer has over the supplier, the more the manufacturer counts on unilateral control mechanisms.

H5: Given a constant degree of interdependence magnitude, the manufacturer's reliance on a unilateral control mechanism increases as interdependence asymmetry increases.

The more powerful party does not need to behave flexibly or voluntarily provide information to the less powerful partner since it can get what it wants through the reliance on power. The less powerful party reciprocates by being unwilling to be flexible or by not voluntarily providing information (Ouchi 1979). Though the less powerful party could voluntarily provide information to induce a similar response from the more powerful party, the more powerful party will continue to rely on unilateral control mechanisms since the more powerful party is in the position to get what it wants. Thus, each exchange

party does not develop the norms of flexibility and of information sharing under highly positive or negative interdependence asymmetry. That is, as the manufacturer's relative power over the supplier increases from the point of equal power, the conditions become adverse to the development of relational norms. As the manufacturer's relative power over the supplier decreases from the point of equal power, the conditions also negatively influence the development of relational norms. In short, given a constant degree of interdependence magnitude, interdependence asymmetry positively influences a manufacturer's dependence on a unilateral control mechanism. As interdependence asymmetry becomes more positive or more negative, the less the norms of information sharing and of flexibility exist between the manufacturer and the supplier.

H6A: Given a constant degree of interdependence magnitude,
the manufacturer's reliance on the norm of information sharing shows
a curvilinear shape as interdependence asymmetry increases.

H6B: Given a constant degree of interdependence magnitude,
the manufacturer's reliance on the norm of flexibility shows
a curvilinear shape as interdependence asymmetry increases.

With a lower level of interdependence magnitude, both a manufacturer and its supplier are relatively autonomous. The tendency to behave opportunistically would be

lower with a low level of interdependence magnitude since both exchange parties cannot achieve much profit from opportunistic behavior. However, opportunistic behavior still exists because each party does not have the power to prevent its partner from self-interested behavior (Lawler and Bacharach 1987). For example, when a parts supplier can not deliver components to several buyers in time, the supplier does not care much about late delivery to the buyer who did not order a large volume of components from it since losing the contract with that buyer will not do much damage to the supplier. The supplier, instead, tries to satisfy other buyers who ordered a large volume of components by providing those components on time. Therefore, a supplier with a low interdependence magnitude might pursue its selfish short-term interests by not meeting the demand for quality that its manufacturer requires, or by delivering products late.

Jaworski (1988) suggests that the greater interdependence between intra-organization units, the less they rely on unilateral control mechanisms over the partner. In the context of inter-organization relationships, his argument implies that the larger the total amount of interdependence between a manufacturer and a supplier, the less the manufacturer relies on unilateral control mechanisms over its partner, because unilateral control mechanisms by which the powerful party pursue its goals will only bring about retaliation from the partner (Lawler and Bacharach 1987). In short, given a constant degree of interdependence asymmetry and environmental uncertainty, the interdependence magnitude negatively influences the manufacturer's dependence on unilateral control mechanisms.

H7: Given a constant degree of interdependence asymmetry, the manufacturer's reliance on a unilateral control mechanism decreases as interdependence magnitude increases.

Minimal interdependence between exchange parties leads easily to relationship dissolution (Dwyer, Schurr, and Oh 1987) because neither party expects much profit from the relationship. In contrast, in a situation of greater interdependence magnitude, both exchange parties are less likely to use power for self-interest (Lawler and Bacharach 1987; Foe and Foe 1974), and more likely to continue their relationship because they both share a large interest (Lusch and Brown 1996; Emerson 1962). Relational norms evolve as exchange parties continue and repeat transactions. Therefore, exchange parties are likely to generate the norms of information sharing and flexibility in situations of high interdependence magnitude rather than in those of low interdependence magnitude.

Jaworski (1988) suggests that the greater the interdependence between intra-organization units, the more they rely on internalized values toward common goals because those values are effective in a situation of greater interdependence. In the context of an inter-organization relationship, Jaworski's suggestion implies that as the interdependence between the manufacturer and the supplier increases, they are likely to count on relational norms, since a significant amount of interdependence is a main requisite for the formation of relational norms (Gundlach and Achrol 1993). In sum, given a constant degree of interdependent asymmetry, the greater the interdependence

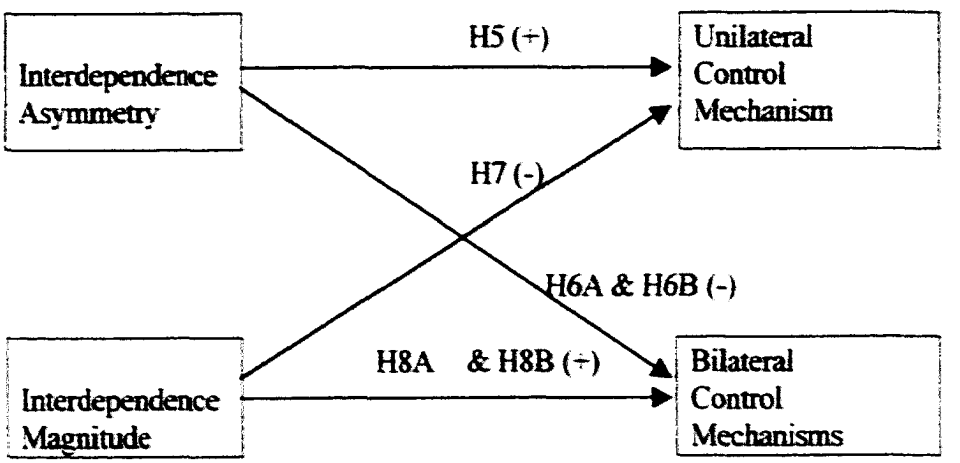
magnitude between the manufacturer and the supplier, the more the norms of information sharing and of flexibility exist between them.

H8A: Given a constant degree of interdependence asymmetry, the manufacturer's reliance on the norm of information sharing increases as interdependence magnitude increases.

H8B: Given a constant degree of interdependence asymmetry, the manufacturer's reliance on the norm of flexibility increases as interdependence magnitude increases.

Figure 3

A Model of the Impact of Interdependence Structure on the Exchange Party's Control Mechanism



III-C. The Effect of Reliance on the Bilateral Control Mechanism on the Dependence on the Unilateral Control Mechanism

Recall that relational norms are the ways both the manufacturer and the supplier behave and the ways they ought to behave for their mutual interest (Heide and John 1992). Therefore, when a supplier relies on relational norms, he does not behave opportunistically. The supplier tries not to deliver defective product or not to be late for product delivery. Thus, relational norms provide confidence to a manufacturer that relinquishing control over his supplier does not create vulnerability that is generated by the supplier's opportunistic behavior (Heide and John 1992). Thus, each exchange party's reliance on relational norms becomes aversive to the condition that the party needs to count on the unilateral control mechanism over its partner.

Exchange parties easily respond to the needs of their exchange partners when they depend on the norm of flexibility. The norm of information sharing contributes to better coordination in inter-organizational relationship than does the unilateral control mechanism does (Gundlach and Achrol 1993). Thus, the benefits coming from relational norms would make a manufacturer reluctant to rely on the unilateral control mechanism.

H9: The unilateral control mechanism will be reduced by the extent of the existence of: a) the norm of information sharing,

b) the norm of flexibility.

III-D. The Effect of Control Mechanisms on the Performance

The unilateral control mechanism that is developed between a manufacturer and its supplier increases the manufacturer's buying performance. A manufacturer with the unilateral control mechanism exercises power over its supplier to acquire resources from the supplier. The unilateral control over a partner is likely to offend the partner's sense of self-control, which might result in negative reactions from the partner (Ouchi 1979). Thus, these negative feelings generated by the unilateral control mechanism prohibit the supplier from actively responding to the manufacturer's enforcement over the supplier, which leads to the supplier's low supplying performance (Gaski and Nevin 1985).

A manufacturer with the unilateral control mechanism could show poor buying performance due to its supplier's lack of enthusiasm for carrying out the manufacturer's enforcement. For example, when a manufacturer feels that the inventory of its supplier's part is not suffient, it forces the supplier to increase the inventory to get the desired amount of parts. The supplier is reluctant to accept the manufacturer's request for maintaining a higher inventory level than before because this will generate additional costs to the supplier. Thus, the manufacturer obtains an unstable supply of resources. In sum, the unilateral control mechanism will decrease the buying performance of a manufacturer.

H10: The unilateral control mechanism negatively influences the manufacturer's buying performance.

The manufacturer's dependence on the norm of flexibility will produce high buying performance. The supplier's flexible response to the manufacturer's request contributes to the manufacturer's buying performance. When a manufacturer has to change the order of components, the supplier with the norm of flexibility would respond to the request for the change of order. For instance, a manufacturer sometimes urgently requests more components from its supplier. Though the production of extra volume in a short period of time can burden suppliers with extra costs that could be higher than profits, the supplier is likely to accept to the manufacturer's request. The norm of flexibility developed between the manufacturer and the supplier makes this flexible behavior possible. Through a constant relationship with the manufacturer, the supplier knows that the manufacturer will show flexible behavior when it faces similar difficulties. Thus, the norm of flexibility developed between a manufacturer and its supplier helps the manufacturer obtain an appropriate amount of resource in time. In sum, the norm of flexibility contributes to the manufacturer's buying performance.

H11A: The norm of flexibility will increase the manufacturer's buying performance.

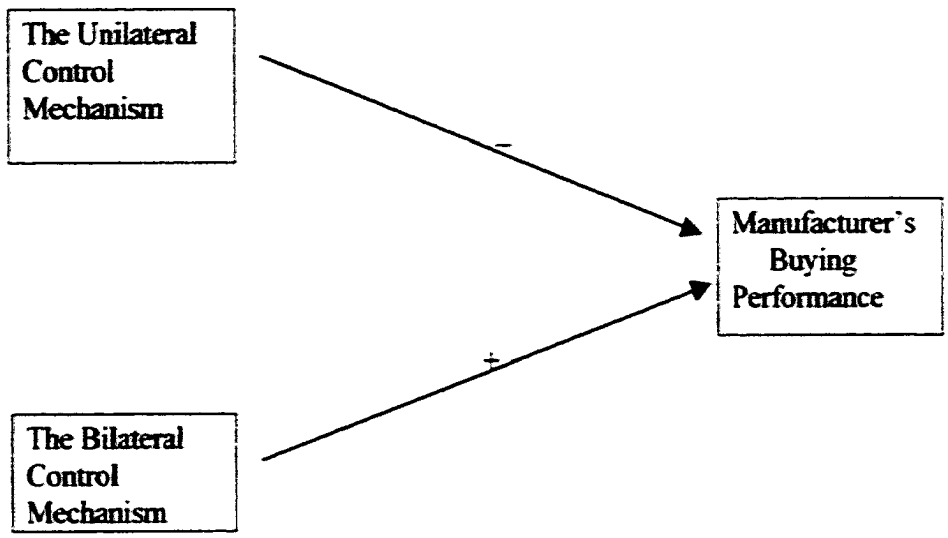
The manufacturer's dependence on the norm of information sharing increases its buying performance. A manufacturer and its supplier develop the norm of information sharing through repeated transactions. Thus, the manufacturer is supposed to exchange

information about the components with its supplier. It can easily get the relevant information about the component market situation, such as an expected shortage of parts or an expected change in price. This information can help the manufacturer to take care of the shortage of the parts through increasing the inventory of them in advance.

The information exchange about the quality of parts also contributes to the manufacturer's buying performance. The manufacturer is in a good position for evaluating the quality of parts the supplier produces. Thus, the information from the manufacturer about the quality of the parts could help the supplier increase the quality. The manufacturer thus can obtain high quality of parts. Therefore, the norm of information sharing increases the manufacturer's buying performance.

H11B: The norm of information sharing will increase the manufacturer's buying performance.

Figure 4
A Model of the Impact of Control Mechanisms
on the Exchange Party's Buying Performance



III-E. Conclusion

My research proposes theoretical hypotheses for control mechanisms to deal with environment uncertainty and for the effect of the control mechanism on the buying performance of the manufacturer. Based on the hypotheses, a model of control mechanisms for the buyer-seller relationship is proposed (see figure 5).

In this model, while environmental volatility positively influences the manufacturer's dependence on a unilateral control mechanism, environmental diversity has a negative relationship with a unilateral control mechanism. In contrast, the bilateral control mechanisms increase as environmental volatility decreases, and as environmental diversity increases.

Internal environments influence the manufacturer's reliance on control mechanisms. The manufacturer's reliance on the bilateral control mechanism increases as the interdependence magnitude increases, and as the interdependence asymmetry decreases. In contrast, the reliance on the unilateral control mechanism increases as interdependence magnitude decreases and as interdependence asymmetry increases.

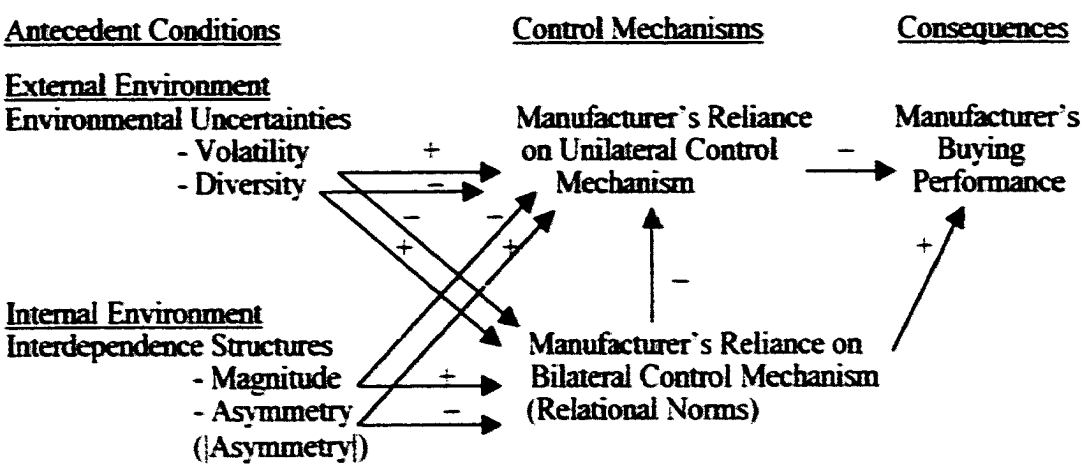
The reliance on the bilateral control mechanism decreases the manufacturer's reliance on the unilateral control mechanism. The bilateral control mechanism provides the manufacturer with confidence that it does not have to worry about its supplier's opportunistic behavior. Thus, the manufacturer who tends to rely on the bilateral control mechanism will be less likely to depend on the unilateral control mechanism.

The control mechanisms tested in this study show the opposite effect on the manufacturer's buying performance. The unilateral control mechanism has a negative

relationship with the manufacturer's buying performance. The manufacturer uses its power to influence its supplier's decisions about the volume of parts produced or the delivery of the parts. However, due to reluctance on the part of supplier, the unilateral control mechanism has a negative relationship with the buying performance.

The bilateral control mechanism increases the manufacturer's buying performance. The supplier's flexible behavior allows the manufacturer to obtain the appropriate amount of parts in time. The constant information sharing about the parts market situation allows the manufacturer either to delay the purchase of parts or to purchase the parts in advance depending on the parts-market situation.

Figure 5
A Model of Manufacturer's Control Mechanisms



IV. Research Methodology

IV-A Introduction

This section describes the methodology that was used to test the hypotheses. Mainly, the context of this study, sampling strategy, and the development of scale will be discussed. The main concern of this paper is the investigation of a manufacturer's control mechanisms in the relationship between it and its supplier. Thus, the context is the relationship between the manufacturer and the main supplier.

A mail survey was used to collect the data for this research. A mail survey is suited for gathering data from a large sample size. Since the purpose of this research is to generalize about the relationship between environments and control mechanisms, and the effect of control mechanisms on performance, it was necessary to use a mail survey to collect data from many respondents.

IV-B. Context

To test the hypotheses, I investigated the purchasing relationship between the manufacturer and the main supplier. I selected this setting for three reasons. First, the manufacturer needs many parts to finish making its products, so it has a good reason to develop control mechanisms to acquire them. Second, the manufacturer has a great deal of interaction with its main supplier (Wilson 1994). The continuous and significant amount of interaction between them might give them the chance to nurture relational norms (Gundlach and Achrol 1983). Third, since the manufacturer and the supplier are

interdependent on each other, they have power structures between them. Therefore, it was relevant to investigate the correlation between power structures and control mechanisms in this setting.

Other control mechanisms, such as contracts, could also act as control mechanisms in this setting. However, as norms that guide the interaction between exchange parties develop, the contracts become a less important control mechanisms (Macaulay, 1963). Macaulay (1963) reported that businesspeople in the manufacturing industry in Wisconsin prefer to rely on 'a person's word,' a handshake, or common honesty even when the transaction involves exposure to serious risks. Businesspeople often entered contracts with a minimal degree of advance planning. Exchange partners do not try to take advantage of this vagueness because they do business based on the norms of the industry. Since a continuous, large amount of interaction between the manufacturer and its main supplier develops relational norms, the relational norms are likely to replace formal contracts.

IV-C. Respondents and Sampling Strategy

Since this research concerns the buyer's control mechanisms, a key informant in this study was the head of the purchasing department in the manufacturing company. The purchasing manager (the head of the purchasing department) is responsible for purchasing materials from the supplier, so s/he has expert knowledge of the relationship with the supplier and the parts s/he deals with. Recent studies of inter-organizational

relationships have used the single-key informant method (Jap and Ganesan 2000; Kumar, Stern, and Achrol 1992; Boyle et al, 1992, Noordewier, John, and Nevin 1990).

Key informants should occupy a position that makes them knowledgeable about the issue being researched (Campbell, 1955). As long as key informants are gaining insight into the relationship with the supplier and have a deep understanding of the external environments, the informants are qualified information providers. Purchasing managers acquire a high level of knowledge about the materials they buy, and they have close relationships with their suppliers (Hutt and Speh 1992).

To make sure the key informants have relevant knowledge, a pre-test was conducted. Pre-test respondents were asked whether they felt competent enough to respond to the survey questions (e.g., Kumar, Stern, and Achrol 1992). Informants were evaluated by their responses to the following questions: how long they have been 1) doing business with the supplier, 2) working in their company, and 3) occupying their current positions. 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 4) supplier's costs of switching to other customers, 5) their supplier's sales volume and profits generated from the relationship with the informant's company. Finally, the informants were asked about 6) their knowledge of the supplied product.

This research relies on key informant data from the manufacturer side of the dyad. A one-sided informant method was adopted for several reasons. First, this study proposes that the manufacturer's control mechanisms are strongly influenced by the external and

internal environments. The manufacturer's decision about whether to rely on a control mechanism or not depends on its judgement of the environment. Thus, it is important to measure how the manufacturer perceives both the external environment and internal power structure. Second, there is not any theoretically meaningful aggregation scheme to resolve differences in perception between informants across the dyad (John and Reve 1982), so it is meaningless to pursue dyadic data. It is reasonable for informants across the dyad to perceive the same phenomena differently due to the different roles they play (buyer vs. seller). For instance, when a manufacturer feels that the supplier depends on him by 5- points, the supplier may or may not perceive the same 5-point dependence on the manufacturer. How the manufacturer behaves depends on its perception of its dependence on its supplier and the perception of the supplier's dependence on it, not on how the supplier actually perceives its dependence on the manufacturer. Thus, the focus is not whether the data is from a dyadic source or a single source, but whether the key informant has relevant knowledge about the phenomena being studied. Selection of relevant informants and well-made multi-item scale can provide reliable and valid data (Reve 1982).

Manufacturers were selected by a random sample from a mailing list of Dun and Bradstreet. SIC codes from 3011 to 3999 were included. 55% of the manufacturers were chosen from the electric and electronic industry since this industry is strongly affected by an uncertain environment, such as an unpredictable supply of parts or uncertain changes in parts prices. The rest of the companies belonged to industries such as leather products

and rubber products which had relatively constant environments. Thus, a larger variance in terms of environments could be obtained.

The informants were asked to identify their major supplier. The major supplier is the supplier from which the informant's company made the largest amount of purchases during 1999. This major supplier served as the referent for all questions. Each informant was mailed a questionnaire and asked to complete it.

IV-D. Scale Development

To conduct a mail survey with a questionnaire, it was necessary to develop scales for 9 constructs. As a first step to develop scales, one must first identify existing scales. Most of scales were adopted from the existing literature. However, two scales, environmental diversity and satisfaction with the supplier's performance, had to be made, as relevant items had not been found. These constructs are listed in Table 1 below.

Table 1
The Constructs for the Hypotheses

Environmental Volatility
Environmental Diversity
A Manufacturer's Dependence on the Supplier
A Supplier's Dependence on the Manufacturer
Buyer's Unilateral Control over the Supplier
The Norm of Information Sharing
The Norm of Flexibility
Effectiveness of Buying Performance
Satisfaction with the Supplier's Performance

IV-D-1. Scale Development Process

Some of the existing scales were for a different setting, such as the relationship between the manufacturer and the dealer. It was necessary to create a number of new scales to test the hypotheses. The process of creating new scales was based on the recommendations suggested by Churchill (1979):

1. Define constructs: definitions were derived from chapter II in this paper.
2. Develop a representative pool of items: items were either adopted from existing literature or created by this researcher. The researcher created the items by referring to the definition of the construct and by considering the research setting.
3. Edit items: items were edited to remove ambiguous statements.
4. Refine through peer review: this stage consisted of two steps. In the first step, three Ph.D. students who major in marketing and organizational behavior examined a scrambled list of items and tried to identify the construct that was closely related with each item. Second, they reviewed the items and removed the awkward words. Through this procedure, several items were removed and the remaining items became clearer.
5. Create preliminary scales and questionnaires: the items were combined into scales and placed in a self-report questionnaire.
6. Preliminary test and revise: The preliminary test consisted of two stages. In the first stage, depth interviews were conducted with 3 purchasing managers of firms that produce industrial products. Interviewees were asked to check the relevance of items and to find awkward terms and questions. Based on the comments by practitioners, the preliminary questionnaire was revised. In the second stage, the revised questionnaire was mailed to a

sample of purchasing managers. The following section provides an overview of the preliminary test.

IV-D-2. Preliminary Test

IV-D-2-a. Interview with Practitioners

To check the relevancy of items developed for this study, depth interviews were conducted with 3 purchasing managers of firms that produce industrial products such as PCB and computer equipment. These interviews each lasted about 25 minutes to 35 minutes. All of the 3 interviewees have work experience ranging from 15 to 22 years.

The interviewees were first informed of the general topic, the purpose of this study, and the context of this research. The participants were then asked to read the preliminary items for each variable. After the interviewees read the items for one variable, they were informed about the definition and characteristics of the variable. The participants were then asked about how well the items represented the variable, and whether or not any non-relevant or awkward terms existed.

The interviews made two contributions to the questionnaire. First, it became clear that purchasing managers were the relevant informants for this study. They knew their main suppliers very well, so they judged each item based on their experience with their main suppliers. This assured me that purchasing managers were qualified to answer the questionnaire. Second, they provided the terms that practitioners use in their industries. For example, the term 'buyer,' which is used in the original questionnaire, is not used in their industries. Instead, they use the term 'customer.' Therefore, the term 'buyer' was

changed to 'customer.' Another important comment by interviewees was that the design of the questionnaire needed to be improved to appeal to the respondents. Thus, the questionnaires became more respondent-oriented. The following section provides the revised items.

IV-D-2-b. Initial Items For Constructs

Environmental Volatility: Environmental volatility was defined as the extent to which environments change rapidly and the difficulty of making accurate predictions about the environments (Klein, Frazier, and Roth 1990; Achrol, Reve, and Stern 1983; Aldrich 1979). A number of researchers have developed scales to measure environmental volatility (e.g. Noordewier, John, and Nevin 1990; Klein, Frazier, and Roth 1990; Dwyer and Welsh 1985). This paper used modified scales that were developed by Noordewier, John, and Nevin (1990).

The scale of environmental volatility mainly captured the buyer's perception of the unstable variability of supplied products. The four Likert scale items were: volatility in terms of price for the supplied product; the stability in the provision of products; availability of the products; and uncertainty in the production of supplied goods. These items tapped the definition of environmental volatility.

Environmental Diversity: Environmental diversity was defined as the extent of dissimilarity between the different environmental factors that manufacturers face (Klein, Frazier, and Roth 1990; Achrol and Stern 1988; Dwyer and Welsh 1985). Specifically, environmental diversity is concerned with the various types of parts that a manufacturer

has to purchase since the context of this research is input environment, which consists of resources a manufacturer dealt with.

Though the items for environmental diversity have been frequently used in the literature, most of their research settings involved an output sector that consists of manufacturers and their dealers. Thus, their items for environmental diversity mainly focused on market environments such as population diversity or dissimilarity among final users. Therefore, a new scale was developed to measure the construct.

The scale was founded on the heterogeneity of supplied product features in the market. The scale asked the respondents to judge the level of diversity in price, quality, and specifications. The other item was the level of variety of purchasing terms between buyers and suppliers in the market.

Table 2
Items in Environmental Uncertainties

	Environmental Volatility
V1	Availability of Major Product in the market is highly uncertain.
V2	Uncertainty in the production of Major Product in the market is a real problem.
V3	The supply of Major Product is not stable.
V4	Price for Major Product in the market is volatile.
	Environmental Diversity
M1	There is a variety of product features in the market.
M2	The price of products in the market is diverse.
M3	The quality of products in the market is diverse.
M4	There is a variety of purchasing terms in the market.

A Manufacturer's Dependence on the Supplier & Supplier's Dependence on the Manufacturer: these constructs were measured to compute the variables of interdependence asymmetry and interdependence magnitude. Interdependence asymmetry was defined as the difference between the supplier's dependence on the manufacturer and the manufacturer's dependence on the supplier (Gap and Ganesan 2000). Interdependence magnitude was the sum of both exchange parties' dependencies on one another (Kumar, Scheer, and Steenkamp 1995). Thus, interdependence asymmetry was calculated by deducing the supplier's dependence from its buyer's dependence, and the interdependence magnitude was calculated by adding the supplier's dependence on the manufacturer to the manufacturer's dependence on the supplier. Therefore, to measure the interdependence asymmetry and interdependence magnitude, it was necessary to measure the two constructs of a manufacturer's dependence on the supplier and a supplier's dependence on the manufacturer from manufacturer's perspective.

A few studies have measured dependence on the partner (e.g., Lusch and Brown 1996; Sachdev, Bello, and Pilling 1994; Provan and Gassenheimer 1994; Noordewier, John, and Nevin 1990; Frazier, Gill, and Kale 1989; Skinner and Guiltinan 1985). A manufacturer's dependence on the supplier was assessed by four items: the possible replacement of sales generated from current supplier to another supplier; switching costs of replacing the current supplier with another; the difficulty of changing current supplier to another; and overall dependence on the supplier. These items were adopted from the

research by Kumar, Scheer, and Steenkamp (1995), Frazier, Gill, and Kale (1989), and Lusch and Brown (1996).

A supplier's dependence on the manufacturer was measured by asking a buyer about its perception of its supplier's dependence. This construct used the same 7-point Likert scale which was used for measuring the manufacturer's dependence on the supplier. Thus, a supplier's dependence on the manufacturer was assessed by the same four items.

Table 3
Items in Interdependence Structures

	A Manufacturer's Dependence on the Supplier
BD1	It would be difficult for your firm to replace Major Supplier's products with another supplier's product line.
BD2	The total costs of switching to a comparable supplier would be prohibitive for your firm.
BD3	If your company wanted to, you could find other suppliers who could provide Your company with comparable product lines.
BD4	Your company is strongly dependent on Major Supplier.
	A Supplier's Dependence on the Manufacturer
SD1	It would be difficult for Major Supplier to replace the sales and profits realized from your firm with another customer.
SD2	Major Supplier's total costs of switching to another comparable customer would be prohibitive.
SD3	Major Supplier could find other customers to replace your company in your trade area, if the supplier wanted to.
SD4	Major Supplier is strongly dependent on your company.

Manufacturer's Unilateral Control Mechanism: the unilateral control mechanism was defined as one party's directive aimed at controlling the activities of another (Bello

and Gilliland 1997). This study focused on the manufacturer's control over the supplier in terms of various production-related decisions.

A few researchers have measured unilateral control mechanisms (e.g., Bello and Gilliland 1997; Celly and Frazier 1996; Heide and John 1992). Bello and Gilliland (1997) and Celly and Frazier (1996) used the setting of the relationship between the supplier and the distributor to investigate the ways in which the supplier controls the distributor. Thus, their scales do not match the setting of this research. In contrast, Heide and John (1992) investigated the mechanism by which the buyer achieved control over the supplier. Thus, this study used Heide and John (1992)'s version of the scale of unilateral control over the supplier.

Table 4
Items in the Unilateral Control Mechanism

U1	Major Supplier's production processes are entirely determined by your company's requirements.
U2	Major Supplier's engineering changes are entirely determined by your company's requirements.
U3	Major Supplier's level of inventory (raw material, semi-finished and finished components) is entirely decided by your company.
U4	The selection of Major Supplier's sub-suppliers is entirely decided by your company.
U5	Major Supplier's quality control procedures are entirely decided by your company.

The Norm of Information Sharing: Two relational norms, the norm of information sharing and the norm of flexibility, were measured for the bilateral control mechanism. The norm of information sharing was defined as the expectation of providing information to the partner by both exchange parties (Heide and John 1992). The literature has measured the norm of information sharing (e.g. Lusch and Brown 1996, Heide and John 1992). Since Lusch and Brown (1996) used the scale of Heide and John (1992), this reseach revised the version of the Heide and John (1992) scale of the norm of information sharing. The scale measured the existence of expectations of information exchange between the two parties.

The Norm of Flexibility: The norm of flexibility was defined as the expectation of willingness to make adaptations as circumstances change (Heide and John 1992). Many researchers have measured the norm of flexibility (Bello and Gilliland 1997, Lusch and Brown 1996, Gundlach and Achrol 1993, Heide and John 1992, Boyle et al 1992). This research revised the scale of Heide and John (1992). The revised scale measured the existence of the expectation of flexible behavior in response to the partner's request.

Table 5
Items in the Bilateral Control Mechanism

	The Norm of Information Sharing
I1	It is expected that both your company and Major Supplier share information that might help the other company.
I2	Your company is supposed to exchange information with Major Supplier regularly.
I3	It is expected that both your company and Major Supplier provide proprietary information if it can help the other company.
I4	It is expected that both your company and Major Supplier keep each other informed about changes that may affect the other company.
	The Norm of Flexibility
F1	Both your company and Major Supplier expect that each company will be flexible to the other company's request for changes.
F2	Both your company and Major Supplier expect to be able to make any adjustments necessary to cope with changing circumstances.
F3	When an unexpected situation arises, both your company and Major Supplier would prefer to amend your agreement rather than hold each other to the original terms.
F4	It is expected that both your company and Major Supplier will be flexible to each other if it can help the other company.

Effectiveness of Buying Performance: Effectiveness of the buying performance was the effectiveness of the manufacturer's buying performance resulting from its relationship with the supplier. The literature has used various types of performance measures, such as return on investment (e.g. Brown, Lusch, and Nicholson 1995), profits (e.g. Reve and Stern 1986), sales volume (Reve and Stern 1986), sales growth (e.g. Aulach, Kotabe, and Sahay 1996), market share (e.g. Aulach, Kotabe, and Sahay 1996), price reduction (Casumano and Takeishi 1991), the rate of defecting parts delivered (Casumano and

Takeishi 1991; Noordewier, John, and Nevin 1990), and on-time delivery (Noordewier, John, and Nevin 1990). Among these measurement scales, sales and financial scales are influenced by many factors, such as the price of a manufacturer's product, product quality, service, etc. Consequently, it is difficult to measure the direct effect of control mechanisms on the sales and financial performance. Therefore, sales and financial scales were excluded in this research. Instead, variables related to purchasing behavior are appropriate for this research. Therefore, this study used the version of Noordewier, John, and Nevin (1992) since their scale measured the purchasing performance of a buyer in the relationship with its supplier.

Table 6
Items in Effectiveness of Buying Performance

	Effectiveness of Buying Performance
P1	What percentage of orders (delivered) of products from Major Supplier are late? _____%
P2	What percentage of products delivered by Major Supplier are defective, not up to specifications, the wrong items, or otherwise unacceptable? _____%

Satisfaction with the Supplier's Performance: Satisfaction with the supplier's performance was defined as the manufacturer's overall evaluation of the supplier's supplying performance. Doney and Cannon (1997) developed a scale for supplier performance. Their items mainly measured the evaluation of a supplier's performance in

areas such as product feature, service feature, and delivery speed, etc. This research revised the version of Doney and Cannon (1997).

Table 7
Items in the Satisfaction with the Supplier's Performance

	Satisfaction with the Supplier's Performance
S1	Your firm is satisfied with Major Supplier's product quality.
S2	The service provided by Major Supplier is satisfactory.
S3	The overall supplying performance of Major Supplier is satisfactory.
S4	The on-time delivery performance of Major Supplier is satisfactory.

IV-D-2-c. Preliminary Test of Initial Scales

The questionnaire was mailed to 207 purchasing managers. The subjects were drawn from the Dun and Bradstreet directory. 37 questionnaires were returned, producing a response rate of 18%.

To check whether respondents (the purchasing managers of the manufacturing companies) were qualified to answer questions about the supplier's dependence on its company, several questions were asked. Respondents were asked about (1) how long the manufacturing company had been doing business with its major supplier, and (2) how long the manager had occupied his or her current position.

Results indicated that the respondents' companies had an average of 20.4 years of relationship with its main supplier. The average length of time each informant had occupied his or her current position was 6.5 years. These mean scores suggested that

purchasing managers had enough opportunity to interact with their main suppliers, and they were qualified informants for providing valid information about their main suppliers.

To evaluate the extent to which respondents had knowledge of their supplier's dependence on the buyer's company, respondents were asked about four dependence dimensions. The respondents knew their supplier's dependence on their companies at the level of 5.9 out of 7 point Likert scale (1. I do not have any knowledge, 7. I do have great deal of knowledge). Thus, it was concluded that the respondents had enough knowledge of their suppliers[2].

Confirmatory factor analysis was run to check whether multiple items captured the variables. Results showed that 8 variables were successfully captured. Since the variable of the effectiveness of buying performance was measured with open-ended questions, it was subjected to factor analysis. However, data analysis showed that some variables were should be revised.

Environmental diversity showed less than a desirable level of reliability (.57). Though M2 and M3 go together with the rest of the items in principal component analysis, they showed low correlations with the rest of the items, which worsened the overall reliability. Thus, items for environmental diversity were revised in the main survey.

Under the suspicion that too specific aspects of diversity could cause low correlations between the items, all of the items that were used for pre-test were replaced

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[2] Kumar, Stern, and Achrol (1992) reported that informants had a knowledge of their channel partners with the rate of 1.20 to 3.50 using 5-point Likert scale (1 = have, 5 = do not have adequate knowledge).

by new items. For instance, instead of just asking about diversity in terms of price, product quality, product features, or purchasing terms, new items stressed a large variety of diverse product types and purchasing terms. The scale asked the respondents to judge the level of diversity in terms of the material, the purchasing terms for parts, and the supplier types a manufacturer deals with.

There was a problem in the scale of the unilateral control mechanism. Though the items for the unilateral control mechanism showed acceptable psychometric properties (reliability: .80), the average scores for each item were relatively low (2.68). I thought that the items leaned toward the least control over the supplier, so the items were changed into milder expressions of the unilateral control mechanism in the main survey to increase variance. For example, instead of 'entirely', the term 'to a large extent' was used.

In addition to this change, one item was deleted and a new item was created. The mean score for the unilateral control of supplier's selection of sub-supplier was too low. This meant that the manufacturer rarely used this unilateral control mechanism in the relationship with its supplier. Thus, a new item about manufacturer's control over its supplier's part price was created in the main survey.

Since some of items used for the satisfaction with the supplier's performance in the pre-test were thought to be a little bit awkward, the wording for S3 and S4 was slightly changed. Instead of using 'Major Supplier' as the subject of the sentence, 'your firm' (manufacturer) was used as the subject. For instance, 'the performance of major supplier is very satisfactory' in the pre-test was changed into 'your firm is satisfied with the overall supplying performance of Major Supplier' in the main survey.

IV-E. Main Survey

The main survey was conducted with a sample of purchasing managers. Each informant received a questionnaire and was asked to complete it. They received a cover letter, questionnaire, and postage paid response 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 20.84%. All returned questionnaires were reviewed for completeness. One questionnaire did not answer most of the items, so it was dropped from the results. The remaining 162 questionnaires were used for further analysis.

IV-E-1. Preliminary Data Review

These responses were reviewed to make sure that they were relevant for verifying the hypotheses. Two steps were used to check for non-response bias. First, the respondents were compared to the entire sample along firm size. Then, small-size companies were compared with the medium-size companies in terms of eight variables. In the second step, early respondents were compared with late respondents in terms of the eight variables in this research.

Data on the number of employees for the firms in the sample was available from the Dun and Bradstreet directory. The directory contains the data on the number of

employees at firms. As shown in Table 8 below, the distribution of the respondents' firm size was similar to the entire sample.

Table 8
Size of Manufacturer

Number of Employees		Entire Sample	Respondents
100 to 500	(small size firm)	65%	70%
500 to 5,000	(middle size firm)	30%	27%
More than 5,000	(large size firm)	5%	3%

The second test for non-response bias was conducted by comparing the early with the late respondents (Armstrong and Ovington 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 (i.e., years of relationship with the supplier, years of experience as a purchasing manager in the company, environmental volatility, environmental diversity, dependence on the partner, unilateral control mechanism, bilateral control mechanism, and satisfaction) were compared across the two groups. The mean values for each scale were compared across the two groups. *t-tests* indicated that there were no significant differences on these variables, suggesting that non-response bias did not exist.

IV-E-2. Scale Review

Several steps were taken to make sure that each scale in the data had acceptable psychometric properties:

Table 9
Correlation Table

	Environmental Volatility	Environmental Diversity	Buyer's Dependence	Supplier's Dependence	The Unilateral Control Mechanism	The Norm of Flexibility	The Norm of Information Sharing	Satisfaction
Environmental Volatility	0.7273 (alpha)							
Environmental Diversity	.4766	0.6037 (alpha)						
Buyer's Dependence	.2453	.0622	0.7871 (alpha)					
Supplier's Dependence	.2650	.1062	.4802	0.7571 (alpha)				
Unilateral Control M.	.4121	.2741	.2434	.4248	0.8111 (alpha)			
Flexibility	-.2374	-.0309	.0546	.1036	-.0014	0.8158 (alpha)		
Information Sharing	-.2283	-.1085	.1012	.1409	.0291	.5647	0.7958 (alpha)	
Satisfaction	-.3581	-.2108	-.0376	-.1674	-.0882	.4326	.4670	0.7821 (alpha)

- Reliability was tested by calculating Conbach alpha.
- Dimensionality was tested through principal component factor analysis. A scale was considered unidimensional if all of its items loaded into one factor.
- Discriminant validity was tested by comparing a scale's cronbach alpha with its correlations with other scales in this research (Ruekert and Churchill 1984). If the cronbach alpha of the scale was substantially larger than the scale's correlations, the scale was considered to have discriminant validity.

IV-E-3. Items for Constructs

Environmental Volatility (SUMVOLAT): since the pretest for environmental volatility showed acceptable psychometric properties, the same items for the construct were used in the main survey. The four Likert scale items were: volatility in terms of price for the supplied product; the stability of the provision of products; availability of the products; and uncertainty in the production of supplied goods. These items tapped the definition of environmental volatility. These items are shown in table 10 below.

Table 10
Items in Environmental Volatility

V1	Availability of Major Product in the market is highly uncertain.
V2	Uncertainty in the production of Major Product is a real problem in the market.
V3	The supply of Major Product is not stable.
V4	Price for Major Product in the market is volatile.

(The response options for all Likert scales in this paper ranged from Strongly Disagree [1] to Strongly Disagree [7].)

Principle component analysis indicated that the scale for environmental volatility was unidimensional. Only the first factor was significant (Buja and Eyuboglu 1992), and all four items loaded onto the first factor, which shows the unidimensionality of the scale. The factor explained the 56% of total variance.

The cronbach alpha for environmental volatility was .73. The alpha of .73 was larger than the correlations with any of the other scales, which provides evidence of discriminant validity (see table 11). Table 11 below shows these findings:

Table 11
Environmental Volatility Diagnostics

Mean Std. Deviation	10.83 4.32
Reliability	Coefficient Alpha = .73
Dimensionality (Factor Analysis)	Factor Eigenvalue Proportion Cumulation 1 2.23341 55.8 55.8 2 .78550 19.6 75.5 3 .56415 14.1 89.6 4 .41695 10.4 100.0
Factor1 Factor loadings	
V1 .77140	Availability of Major Product in the market is highly uncertain.
V2 .84341	Uncertainty in the production of Major Product is a real problem in the market.
V3 .75222	The supply of Major Product is not stable.
V4 .60099	Price for Major Product in the market is volatile.
Validity	The alpha of .73 was larger than the correlation between environmental volatility and any of the scales.

Environmental Diversity (SUMDIVER): the items for environmental diversity that were used for preliminary test did not have acceptable psychometric properties.

Table 12
Items in Environmental Diversity

M1	In making product, your firm requires a large variety of materials (parts, raw materials, etc).
M2	The purchasing terms for the parts your firm buys are very different from another.
M3	The parts your firm uses come from a large variety of supplier types.
M4	Your firm receives supplier proposals that differ substantially from one another.

Principle component analysis for 4 environment variables did not indicate that the scale for environmental diversity went together. Item 2 (M2) did not converge with other items for environmental diversity. Thus, M2 was excluded.

This revised scale showed acceptable psychometric properties. Principal component analysis for the remaining three items indicated that the scale for environmental diversity was unidimensional. Only the first factor was significant, and all three items loaded onto the first factor. The factor explained the 55.9% of total variance.

The cronbach alpha for environmental volatility was .60, which was relatively lower than that of other scales. The alpha of .60 was larger than the correlations with any of the other scales, which provided evidence of discriminant validity (see table 13). Table 13 below shows the result of these findings:

Table 13
Environmental Diversity Diagnostics

Mean Std. Deviation	8.09 3.59			
Reliability	Coefficient Alpha = .60			
Dimensionality (Factor Analysis)	Factor	Eigenvalue	Proportion	Cumulation
	1	1.67809	55.9	55.9
	2	.76710	25.6	81.5
	3	.55481	18.5	100.0
Factor1 Factor loadings				
M1 .68691	In making product, your firm requires a large variety of materials (parts, raw materials, etc).			
M3 .81360	The parts your firm uses comes from a large variety of supplier types.			
M4 .73776	Your firm receives supplier proposals that differ from one another substantially.			
Validity	The alpha of .60 was larger than the correlation between environmental diversity and any of the scales.			

A Manufacturer's Dependence on the Supplier (BUYDEP) & the Supplier's Dependence on the Manufacturer (SUPDEP): since the pretests for the scale of the manufacturer's dependence on the supplier and the scale of the supplier's dependence on the manufacturer showed acceptable psychometric properties, the same items for these constructs were used in the main survey. The dependence on the partner was assessed mostly by examining the expected ease and costs associated with replacing the current partner, and the overall dependence on the partner.

Table 14
Items in Interdependence Structures

	A Manufacturer's Dependence on the Supplier
BD1	It would be difficult for your firm to replace Major Supplier's products with another supplier's product line.
BD2	The total costs of switching to a comparable supplier would be prohibitive for your firm.
BD3	If your company wanted to, you could find other suppliers who could provide your company with comparable product lines.
BD4	Your company is strongly dependent on Major Supplier.
	A Supplier's Dependence on the Manufacturer
SD1	It would be difficult for Major Supplier to replace the sales and profits realized from your firm with another customer.
SD2	Major Supplier's total costs of switching to another comparable customer would be prohibitive.
SD3	Major Supplier could find other customers to replace your company in your trade area, if the supplier wanted to.
SD4	Major Supplier is strongly dependent on your company.

Among the four items that were used to measure the manufacturer's dependence on the supplier, one item (BD3) that used reversed scale did not go together with the other items in the principle component analysis. The same phenomenon happened to the items related to the supplier's dependence on the manufacturer. Thus, two reversed items, BD3 and SD3, were excluded in the main analysis. The scale that was used for measuring the manufacturer's dependence on the supplier was used for the scale of the supplier's dependence on the manufacturer. Therefore, both the manufacturer's dependence and the supplier's dependence were measured by the same three items.

Principle component analysis for the remaining three items for the manufacturer's dependence on the supplier indicated that the scale was unidimensional. Only the first factor was significant, and all three items loaded onto the first factor. The factor explained the 70.1% of total variance.

Principle component analysis for the rest three items for the supplier's dependence on the manufacturer indicated that the scale was unidimensional. Only the first factor was significant, and all three items loaded onto the first factor, which showed the dimensionality of the scale. The factor explained the 67.3% of total variance.

The coefficient alphas for the manufacturer's dependence on the supplier (alpha: .79) and for the supplier's dependence on the manufacturer (alpha = .76) were at an acceptable level. The alphas of .79 and .76 were larger than the correlations with any of the other scales, which provided evidence of discriminant validity (see table 15). Table 15 below shows the results:

Table 15
Manufacturer's Dependence on Its Supplier Diagnostics

Mean Std. Deviation	11.72 4.23			
Reliability	Coefficient Alpha = .79			
Dimensionality (Factor Analysis)	Factor	Eigenvalue	Proportion	Cumulation
	1	2.10420	70.1	70.1
	2	.60386	20.1	90.3
	3	.29197	9.7	100.0
Factor1 Factor loadings				
BD1 .81998	It would be difficult for your firm to replace Major Supplier's products with another supplier's product line.			
BD2 .90555	The total costs of switching to a comparable supplier would be prohibitive for your firm.			
BD4 .78219	Your company is strongly dependent on Major Supplier.			
Validity	The alpha of .79 was larger than the correlation between manufacturer's dependence and any of the scales.			

Table 16
Supplier's Dependence on Its Manufacturer Diagnostics

Mean	10.79			
Std. Deviation	3.93			
Reliability	Coefficient Alpha = .76			
Dimensionality (Factor Analysis)	Factor	Eigenvalue	Proportion	Cumulation
	1	2.01942	67.3	67.3
	2	.56552	18.9	86.2
	3	.41506	13.8	100.0
Factorl	Factor Loadings			
SD1	.85767	It would be difficult for Major Supplier to replace the sales and profits realized from your firm with another customer.		
SD2	.79498	Major Supplier's total costs of switching to another comparable customer would be prohibitive.		
SD4	.80736	Major Supplier is strongly dependent on your company.		
Validity	The alpha of .76 was larger than the correlation between supplier's dependence and any of the scales.			

Interdependence Magnitude (SUMPOWER) and Asymmetry (ASYPOWER)

Measures: the scales for the manufacturer's dependence and the supplier's dependence were used to calculate power magnitude and power asymmetry. Power magnitude was captured by combining the manufacturer's dependence with the supplier's dependence. Power asymmetry was obtained by deducting supplier's dependence from the manufacturer's dependence.

Manufacturer's Unilateral Control over the Supplier (SUMCONTR): the unilateral control mechanism focused on the manufacturer's control over the supplier in terms of various production-related decisions.

Table 17
Items for the Unilateral Control Mechanism

U1	Major Supplier's production processes are to a large extent determined by your firm's requirements.
U2	Major Supplier's engineering changes are to a large extent determined by your firm's requirements.
U3	Major Supplier's level of inventory (raw material, semi-finished and finished components) is to a large extent decided by your firm.
U4	Your firm influences to a large extent Major Supplier's part-price.
U5	Major Supplier's quality control procedures are to a large extent decided by your firm.

Principle component analysis for the five items for the unilateral control mechanism indicated that the scale was unidimensional. Only the first factor was significant, and all five items loaded onto the first factor. The factor explained the 58.0% of total variance. The cronbach alpha for environmental volatility was at an acceptable level (.81). The alpha of .81 was larger than the correlations with any of the other scales, which provided the evidence of discriminant validity (see table 18). Table 18 below shows the result of these findings:

Table 18
The Unilateral Control Mechanism Diagnostics

Mean Std. Deviation	12.02 5.60			
Reliability	Coefficient Alpha = .81			
Dimensionality (Factor Analysis)	Factor	Eigenvalue	Proportion	Cumulation
	1	2.89981	58.0	58.0
	2	.89673	17.9	75.9
	3	.50444	10.1	86.0
	4	.40427	8.1	94.1
	5	.29475	5.9	100.0
Factor1 Factor Loadings				
U1 .82164	Major Supplier's production processes are to a large extent determined by your firm's requirements.			
U2 .70952	Major Supplier's engineering changes are to a large extent determined by your firm's requirements.			
U3 .77485	Major Supplier's level of inventory (raw material, semi-finished and finished components) is to a large extent decided by your firm.			
U4 .74567	Your firm influences to a large extent Major Supplier's part-price.			
U5 .75158	Major Supplier's quality control procedures are to a large extent decided by your firm.			
Validity	The alpha of .81 was larger than the correlation between the unilateral control mechanism and any of the scales.			

The Norm of Information Sharing (SUMINFOR) and The Norm of Flexibility (SUMFLEX): two relational norms, the norm of information sharing and the norm of flexibility, were measured for the bilateral control mechanism. The scale measured the existence of expectations of exchanged information between two exchange parties and of expectation of flexible behavior in response to the partner's request. Since the pretests for

the scale of the norm of information sharing and the norm of flexibility showed acceptable psychometric properties, the same items for these constructs were used in the main survey. Each scale consisted of four items.

Table 19
Items in the Bilateral Control Mechanism

	The Norm of Information Sharing
I1	It is expected that both your firm and Major Supplier share information that might help the other company.
I2	Your firm is supposed to exchange information with Major Supplier regularly.
I3	It is expected that both your firm and Major Supplier provide proprietary information if it can help the other company.
I4	It is expected that both your firm and Major Supplier keep each other informed about changes that may affect the other company.
	The Norm of Flexibility
F1	Both your firm and Major Supplier expect that each company will be flexible to the other company's request for changes.
F2	Both your firm and Major Supplier expect to be able to make any adjustments necessary to cope with changing circumstances.
F3	When an unexpected situation arises, both your firm and Major Supplier would prefer to amend your agreement rather than hold each other to the original terms.
F4	It is expected that both your firm and Major Supplier will be flexible to each other if it can help the other company.

The scale for the norm of information sharing showed acceptable psychometric properties in the main test. Principle component analysis for the four items for the norm of information sharing indicated that the scale was unidimensional. Only the first factor

was significant, and all four items loaded onto the first factor. The factor explained the 64.6% of total variance.

Principle component analysis for 4 items indicated that the items for the norm of flexibility did not go together. Item 3 (F3) did not converge with the rest of the items. Thus, F3 was excluded.

The scale for the norm of flexibility showed acceptable psychometric properties. Principle component analysis for the rest of the three items for the norm of flexibility indicated that the scale was unidimensional. Only the first factor was significant, and the three items loaded onto the first factor. The factor explained the 73.3% of total variance.

The coefficient alphas for the norm of information sharing was .80, and the norm of flexibility were .82. The alphas of .80 and .82 were larger than the correlations with any of the other scales, which provided evidence of discriminant validity (see table 20: correlation table). Table 20 below shows the result of these findings:

Table 20
The Norm of Information Sharing Diagnostics

Mean Std. Deviation	20.81 4.39			
Reliability	Coefficient Alpha = .80			
Dimensionality (Factor Analysis)	Factor	Eigenvalue	Proportion	Cumulation
	1	2.58446	64.6	64.6
	2	.70637	17.7	82.3
	3	.38776	9.7	92.0
	4	.32121	8.0	100.0
Factor1 Factor Loadings				
I1 .84058	It is expected that both your firm and Major Supplier share information that might help the other company.			
I2 .78224	Your firm is supposed to exchange information with Major Supplier regularly.			
I3 .64189	It is expected that both your firm and Major Supplier provide proprietary information if it can help the other company.			
I4 .77107	It is expected that both your firm and Major Supplier keep each other informed about changes that may affect the other company.			
Validity	The alpha of .80 was larger than the correlation between the norm of information sharing and any of the scales.			

Table 21
The Norm of Flexibility Diagnostics

Mean Std. Deviation	16.35 2.98
Reliability	Coefficient Alpha = .82
Dimensionality (Factor Analysis)	Factor Eigenvalue Proportion Cumulation 1 2.00004 73.3 73.3 2 .58838 19.6 92.9 3 .21158 7.1 100.0
Factor| Factor Loadings	
F1 .88262	Both your firm and Major Supplier expect that each company will be flexible to the other company's request for changes.
F2 .92070	Both your firm and Major Supplier expect to be able to make any adjustments necessary to cope with changing circumstances.
F4 .75718	It is expected that both your firm and Major Supplier will be flexible to each other if it can help the other company.
Validity	The alpha of .82 was larger than the correlation between the norm of flexibility and any of the scales.

Effectiveness of Buying Performance: effectiveness of the buying performance is the effectiveness of the manufacturer's buying performance resulting from the relationship between the manufacturer and the supplier. This construct was measured by two variables; the percentage of late delivery and the ratio of defected parts to non-defected parts delivered.

Satisfaction with the Supplier's Performance: satisfaction with the supplier's performance was defined as the manufacturer's overall satisfaction with the supplier's performance. It was assessed by asking the manufacturer to evaluate its level of

satisfaction with its major supplier's product quality, service, and on-time delivery. The last item was the manufacturer's overall satisfaction with the supplying performance of the major supplier.

Table 22
Items in Buying Performance

	Effectiveness of Buying Performance
P1	What percentage of orders (delivered) of products from Major Supplier are late? _____%
P2	What percentage of products delivered by Major Supplier are defective, not up to specifications, the wrong items, or otherwise unacceptable? _____%
	Satisfaction with the Supplier's Performance
S1	Your firm is satisfied with Major Supplier's product quality.
S2	The service provided by Major Supplier is satisfactory.
S3	Your firm is satisfied with the overall supplying of Major Supplier.
S4	Your firm is satisfied with the on-time delivery performance of Major Supplier.

The scale for the evaluation of supplying performance showed acceptable psychometric properties. Principle component analysis for the four items indicated that the scale for the evaluation of supplying performance was unidimensional. Only the first factor was significant, and all three items loaded onto the first factor. The factor explained the 60.8% of total variance. The Cronbach alpha for environmental volatility was .78. Table 23 below shows the results.

Table 23
The Evaluation of Supplying Performance Diagnostics

Mean Std. Deviation	23.08 3.17			
Reliability	Coefficient Alpha = .78			
Dimensionality (Factor Analysis)	Factor	Eigenvalue	Proportion	Cumulation
	1	2.43120	60.8	60.8
	2	.72261	18.1	78.8
	3	.45553	11.4	90.2
	4	.39066	9.8	100.0
Factor	Factor Loadings			
S1	.82599	Your firm is satisfied with Major Supplier's product quality.		
S2	.72617	The service provided by Major Supplier is satisfactory.		
S3	.82109	Your firm is satisfied with the overall supplying of Major Supplier.		
S4	.73989	Your firm is satisfied with the on-time delivery performance of Major Supplier.		
Validity	The alpha of .78 was larger than the correlation between satisfaction with supplier's performance and any of the scales.			

IV-F. Hypothesis Testing

To conduct a rigorous test of the hypotheses presented in the previous chapter, regression analysis was used. Hypotheses from 1 to 8 dealt with the relationship between environments and control mechanisms. Hypothesis 9 dealt with the interaction between control mechanisms. Hypotheses 10 and 11 dealt with the influence of control mechanisms on the manufacturer's buying performance. Through the regression analysis, each hypothesis was investigated.

IV-F-1. Test of the Influence of Environments on Control Mechanisms

IV-F-1-a. Test of the Influence of Environments on the Unilateral Control Mechanisms

The hypotheses concerning the relationships between environments and the unilateral control mechanism were developed in chapter II. They are summarized in Table 24 below:

Table 24
Hypotheses for the Relationship between
Environments and the Unilateral Control Mechanism

H1: Given a constant degree of environmental diversity, the manufacturer's reliance on a unilateral control mechanism increases as environmental volatility increases.
H3: Given a constant degree of environmental volatility, the manufacturer's reliance on a unilateral control mechanism decreases as environmental diversity increases.
H5: Given a constant degree of interdependence magnitude, the manufacturer's reliance on a unilateral control mechanism increases as interdependence asymmetry increases.
H7: Given a constant degree of interdependence asymmetry, the manufacturer's reliance on a unilateral control mechanism decreases as interdependence magnitude increases.

These hypotheses were tested formally with multiple regression. Hypotheses 1,3,5,7 were tested through multiple regression. The dependent variable in the regression model was the unilateral control mechanism (SUMCONTR). The independent variables included environmental volatility (SUMVOLAT), environmental diversity (SUMDIVER), power asymmetry (ASYPOWER), and power magnitude (SUMPOWER). The equation was structured as follows:

$$SUMCONTR = b_0 + b_1 SUMVOLAT + b_2 SUMDIVER + b_3 ASYPOWER + b_4 SUMPOWER + ui$$

Where

b_0

b_1, b_2, b_3, b_4 = coefficient and

ui = a disturbance term

The results are shown in Table 25 below:

Table 25
Multiple Regression for Hypotheses 1,3,5 and 7

Dependent Variable.. SUMCONTR

Multiple R .47022
R Square .22110
Adjusted R Square .19785
Standard Error 4.83375

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	4	888.76129	222.19032
Residual	134	3130.92216	23.36509

F = 9.50950 Signif F = .0000

Variables in the Equation

Variable	B	SE B	Beta	T	Sig T
SUMVOLAT	.272590	.117574	.208015	2.318	.0219
SUMDIVER	.162749	.134514	.105891	1.210	.2284
ASYPOWER	.225095	.098253	.176082	2.291	.0235
SUMPOWER	.222474	.061486	.287792	3.618	.0004
(Constant)	2.815223	1.641706		1.715	.0887

The model had acceptable statistical properties. It was significant (F=9.5) and explained a substantial portion of the variance in SUMCONTR (Adj R^2 = .20). Despite the fact that the two external environment variables focused on external environment and the other two internal environment variables focused on the power relationship between a

manufacturer and its supplier, there was no indication of collinearity between any of the variables. The VIF[3]'s were all less than 2. Several significant results were found:

- The coefficient for environmental volatility was positive and significant (t = 2.32). This suggested that increases in environmental volatility would lead to an increase in manufacturer's dependence on the unilateral control mechanism. This supported hypothesis 1.
- The coefficient for environmental diversity was not significant (t = 1.21). Thus, this result did not support hypothesis 3.
- The coefficient for power asymmetry was positive and significant (t =2.29). This suggested that an increase in power asymmetry would lead to an increase in the unilateral control mechanism. This supported hypothesis 5.
- The coefficient for power magnitude was positive and significant (t = 3.62). This result, contrary to the suggestion of this study, did not support hypothesis 7. The negative relationship between power magnitude and the unilateral control mechanism was hypothesized in hypothesis 7. The result suggested that increases in power magnitude would lead to increases in the unilateral control mechanism.

[3] The computational formula for VIF (Variance Inflation Factor) is 1/(1-Sqrt Ri^2). Ri^2 is the squared multiple correlation coefficient that results when a independent variable is regressed against all other independent variables. VIF that is greater than 10 indicates collinearity (Chatterjee and Price 1991).

IV-F-1-b. Test of the Influence of Environments on the Bilateral Control Mechanism

The hypotheses concerning the relationship between environments and the bilateral control mechanisms are summarized in Table 26 below:

Table 26
Hypotheses for the Relationship between
Environments and the Bilateral Control Mechanism

H2A: Given a constant degree of environmental diversity, the manufacturer's reliance on the norm of information sharing decreases as environmental volatility increases.
H2B: Given a constant degree of environmental diversity, the manufacturer's reliance on the norm of flexibility decreases as environmental volatility increases.
H4A: Given a constant degree of environmental volatility, the manufacturer's reliance on the norm of information sharing increases as environmental diversity increases.
H4B: Given a constant degree of environmental volatility, the manufacturer's reliance on the norm of flexibility increases as environmental diversity increases.
H6A: Given a constant degree of interdependence magnitude, the manufacturer's reliance on the norm of information sharing shows a curvilinear shape as interdependence asymmetry increases.
H6B: Given a constant degree of interdependence magnitude, the manufacturer's reliance on the norm of flexibility shows a curvilinear shape as interdependence asymmetry increases.
H8A: Given a constant degree of interdependence asymmetry, the manufacturer's reliance on the norm of information sharing increases as interdependence magnitude increases.
H8B: Given a constant degree of interdependence asymmetry, the manufacturer's reliance on the norm of flexibility increases as interdependence magnitude increases.

These hypotheses were tested twice. In the first test, SUMINFOR was regressed against all environmental variables. In the second test, SUMFLEX was regressed against the same environmental variables. The hypotheses were tested with multiple regression.

Among the tests, the curvilinear relationship between relational norms and interdependence asymmetry was suggested in H6A and H6B. As the manufacturer's relative power over the supplier increases from the point of equal power, or as the manufacturer's relative power decreases from the equal power, the manufacturer is less likely to rely on relational norms. The absolute value of power asymmetry (ABSASYPW) was used to measure the power asymmetry, since the absolute value of power asymmetry means that the manufacturer has either more relative power over the supplier or less relative power over the supplier.

In the Hypothesis test for 2A, 4A, 6A, and 8A, the dependent variable in the regression model was the norm of information sharing (SUMINFOR). The independent variables included environmental volatility (SUMVOLAT), environmental diversity (SUMDIVER), power asymmetry (ASYPOWER), and power magnitude (SUMPOWER). The equation was structured as follows:

$$\text{SUMINFOR} = b_0 + b_1\,\text{SUMVOLAT} + b_2\,\text{SUMDIVER} + b_3\,\text{ABSASYPO} + b_4\,\text{SUMPOWER} + ui$$

The results are shown in Table 27:

Table 27
Multiple Regression for Hypotheses 2A,4A,6A and 8A

Dependent Variable.. SUMINFOR

Multiple R	.34531
R Square	.11924
Adjusted R Square	.09334
Standard Error	4.22059

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	4	327.98828	81.99707
Residual	136	2422.62165	17.81339

F = 4.60311 Signif F = .0016

Variables in the Equation

Variable	B	SE B	Beta	T	Sig T
SUMVOLAT	-.192588	.104043	-.177871	-1.851	.0663
SUMDIVER	-.082200	.114876	-.066961	-.716	.4755
ABSASYPW	-.304871	.125582	-.202106	-2.428	.0165
SUMPOWER	.144483	.052782	.228955	2.737	.0070
(Constant)	21.389605	1.500117		14.259	.0000

The model had acceptable statistical properties. It was significant (F=4.6) and explained a substantial portion of the variance in SUMINFOR (Adj R^2 = .09). Several significant results were found:

- The coefficient for environmental volatility was negative and significant (t = -1.851) at .10 significance level. This suggested that increases in environmental volatility would lead to decreases in the norm of information sharing. This moderately supported hypothesis 2A.

- The coefficient for environmental diversity was not significant (t = -.716). Thus, this result did not support hypothesis 4A.
- The coefficient for the absolute value of power asymmetry was negative and significant (t = -2.42). This suggested that increases in power asymmetry would lead to decreases in the norm of information sharing. This supported hypothesis 6A.
- The coefficient for interdependent magnitude was positive and significant (t = 2.74). This suggested that increases in power magnitude would lead to increases in the norm of information sharing. This supported hypothesis 8A.

In the Hypothesis test for 2B, 4B, 6B, and 8B, the dependent variable in the regression model was the norm of flexibility (SUMFLEX). The independent variables included environmental volatility (SUMVOLAT), environmental diversity (SUMDIVER), power asymmetry (ASYPOWER), and power magnitude (SUMPOWER). The equation was structured as follows:

$$\text{SUMFLEX} = b_0 + b_1\,\text{SUMVOLAT} + b_2\,\text{SUMDIVER} + b_3\,\text{ABSASYPO} + b_4\,\text{SUMPOWER} + ui$$

The results are shown in Table 28:

Table 28
Multiple Regression for Hypotheses 2B,4B,6B and 8B

Equation Number 1 Dependent Variable.. SUMFLEX

Multiple R	.31917
R Square	.10187
Adjusted R Square	.07545
Standard Error	2.84514

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	4	124.86604	31.21651
Residual	136	1100.89283	8.09480

F = 3.85637 Signif F = .0053

---------- Variables in the Equation ----------

Variable	B	SE B	Beta	T	Sig T
SUMVOLAT	-.199849	.070136	-.276495	-2.849	.0051
SUMDIVER	.064873	.077439	.079163	.838	.4036
ABSASYPW	-.144055	.084656	-.143055	-1.702	.0911
SUMPOWER	.073709	.035581	.174971	2.072	.0402
(Constant)	16.823201	1.011242		16.636	.0000

The model had acceptable statistical properties. It was significant (F=3.86) and explained a substantial portion of the variance in SUMFLEX (Adj R^2 = .08). This leads to several significant findings:

- The coefficient for environmental volatility was negative and significant (t = -2.85). This suggested that increases in environmental volatility would lead to decreases in the norm of flexibility. This supported hypothesis 2B.

- The coefficient for environmental diversity was not significant (t = 838). This result did not support hypothesis 4B.
- ABSASYPW was significant (t = -1.70), and had a negative coefficient. This suggested that increases in power asymmetry between the manufacturer the supplier would lead to decreases in the norm of flexibility. This moderately supported hypothesis 6B.
- SUMPOWER was also significant (t = 2.07) and had a positive coefficient. This suggested that increase in power magnitude would lead to increase in the norm of flexibility. This supported hypothesis 8B.

IV-F-2. Test of the Interaction between Control Mechanisms

In chapter II, it was hypothesized that control mechanisms interact with each other. There is a negative relationship between the unilateral control mechanism and the bilateral control mechanism. Table 29 summarized the relationship:

Table 29
Hypotheses for the Relationship between Control Mechanisms

H9: The manufacturer's dependence on the unilateral control mechanism will be reduced by the extent of the existence of a) the norm of information sharing b) the norm of flexibility

In the Hypothesis test for 9, the dependent variable in the regression model was the unilateral control mechanism (SUMCONTR). The independent variables included the norm of information sharing (SUMINFOR) and the norm of flexibility (SUMFLEX). The equation was structured as follows:

$$SUMCONTR = b0 + b1\ SUMINFOR + b2\ SUMFLEX + ui$$

The results are shown in Table 30 below:

Table 30
Multiple Regression for Hypotheses 9

Dependent Variable.. SUMCONTR

Multiple R	.03851
R Square	.00148
Adjusted R Square	-.01140
Standard Error	5.65165

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	2	7.35165	3.67580
Residual	155	4950.88257	31.96118

F = .11508 Signif F = .8914

Variable	B	SE B	Beta	T	Sig T
SUMFLEX	-.057515	.181506	-.030749	.317	.7518
SUMINFOR	.059274	.124517	.046193	.476	.6347
(Constant)	11.779038	2.656782		4.434	.0000

There was no significant relationship between the control mechanisms. Thus, hypothesis 9 was not supported.

IV-F-3. Test of the Influence of Control Mechanisms on Performance

The hypotheses concerning the relationship between control mechanisms and buying performance were suggested in chapter II. They are summarized in Table 31 below:

Table 31
Hypotheses for the Relationship between
Control Mechanisms and Performance

H10: The unilateral control mechanism negatively influences the manufacturer's buying performance.
H11A: The norm of flexibility will increase the manufacturer's buying performance.
H11B: The norm of information sharing will increase the manufacturer's buying performance.

Since the buying performance consists of satisfaction with the performance of the supplier and the effectiveness of the buying performance (supplier's late delivery, the ratio of supplying defected parts), each hypothesis was run three times by using each performance as a dependence variable. In the Hypothesis test for 11, the dependent variable in the regression model was the satisfaction with supplier's performance (SUMSATIS). The independent variables are the unilateral control mechanism (SUMCONTR), the norm of information sharing (SUMINFOR), and the norm of flexibility (SUMFLEX). The equation was structured as follows:

$$SUMSATIS = b0 + b_1 SUMCONTR + b_2 SUMINFOR + b_3 SUMFLEX + ui$$

The results are shown in Table 32 below:

Table 32
Multiple Regression for Hypotheses 10 through 11B (Dependent Variable: Satisfaction)

Dependent Variable.. SUMSATIS

Multiple R	.51776
R Square	.26808
Adjusted R Square	.25334
Standard Error	2.73671

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	3	408.73461	136.24488
Residual	149	1115.94510	7.48956

F = 18.19130 Signif F = .0000

Variables in the Equation

Variable	B	SE B	Beta	T	Sig T
SUMCONTR	-.068985	.039874	-.121517	-1.730	.0857
SUMFLEX	.273008	.092157	.251770	2.962	.0036
SUMINFOR	.236926	.062009	.324885	3.821	.0002
(Constant)	14.457615	1.395917		10.357	.0000

The model had acceptable statistical properties. It was significant (F=32.01) and explained a substantial portion of the variance in SUMSATIS (Adj R^2 = .25). The VIF's were all less than 2, so it had no sign of collinearity. Several significant results were found:

- SUMCONTR was highly significant (t = -1.73) at .10 significance level, and had a negative coefficient. This suggested that increases in the unilateral control mechanism would lead to decreases in satisfaction with the supplier's performance. This moderately supported hypothesis 10.
- SUMINFOR was also significant (t =2.96) and had a positive coefficient. This suggested that increases in the norm of information sharing would lead to increases in satisfaction with the supplier's performance. This supported hypothesis 11A.
- SUMFLEX was also significant (t = 3.82) and had a positive coefficient. This suggested that increase in the norm of flexibility would lead to increase in satisfaction with the supplier's performance. This supported hypothesis 11B.

In the second test Hypothesis test for 11, the dependent variable in the regression model was late delivery (LATEDELI). The independent variables were the unilateral control mechanism (SUMCONTR), the norm of information sharing (SUMINFOR), and the norm of flexibility (SUMFLEX). The equation was structured as follows:

$$\text{LATEDELI} = b0 + b_1\,\text{SUMCONTR} + b_2\,\text{SUMINFOR} + b_3\,\text{SUMFLEX} + ui$$

The results are shown in Table 33 below:

Table 33
Multiple Regression for Hypotheses 10 through 11B (Dependent Variable: Late Delivery)

Dependent Variable.. LATEDELI late delivery

Multiple R	.15030
R Square	.02259
Adjusted R Square	.00317
Standard Error	9.29953

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	3	301.82995	100.60998
Residual	151	13058.66133	86.48120

F = 1.16337 Signif F = .3258

Variables in the Equation

Variable	B	SE B	Beta	T	Sig T
SUMCONTR	.069374	.132629	.042381	.527	.5993
SUMFLEX	-.175656	.299600	-.056973	-.586	.5585
SUMINFOR	-.222951	.206885	-.104731	-1.078	.2829
(Constant)	13.532231	4.678114		2.893	.0044

The model did not have acceptable statistical properties. It was not significant (F=1.16) and did not explain a substantial portion of the variance in LATEDELI (Adj R^2 = .01). A backward regression was run to check if the model could be improved. The non-significant variables were eliminated through the backward process, and the model was recalculated. Through this process, the final model contained only significant variables. The sequence of deletions shown in table 34 below:

Table 34
Variables Deleted During Backwards Elimination

Step	Deleted Variables	p Value
1.	SUMCONTR	0.5893
2.	SUMFLEX	0.5496

Table 35
Reduced Equation for Hypothesis 10 through 11B

Dependent Variable. LATEDELI late delivery

Multiple R .13594
R Square .01848
Adjusted R Square .01207
Standard Error 9.25795

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	1	246.90496	246904964
Residual	153	13113.58632	85.70971

F = 2.88071 Signif F = .0917

---------- Variables in the Equation ----------

Variable	B	SE B	Beta	T	Sig T
SUMINFOR	-.289394	.170506	-.135942	-1.697	.0917
Constant)	12.886928	3.612881		3.567	.0005

The model had acceptable statistical properties. It was significant (F = 2.88) at the .10 significance level, and explained a portion of variance in LATEDELI (Adj R^2 = .01).

- SUMINFOR was significant (t = -1.697) at .10 significance level and had a negative coefficient. This moderately suggested that increases the norm of information sharing would lead to decreases in the supplier's late delivery.

In the third test Hypothesis test for 11, the dependent variable in the regression model was the supplier's delivery of defected products (DEFECT). The independent variables were the unilateral control mechanism (SUMCONTR), the norm of information sharing (SUMINFOR), and the norm of flexibility (SUMFLEX). The equation was structured as follows:

$$DEFECT = b0 + b_1 SUMCONTR + b_2 SUMINFOR + b_3 SUMFLEX + ui$$

The results are shown in Table 36 below:

Table 36
Multiple Regression for Hypotheses 10 through 11B

Dependent Variable.. DEFECT delivery of defected product

Multiple R .18675
R Square .03488
Adjusted R Square .01463
Standard Error 3.61189

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	3	67.41548	22.47183
Residual	143	1865.53874	13.04573

F = 1.72254 Signif F = .1650

---------- Variables in the Equation ----------

Variable	B	SE B	Beta	T	Sig T
SUMCONTR	.082048	.053283	.126690	1.540	.1258
SUMFLEX	-.068287	.119390	-.056195	-.572	.5682
SUMINFOR	.078116	.081940	.093548	.953	.3420
Constant)	4.327363	1.913481		2.262	.0252

The model did not have acceptable statistical properties. It was not significant (F=1.72) and did not explain a substantial portion of the variance in LATEDELI (Adj R^2 = .01). A backward regression was run to check if the model could be improved. The non-significant variables were eliminated at each iteration, and the model was recalculated. Though this process was continued until the model contained significant variables, no significant variable was found.

IV-F-4. Summary of Multiple Regression Test Results

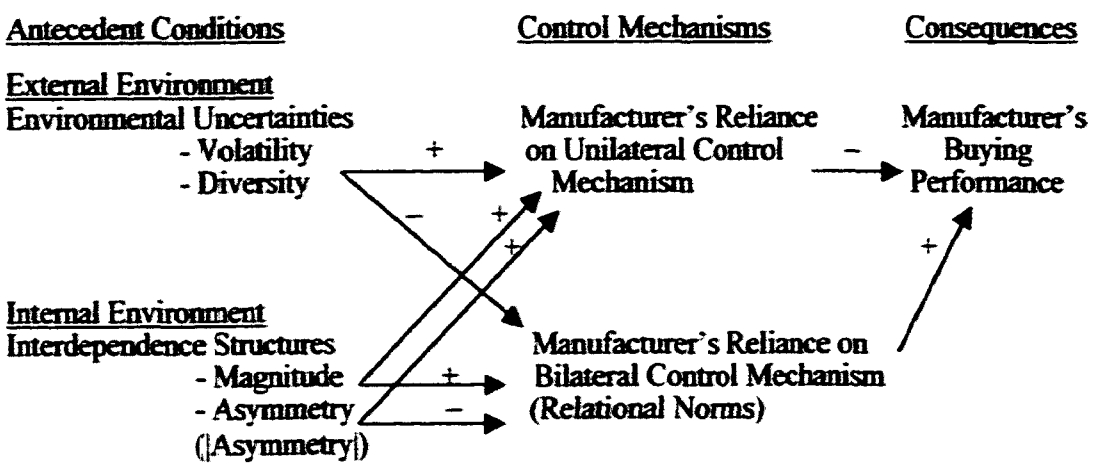
In the hypothesis tests for the relationships between environments and control mechanisms, the findings supported hypotheses 1, 2A, 2B, 5, 6A, 6B, 8A, and 8B. Environmental volatility and Interdependence asymmetry positively influence the manufacturer's dependence on the unilateral control mechanism and negatively influence the bilateral control mechanism. Interdependence magnitude positively influences the manufacturer's reliance on the bilateral control mechanism.

The findings did not support hypotheses 3, 4A, 4B, and 7. Environmental diversity showed no relationship with either the unilateral control mechanism or the bilateral control mechanism. Counter to expectation, interdependence magnitude positively influences the manufacturer's dependence on the unilateral control mechanism.

The hypothesis 10 about the negative relationship between control mechanisms is not supported. The results showed that there is no relationship between the unilateral control mechanism and the bilateral control mechanism.

In the test about the effect of control mechanisms on performance, the finding supported hypotheses 10, 11A, and 11B. While the unilateral control mechanism has a negative relationship with the manufacturer's buying performance, the bilateral control mechanism increases the manufacturer's buying performance. Figure 6 summarizes the research findings:

Figure 6
The Result of the Model of Manufacturer's Control Mechanisms



IV-F-5. Additional Test with LISREL

The comprehensive model of this research was tested with LISREL. Two separate models were tested: a model without interdependence asymmetry (model A), a model without interdependence magnitude (model B). Since interdependence magnitude and interdependence asymmetry were defined by the same items for a manufacturer's power and its supplier's power, a model including both interdependence magnitude and interdependence asymmetry could not be tested in LISREL.

Model A consists of 3 antecedent variables (environmental volatility, environmental diversity, and interdependence magnitude), 3 mediating variables (the unilateral control mechanism, the norm of flexibility, and the norm of information sharing), and 1 dependent variable (satisfaction with the supplier's performance). The same variables were used in model B except the variable of interdependence magnitude was replaced by interdependence asymmetry. In each model, thirteen relationships were tested. The input data for the models was the correlation matrix shown in Table 37.

IV-5-a. Test of the Model A

In model A, 7 variables were used. The exogenous variables were environmental volatility (X_1), environmental diversity (X_2), and interdependence magnitude (X_3). The endogenous variables were the unilateral control mechanism (Y_1), the norm of flexibility (Y_2), the norm of information sharing (Y_3), and satisfaction with the supplier's performance (Y_4). The model is shown in Table 38.

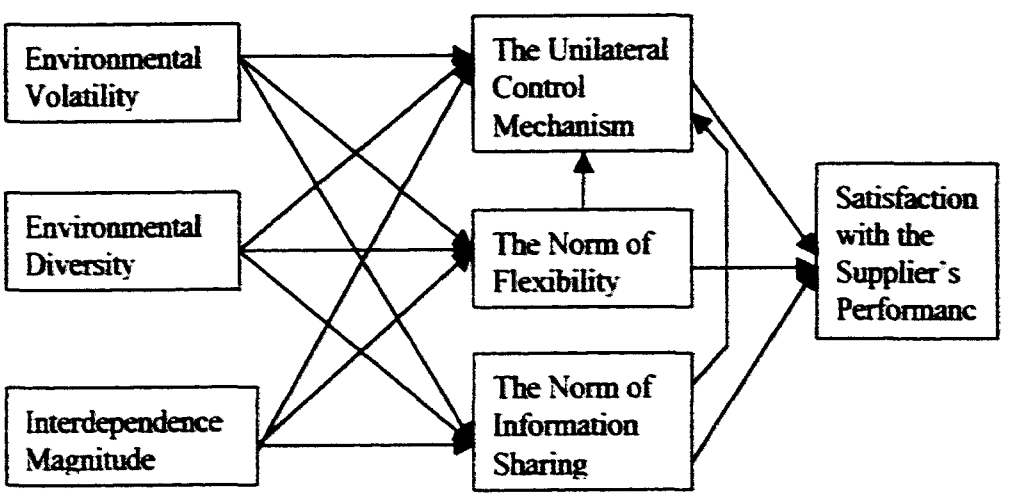
Table 37
Correlation Table

	SUMVOLAT	SUMDIVER	SUMPOWER	ASYPOWER	SUMCONTR	SUMFLEX	SUMINFOR	SUMSATIS
SUMVOLAT	1.000							
SUMDIVER	.477	1.000						
BUYDEP	.293	.085	1.000					
SUPDEP	.011	.037	-.086	1.000				
SUMCONTR	.412	.274	.374	.147	1.000			
SUMFLEX	-.237	-.030	.083	.007	-.001	1.000		
SUMINFOR	-.228	-.108	.144	.001	.029	.564	1.000	
SUMSATIS	-.358	-.211	-.114	-.140	-.088 (alpha)	.432	.4670	1.000

Table 38
Paths in LISREL Model A

Path	Description
γ_{11}	Environmental Volatility → The Unilateral Control Mechanism
γ_{21}	Environmental Volatility → The Norm of Flexibility
γ_{31}	Environmental Volatility → The Norm of Information Sharing
γ_{12}	Environmental Diversity → The Unilateral Control Mechanism
γ_{22}	Environmental Diversity → The Norm of Flexibility
γ_{32}	Environmental Diversity → The Norm of Information Sharing
γ_{13}	Interdependence Magnitude → The Unilateral Control Mechanism
γ_{23}	Interdependence Magnitude → The Norm of Flexibility
γ_{33}	Interdependence Magnitude → The Norm of Information Sharing
β_{21}	The Norm of Flexibility → The Unilateral Control Mechanism
β_{31}	The Norm of Information Sharing → The Unilateral Control Mechanism
β_{41}	The Unilateral Control Mechanism → Satisfaction with the Supplier's Performance
β_{42}	The Norm of Flexibility → Satisfaction with the Supplier's Performance
β_{43}	The Norm of Information Sharing → Satisfaction with the Supplier's Performance

Figure 7
LISREL Model A



As shown in Table 39 below, the model test provided poor results. P-value for Chi-square was .00, which means that the model needed improvement. The Adjusted Goodness of Fit Index (AGFI) was.34. This indicated that 34% of the total variance in the data was explained by the model. The Root Mean Square Residual (RMR) was .11, which suggested that the model generated large residuals. Thus, the three indices indicate that the model is a poor fit of the model for the data, and suggested that there were other significant relationships in the data.

Table 40
Model 1 – LISREL Results

Goodness of Fit		0.41	
Adjusted Goodness of Fit		0.34	
Root Mean Square Residual		0.11	
Chi Square with 4 degrees of freedom		66.53 (P = .00)	
Path	Description	Coefficient	t-value
γ_{11}	SUMVOLAT → SUMCONTR	.30	3.35
γ_{21}	SUMVOLAT → SUMFLEX	-.35	-3.83
γ_{31}	SUMVOLAT → SUMINFOR	-.30	-3.37
γ_{12}	SUMDIVER → SUMCONTR	.12	1.49
γ_{22}	SUMDIVER → SUMFLEX	.12	1.30
γ_{32}	SUMDIVER → SUMINFOR	.02	.20
γ_{13}	SUMPOWER → SUMCONTR	.27	3.57
γ_{23}	SUMPOWER → SUMFLEX	.17	2.19
γ_{33}	SUMPOWER → SUMINFOR	.23	2.93
β_{12}	SUMFLEX → SUMCONTR	.02	.21
β_{13}	SUMINFOR → SUMCONTR	.06	.85
β_{41}	SUMCONTR → SUMSATIS	-.10	-1.43
β_{42}	SUMFLEX → SUMSATIS	.33	4.86
β_{43}	SUMINFOR → SUMSATIS	.24	3.58

Several paths were not significant; γ_{12} (Environmental Diversity → The Unilateral Control Mechanism), γ_{22} (Environmental Diversity → The Norm of Flexibility) γ_{32} (Environmental Diversity → The Norm of Information Sharing), β_{21} (The Norm of Flexibility → The Unilateral Control Mechanism), β_{31} (The Norm of Information Sharing→ The Unilateral Control Mechanism), and β_{41}(The Unilateral Control Mechanism → Satisfaction with the Supplier's Performance). These non-significant relationships were consistent with the multiple regression analysis of the data with the exception of the relationship between the unilateral control mechanism and manufacturer's buying performance that was significant at .10 level in the regression analysis. These non-significant paths were removed, and the model without non-significant paths was re-tested. However, coefficients in the model were very similar to the values that had been produced by model 1. This suggested that the removal of non-significant relationships was not enough to improve the model, and a new path should be considered to improve the model 1.

Table 40
Model 1 - Standardized Residuals

	SUMCONTR	SUMFLEX	SUMINFOR	SUMSATIS	SUMVOLAT	SUMDIVER	SUMPOWER
SUMCONTR	6.59						
SUMFLEX	0.00	0.00					
SUMINFOR	6.59	6.59	0.00				
SUMSATIS	6.59	6.59	6.59	6.59			
SUMVOLAT	0.00	0.00	0.00	-3.17	0.00		
SUMDIVER	0.00	0.00	0.00	-2.17	0.00	0.00	
SUMPOWER	0.00	0.00	0.00	-2.34	0.00	0.00	0.00

The standardized residual matrix was reviewed to identify large amounts of unexplained variance. As shown in Table 38, 11 residuals were greater than |2|. Of these residuals, the relationship between the norm of flexibility and the norm of information sharing was among the largest (6.59). This large unexplained variance suggested that there was a strong relationship between the norm of flexibility and the norm of information sharing. This was not a surprising outcome, since both norms represent mutually beneficial relationship between a manufacturer and its supplier. Therefore, it would be reasonable to expect a strong relationship between the two variables. Thus, a new model (model 2) was constructed by adding a path β_{23} (the norm of flexibility → the norm of information sharing) to model 1. Model 2 was then tested.

Table 41
Model 2 – LISREL Results

Goodness of Fit	0.96
Adjusted Goodness of Fit	0.88
Root Mean Square Residual	0.069
Chi Square with 9 degrees of freedom	22.64 (P = .007)

Path	Description	Coefficient	t-value
γ_{11}	SUMVOLAT → SUMCONTR	.33	4.56
γ_{21}	SUMVOLAT → SUMFLEX	-.29	-3.58
γ_{31}	SUMVOLAT → SUMINFOR	-.15	-2.11
γ_{13}	SUMPOWER → SUMCONTR	.28	3.82
γ_{23}	SUMPOWER → SUMFLEX	.17	2.09
γ_{33}	SUMPOWER → SUMINFOR	.14	2.12
β_{42}	SUMFLEX → SUMSATIS	.25	2.98
β_{43}	SUMINFOR → SUMSATIS	.33	3.95
β_{32}	SUMFLEX → SUMINFOR	.52	7.70

Model 2 showed better fit. GFI and AGFI each rose to .97 and .87, which mean that more variance in the data was explained than model 1. RMR dropped to .056. As expected, β_{32} (SUMFLEX → SUMINFOR) was significant and positive (t = 7.70). LISREL output for model 1 suggested both directions between the norm of flexibility and the norm of information sharing, but as β_{32} was added in model 2, the suggested direction from the norm of information sharing to the norm of flexibility was removed.

Table 42
Model 2 - Standardized Residuals

	SUMCONTR	SUMFLEX	SUMINFOR	SUMSATIS	SUMVOLAT	SUMDIVER	SUMPOWER
SUMCONTR	0.00						
SUMFLEX	0.82	0.00					
SUMINFOR	0.98	0.00	0.00				
SUMSATIS	-.82	0.00	0.00	-0.65			
SUMVOLAT	0.00	0.00	0.00	**-3.40**	0.00		
SUMDIVER	1.52	1.38	0.20	-1.87	0.00	0.00	
SUMPOWER	0.00	0.00	0.00	-2.68	0.00	0.00	0.00

However, the P-value for Chi-square (.007) showed that model 2 did not fit well with the data and it should be improved. Thus, the standardized residual matrix was reviewed to identify unexplained variance. As shown in Table 42, one residual for path γ_{41} (environmental volatility and manufacturer's buying performance) was bigger than |2|. This large unexplained variance suggested that there was a strong relationship between

environmental volatility and manufacturer's buying performance. Therefore, a new model (model 3) was constructed by adding path γ_{41} to model 2.

Model 3 showed good fit with the data. GFI and AGFI each rose to .98 and .92. which showed that most of the variance in the data was explained. RMR dropped to .033. As expected, γ_{41} (SUMVOLAT $\rightarrow$ SUMSATIS) was significant and negative (t = -3.54). Accordingly, Model 3 was accepted as a final model.

Table 43
Model 3 – LISREL Results

Goodness of Fit	0.98
Adjusted Goodness of Fit	0.94
Root Mean Square Residual	0.037
Chi Square with 8 degrees of freedom	10.38 (P = .24)

Path	Description	Coefficient	t-value
γ_{11}	SUMVOLAT $\rightarrow$ SUMCONTR	.33	4.56
γ_{21}	SUMVOLAT $\rightarrow$ SUMFLEX	-.29	-3.58
γ_{31}	SUMVOLAT $\rightarrow$ SUMINFOR	-.15	-2.11
γ_{13}	SUMPOWER $\rightarrow$ SUMCONTR	.28	3.82
γ_{23}	SUMPOWER $\rightarrow$ SUMFLEX	.17	2.09
γ_{33}	SUMPOWER $\rightarrow$ SUMINFOR	.14	2.12
β_{42}	SUMFLEX $\rightarrow$ SUMSATIS	.21	2.59
β_{43}	SUMINFOR $\rightarrow$ SUMSATIS	.29	3.66
β_{32}	SUMFLEX $\rightarrow$ SUMINFOR	.52	7.70
γ_{41}	SUMVOLAT $\rightarrow$ SUMSATIS	-.24	-3.54

The final hypothesis test was conducted by using Model 3. These results were:

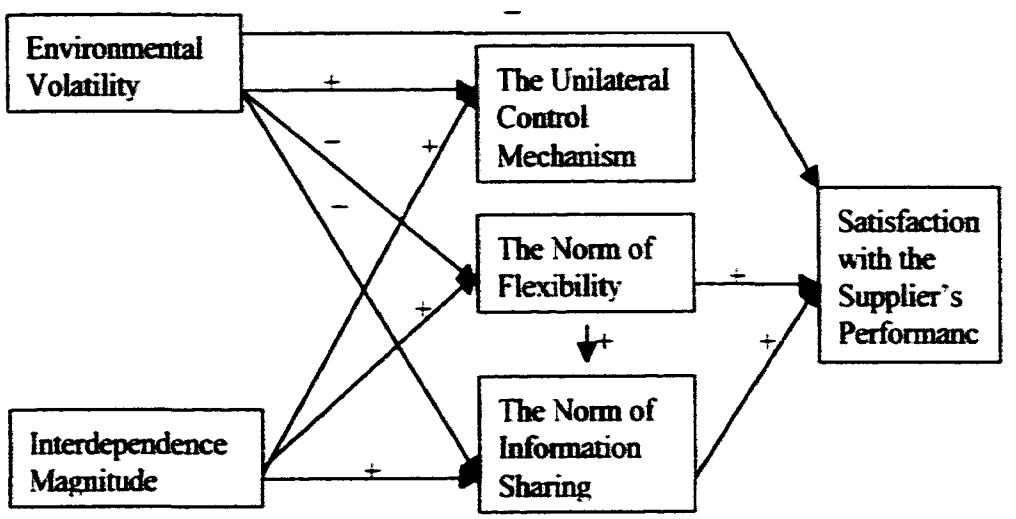
- Path γ_{11} (SUMVOLAT $\rightarrow$ SUMCONTR) was positive and significant (t = 4.56). This was consistent with the result of the multiple regression analysis. This suggested that increases in environmental volatility would lead to an increase in manufacturer's dependence on the unilateral control mechanism. This supported hypothesis 1.
- Path γ_{21} (SUMVOLAT $\rightarrow$ SUMFLEX) was negative and significant (t = -3.58). This was consistent with the result of the multiple regression analysis. This suggested that increases in environmental volatility would lead to decreases in the norm of flexibility. This supported hypothesis 2B.
- Path γ_{31}(SUMVOLAT $\rightarrow$ SUMINFOR) was negative and significant (t = -2.11). This was consistent with the result of the multiple regression analysis. This suggested that increases in environmental volatility would lead to decreases in the norm of information sharing. This supported hypothesis 2A.
- Path γ_{13} (SUMPOWER $\rightarrow$ SUMCONTR) was positive and significant (t = 3.82). This was consistent with the results of the multiple regression analysis and, thus, was another statistical indication failing to support hypothesis 7 that posited a negative relationship between interdependence magnitude and the unilateral control mechanism. The statistical results indicated that increases in power magnitude might lead to increases in the unilateral control mechanism. Hypothesis 7 was not supported.
- Path γ_{23} (SUMPOWER $\rightarrow$ SUMFLEX) was positive and significant (t = 2.09). This was consistent with the results of the multiple regression analysis and suggested that

increase in power magnitude would lead to increase in the norm of flexibility. This supported hypothesis 8B.

- Path γ_{33} (SUMPOWER $\rightarrow$ SUMINFOR) was positive and significant (t = 2.12). This was consistent with the result of the multiple regression analysis. This suggested that increases in power magnitude would lead to increases in the norm of information sharing. This supported hypothesis 8A.
- Path β_{42} (SUMFLEX $\rightarrow$ SUMSATIS) was positive and significant (t = 2.59). This was consistent with the result of the multiple regression analysis. This suggested that increase in the norm of flexibility would lead to increase in satisfaction with the supplier's performance. This supported hypothesis 11B.
- Path β_{43} (SUMINFOR $\rightarrow$ SUMSATIS) was positive and significant (t = 3.66). This was consistent with the result of the multiple regression analysis. This suggested that increases in the norm of information sharing would lead to increases in satisfaction with the supplier's performance. This supported hypothesis 11A.
- Paths positing a relationship between environmental diversity and control mechanisms (Path γ_{12}, Path γ_{22}, and Path γ_{32}) were not significant (t = 1.49, 1.30, 0.20 each). This was consistent with the result of the multiple regression analysis. These results failed to support hypotheses 3, 4A, and 4B.
- Paths posting a relationship between the bilateral control mechanism and the unilateral control mechanism (β_{12} and β_{13}) were not significant (t = 0.21, 0.85 each). This was consistent with the result of the multiple regression analysis. These results failed to support hypotheses 9A and 9B.

- Path β_{41} (SUMCONTR $\rightarrow$ SUMSATIS) was not significant (t = -1.43). These results failed to support hypotheses 10. Since LISREL used .05 as a cutoff to judge significance, the moderately significant (.10 level) relationship in the regression was not supported. Thus, LISREL analysis showed similar results to the regression analysis. However, the relationship disappeared as a path γ_{41} (SUMVOLAT $\rightarrow$ SUMSATIS) was added. Thus, this suggested that environmental volatility directly influences manufacturer's satisfaction with the supplier's performance, as opposed to indirectly through the unilateral control mechanism.
- A new path β_{32} (SUMFLEX $\rightarrow$ SUMINFOR) was significant and positive (t = 7.70). This means that a manufacturer reliance on the norm of flexibility increase the manufacturer's dependence on the norm of information sharing.
- A new path γ_{41} (SUMVOLAT $\rightarrow$ SUMSATIS) was identified. The path was significant and negative (t = -3.54). This means that increases in environmental volatility would lead to decrease a manufacturer's satisfaction of its supplier's performance.

Figure 8
The Result of Model A



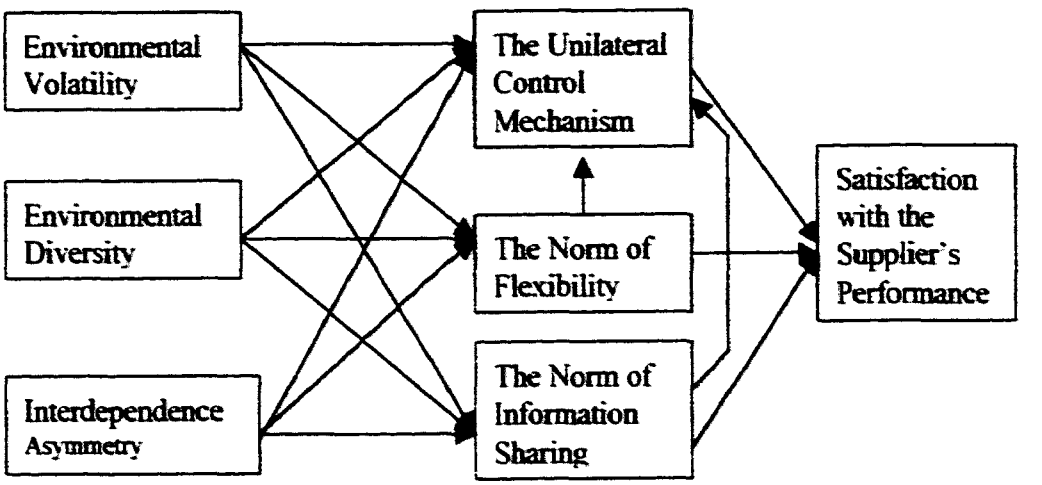
IV-F-5-b. Test of the Model B

In the model B, 7 variables were used. The exogenous variable was environmental volatility (X_1), environmental diversity (X_2), and interdependence asymmetry (X_3). The endogenous variables were the unilateral control mechanism (Y_1), the norm of flexibility (Y_2), the norm of information sharing (Y_3), and satisfaction with the supplier's performance (Y_4). Model B is shown in Table 44.

Table 44
Paths in LISREL Model B

Path	Description
γ_{11}	Environmental Volatility → The Unilateral Control Mechanism
γ_{21}	Environmental Volatility → The Norm of Flexibility
γ_{31}	Environmental Volatility → The Norm of Information Sharing
γ_{12}	Environmental Diversity → The Unilateral Control Mechanism
γ_{22}	Environmental Diversity → The Norm of Flexibility
γ_{32}	Environmental Diversity → The Norm of Information Sharing
γ_{13}	Interdependence Asymmetry → The Unilateral Control Mechanism
γ_{23}	Interdependence Asymmetry → The Norm of Flexibility
γ_{33}	Interdependence Asymmetry → The Norm of Information Sharing
β_{21}	The Norm of Flexibility → The Unilateral Control Mechanism
β_{31}	The Norm of Information Sharing → The Unilateral Control Mechanism
β_{41}	The Unilateral Control Mechanism → Satisfaction with the Supplier's Performance
β_{42}	The Norm of Flexibility → Satisfaction with the Supplier's Performance
β_{43}	The Norm of Information Sharing → Satisfaction with the Supplier's Performance

Figure 9
LISREL Model B



As shown in Table 45 below, the model provided poor results. P-value for Chi-square was .00, which means that the model needed to be improved. The Adjusted Goodness of Fit Index (AGFI) was.30. The Root Mean Square Residual (RMR) was .12, which showed that the model generated large residuals. Thus, the three indices indicated a poor fit of the model for the data, and suggested that there were other significant relationships in the data.

Table 45
Model 4 – LISREL Results

Goodness of Fit	0.90
Adjusted Goodness of Fit	0.30
Root Mean Square Residual	0.12
Chi Square with 4 degrees of freedom	71.83 (P = .00)

Path	Description	Coefficient	t-value
γ_{11}	SUMVOLAT → SUMCONTR	.40	4.73
γ_{21}	SUMVOLAT → SUMFLEX	-.29	-3.29
γ_{31}	SUMVOLAT → SUMINFOR	-.23	-2.59
γ_{12}	SUMDIVER → SUMCONTR	.09	1.13
γ_{22}	SUMDIVER → SUMFLEX	.11	1.22
γ_{32}	SUMDIVER → SUMINFOR	.01	.01
γ_{13}	ASYPOWER → SUMCONTR	.14	1.97
γ_{23}	ASYPOWER → SUMFLEX	.01	.08
γ_{33}	ASYPOWER → SUMINFOR	.01	.05
β_{12}	SUMFLEX → SUMCONTR	.03	.45
β_{13}	SUMINFOR → SUMCONTR	.11	1.54
β_{41}	SUMCONTR → SUMSATIS	-.09	-1.43
β_{42}	SUMFLEX → SUMSATIS	.24	3.59
β_{43}	SUMINFOR → SUMSATIS	.33	4.87

Several paths were not significant; γ_{12} (Environmental Diversity $\rightarrow$ The Unilateral Control Mechanism), γ_{22} (Environmental Diversity $\rightarrow$ The Norm of Flexibility) γ_{32} (Environmental Diversity $\rightarrow$ The Norm of Information Sharing), γ_{23} (Interdependence Asymmetry $\rightarrow$ The Norm of Flexibility), γ_{33} (Interdependence Asymmetry $\rightarrow$ The Norm of Information Sharing), β_{12} (The Norm of Flexibility $\rightarrow$ The Unilateral Control Mechanism), β_{13} (The Norm of Information Sharing $\rightarrow$ The Unilateral Control Mechanism), and β_{41} (The Unilateral Control Mechanism $\rightarrow$ Satisfaction with the Supplier's Performance).

These non-significant relationships were consistent with the data analysis with multiple regression. However several different results were produced due to the problem of manipulation of interdependence asymmetry. In multiple regression analysis, the absolute value of interdependence asymmetry was regressed against the bilateral control mechanism, whereas manufacturer's relative power over the supplier was regressed against the unilateral control mechanism. However, since the correlation data matrix from all variables is calculated simultaneously in LISREL, the absolute value of interdependence asymmetry could not be used. Instead, manufacturer's relative power over the supplier was used. That is why γ_{23} (Interdependence Asymmetry $\rightarrow$ The Norm of Flexibility) and γ_{33} (Interdependence Asymmetry $\rightarrow$ The Norm of Information Sharing) were not significant in the LISREL test.

All of these non-significant paths were removed, and the model without non-significant paths was re-tested. However, coefficients in the model were very similar to

the values that had been produced by model 4. This suggested that the removal of non-significant relationships was not sufficient to improve the model, and a new path should be considered to improve the model B.

The standardized residual matrix was reviewed to identify large amounts of unexplained variance. As shown in Table 46, 10 residuals were greater than |2|. Of these residuals, the β_{23} (the norm of flexibility → the norm of information sharing) was among the largest (6.81). This large unexplained variance suggested that there was a strong relationship between relational norms. This was consistent with the standardized residual matrix in the model 1. As was mentioned in the discussion of model 1, it was reasonable to expect a strong relationship between the two variables, since both norms represented the bilateral control mechanism.

Table 46
Model 4 - Standardized Residuals

	SUMCONTR	SUMFLEX	SUMINFOR	SUMSATIS	SUMVOLAT	SUMDIVER	SUMPOWER
SUMCONTR	6.81						
SUMFLEX	0.00	0.00					
SUMINFOR	6.81	6.81	0.00				
SUMSATIS	6.81	6.81	6.81	6.81			
SUMVOLAT	0.00	0.00	0.00	-3.16	0.00		
SUMDIVER	0.00	0.00	0.00	-2.17	0.00	0.00	
SUMPOWER	0.00	0.00	0.00	-1.90	0.00	0.00	0.00

Model 5 showed better fit. GFI and AGFI each rose to .96 and .90, which meant that more variance in the data were explained than model 1. RMR dropped to .068. As

expected, β_{32} (SUMFLEX → SUMINFOR) was significant and positive (t value = 8.05). LISREL output for model 4 suggested both directions between the norm of flexibility and the norm of information sharing, but as β_{32} was added in model 5, the suggested direction from the norm of information sharing to the norm of flexibility disappeared.

Table 47
Model 5 – LISREL Results

Goodness of Fit	0.96
Adjusted Goodness of Fit	0.90
Root Mean Square Residual	0.068
Chi Square with 12 degrees of freedom	24.88 (P = .009)

Path	Description	Coefficient	t-value
γ_{11}	SUMVOLAT → SUMCONTR	.41	5.73
γ_{21}	SUMVOLAT → SUMFLEX	-.24	-3.07
γ_{31}	SUMVOLAT → SUMINFOR	-.10	-1.49
γ_{13}	ASYPOWER → SUMCONTR	.14	1.99
β_{42}	SUMFLEX → SUMSATIS	.25	2.98
β_{43}	SUMINFOR → SUMSATIS	.33	3.95
β_{32}	SUMFLEX → SUMINFOR	.54	8.05

However, P-value for Chi-square (.009) showed that model 5 did not fit well with the data, and it should be improved. Thus, the standardized residual matrix was reviewed to identify unexplained variance. As shown in Table 48, one residual for path γ_{41} (environmental volatility and manufacturer's buying performance) was bigger than |2|. Therefore, model 6 was constructed by adding path γ_{41} to model 5.

Table 48
Model 5 - Standardized Residuals

	SUMCONTR	SUMFLEX	SUMINFOR	SUMSATIS	SUMVOLAT	SUMDIVER	SUMPOWER
SUMCONTR	0.00						
SUMFLEX	1.37	0.00					
SUMINFOR	1.74	0.00	0.00				
SUMSATIS	-0.43	0.00	0.00	0.00			
SUMVOLAT	0.00	0.00	0.00	**-3.40**	0.00		
SUMDIVER	1.16	1.22	0.01	-1.94	0.00	0.00	
SUMPOWER	0.00	0.12	0.05	-1.76	0.00	0.00	0.00

Model 6 (Table 49) showed good fit with the data. GFI and AGFI each rose to .98 and .94, which showed that most of the variance in the data were explained. RMR dropped to .046. As expected, γ_{41} (SUMVOLAT → SUMSATIS) was significant and negative (t = -3.54). Accordingly, Model 6 was accepted as a final model.

Table 49
Model 6 – LISREL Results

Goodness of Fit	0.98
Adjusted Goodness of Fit	0.94
Root Mean Square Residual	0.046
Chi Square with 10 degrees of freedom	12.62 (P = .25)

Path	Description	Coefficient	t-value
γ_{11}	SUMVOLAT → SUMCONTR	.41	5.73
γ_{21}	SUMVOLAT → SUMFLEX	-.24	-3.07
γ_{31}	SUMVOLAT → SUMINFOR	-.10	-1.49
γ_{13}	ASYPOWER → SUMCONTR	.14	1.99
β_{42}	SUMFLEX → SUMSATIS	.21	2.59
β_{43}	SUMINFOR → SUMSATIS	.29	3.66
β_{32}	SUMFLEX → SUMINFOR	.54	8.05
γ_{41}	SUMVOLAT → SUMSATIS	-.24	-3.54

The final hypothesis test was conducted by using Model 6. These results were:

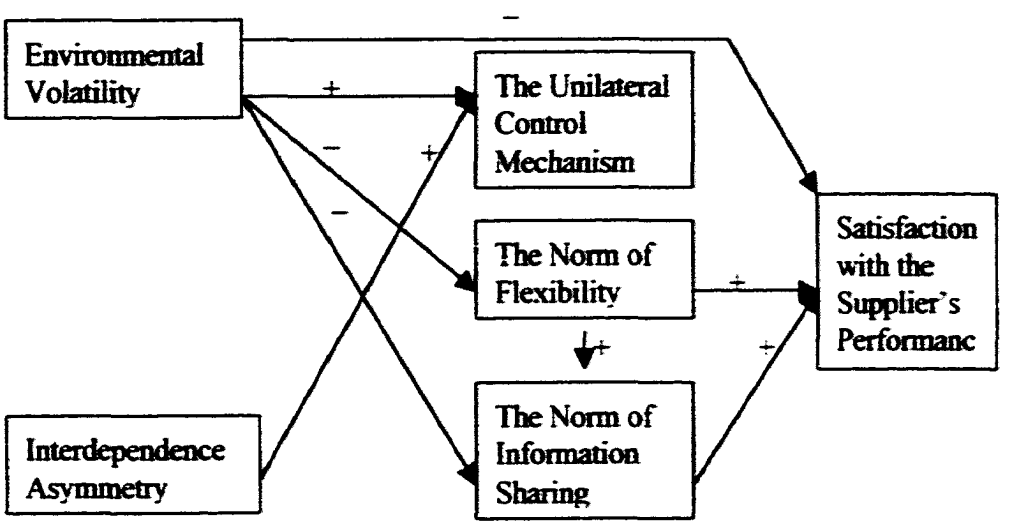
- Path γ_{11} (SUMVOLAT → SUMCONTR) was positive and significant (t = 5.73). This was consistent with the result of the multiple regression analysis. This suggested that increases in environmental volatility would lead to an increase in manufacturer's dependence on the unilateral control mechanism. This supports hypothesis 1.
- Path γ_{21} (SUMVOLAT → SUMFLEX) was negative and significant (t = -3.07). This was consistent with the result of the multiple regression analysis. This suggested that increases in environmental volatility would lead to decreases in the norm of flexibility in support of hypothesis 2B.
- Path γ_{31} (SUMVOLAT → SUMINFOR) was negative and significant (t = -1.49). This was consistent with the result of the multiple regression analysis and suggested that

increases in environmental volatility would lead to decreases in the norm of information sharing. This supported hypothesis 2A.

- Path γ_{13} (ASYPOWER $\rightarrow$ SUMCONTR) was negative and significant (t=1.99). This was consistent with the result of the multiple regression analysis. The result suggested that increases in manufacturer's relative power over the supplier would lead to increases in the unilateral control mechanism. This supported hypothesis 5.
- Path β_{42} (SUMFLEX $\rightarrow$ SUMSATIS) was positive and significant (t = 2.59). This was consistent with the result of the multiple regression analysis. This suggested that an increase in the norm of flexibility would lead to increase in satisfaction with the supplier's performance. This supported hypothesis 11B.
- Path β_{43} (SUMINFOR $\rightarrow$ SUMSATIS) was positive and significant (t = 3.66). This was consistent with the result of the multiple regression analysis. This suggested that an increase in the norm of information sharing would lead to increases in satisfaction with the supplier's performance. This supported hypothesis 11A.
- Paths describing a relationship between environmental diversity and control mechanisms (Path γ_{12}, Path γ_{22}, and Path γ_{32}) were not significant (t =1.13, 1.22, 0.01 each). This was consistent with the result of the multiple regression analysis. These results failed to support hypotheses 3, 4A, and 4B.
- Paths describing a relationship between the bilateral control mechanism and the unilateral control mechanism (β_{12} and β_{13}) were not significant (t = .45, 1.54 each). This was consistent with the result of the multiple regression analysis. These results failed to support hypotheses 9A and 9B.

- Path γ_{23} (ASYPOWER $\rightarrow$ SUMFLEX) and Path γ_{33} (ASYPOWER $\rightarrow$ SUMINFOR) were not significant (t=.08, .01 each). As was mentioned above, this is due to the inability of using the absolute value of interdependence asymmetry in the creation of correlation matrix.
- Path β_{41} (SUMCONTR $\rightarrow$ SUMSATIS) was not significant (t = -1.43), as was the case in model A. As already mentioned in model A, since LISREL used .05 as a cutoff to judge significance, the moderately significant (.10 level) relationship in the regression analysis was not supported. Thus, LISREL analysis showed similar results to the regression analysis. However, the relationship disappeared as a path γ_{41} (SUMVOLAT $\rightarrow$ SUMSATIS) was added.
- A new path β_{32} (SUMFLEX $\rightarrow$ SUMINFOR) was significant and positive (t = 8.05). This result was consistent with model A. This means that a manufacturer's reliance on the norm of flexibility increase the manufacturer's dependence on the norm of information sharing.
- A new path γ_{41} (SUMVOLAT $\rightarrow$ SUMSATIS) was identified. The path was significant and negative (t = -3.54). This result was consistent with model A. This means that increases in environmental volatility would lead to a decrease in a manufacturer's satisfaction with a supplier's performance.

Figure 10
The Result of Model B



IV-F-5-c. Summary of LISREL Test Results

Through the additional tests with LISREL, the comprehensive model of this research was confirmed. The additional LISREL test showed similar results to the multiple regression test. The LISREL tests showed significant relationships between environments and control mechanisms and between the bilateral control mechanism and manufacturer's satisfaction with the supplier's performance.

However, two unexpected paths were identified in the LISREL tests. The first path was the influence of the norm of flexibility on a manufacturer's reliance on the norm of information sharing. The need for norm of flexibility arises partly because of the bounded rationality and the limits of the human mind to handle the appropriate amount of information (Macneil 1980). Though the norm of flexibility could be an alternative to

deal with lack of information, the norm of flexibility could not be a permanent solution since exchange parties relying on the norm of flexibility would still suffer from the lack of appropriate amount of information. Thus, exchange parties with the norm of flexibility need to collect information to make up for the lack of adequate assessment of the business situation. Thus, a manufacturer's dependence on the norm of flexibility might increase its reliance on the norm of information sharing.

The second unexpected path was the direct influence of environmental volatility on manufacturer's satisfaction with the supplier's performance. In a volatile environment, supplier has a chance to engage in an opportunistic behavior to take advantage of uncertain situation (Klein, Frazier, and Roth 1990). Though a manufacturer relies on the unilateral control mechanism to reduce such opportunistic behavior (path γ_{11}), the manufacturer in a volatile environment is not satisfied with the supplier's performance (path γ_{41}). This means that the unilateral control mechanism does not seem to contribute to improving a supplier's performance because of the supplier's negative reaction to the manufacturer's reliance on the unilateral control mechanism (path β_{41}).

This is reconfirmed by a statistical result that when path γ_{41} (SUMVOLAT $\rightarrow$ SUMSATIS) was added to model A and model B, path β_{41} (SUMCONTR $\rightarrow$ SUMSATIS) became insignificant. If the unilateral control mechanism increases a manufacturer's satisfaction with a supplier's performance, the relationship between volatile environment and satisfaction with its supplier's performance should not be statistically significant due to the influence of the unilateral control mechanism on the satisfaction with the supplier's performance. However, this was not observed. Thus, it

was concluded that a manufacturer's dissatisfaction with its supplier's performance in a volatile environment was not resolved by the use of the unilateral control mechanism.

Chapter V. Discussion and Implications

This study proposed and tested control mechanisms in the relationship between a manufacturer and its supplier: the influence of external and internal environments on control mechanisms; the interaction between control mechanisms; and the effect of control mechanisms on the performance. It was proposed that the manufacturer's reliance on the unilateral control mechanism would increase as power magnitude and environmental diversity decreased; furthermore, this reliance would increase as power asymmetry and environmental volatility increased. In contrast, a reliance on the bilateral control mechanism would increase as the power magnitude and environmental diversity increased, and also as the power asymmetry and environmental volatility decreased.

This study also tested the interaction between control mechanisms. It was proposed that the increase in reliance on the bilateral control mechanism would lead to the decrease in the dependence on the unilateral control mechanism. It also proposed that the unilateral control mechanism would negatively influence the supplier's performance. In contrast, the bilateral control mechanism would positively influence the supplier's performance.

The proposed relationships were tested with data gathered from purchasing managers. The following three sections summarize the findings from this study and examine possible reasons for several unexpected findings. The limitations of this study and future direction will follow.

V-A. Interpretation of the Influence of Environments on Control Mechanisms

The results of this study showed some significant findings about the control mechanisms adopted by manufacturers. The multiple regression analysis indicated that manufacturer's reliance on a specific control mechanism was strongly influenced by internal and external environments.

V-A-1. Interpretation of the Influence of Environments on the Unilateral Control Mechanism

The analysis indicated that as the manufacturer's perception of environmental volatility increased, the manufacturer's dependence on the unilateral control mechanism increased. This finding supported hypothesis 1. Similarly, the statistics indicated that a high level of power asymmetry between the manufacturer and the supplier led to high level of the manufacturer's reliance on the unilateral control mechanism. This finding was consistent with hypothesis 5.

The analysis indicated that several hypotheses were not supported. The statistics relating to hypothesis 3 did not show any significant result. Thus, this study failed to show the negative relationship between environmental diversity and the unilateral control mechanism.

Most of the hypotheses related to environmental diversity, the relationships between environmental diversity and control mechanisms, were not significant. In addition to hypothesis 3, hypotheses 4A and 4B - the relationships between environmental diversity and relational norms - were not significant. It is possible that the low coefficient alpha of

environmental diversity might cause the non-significant results. The coefficient alpha for the environmental diversity was relatively low (.60). The low level of consistency among items for environmental diversity was not enough for hypotheses testing about the relationship between the control mechanisms and the environmental diversity. Marketing literature requires the minimum reliability of .70 (Nunnally 1978).

In addition to the scale problem, there might be a theoretical explanation for the lack of relationship between environmental diversity and the unilateral control mechanism. As environmental diversity increases, the manufacturer is less likely to have enough information about the parts it purchases, since obtaining information about various types of parts requires the manufacturer to spend a greater amount of time and resources. Thus, a diverse environment prevents the manufacturer from depending on the unilateral control mechanism due to the lack of information about the parts and its supplier. For instance, it is difficult for a manufacturer to force its supplier to increase its product quality without relevant information about product features or product quality. However, as environmental diversity increases, the information asymmetry between a manufacturer and its supplier increases, which provides the supplier with a chance to engage in opportunistic behavior (Klein, Frazier, and Roth 1990). Therefore, the supplier's opportunistic behavior pressures the manufacturer to rely on the unilateral control mechanism to prevent the opportunistic behavior. Thus, two conflict conditions coexist in a diverse environment. These two conflict conditions cause the non-significant relationship between environmental diversity and the unilateral control mechanism.

The data provided an opposite result concerning hypothesis 7. This hypothesis suggested that there would be a negative relationship between power magnitude and the unilateral control mechanism. However, the result was the opposite. The coefficient for power magnitude was positive and significant (.22, p=.00).

In order to examine other possible explanations, a regression analysis was done. The manufacturer's power and the supplier's power were separately regressed against the unilateral control mechanism. The regression results showed that only the manufacturer's power had a significant and positive relationship with the unilateral control mechanism (.39, p=.00), and the supplier's power did not have any relationship with the mechanism (.05, p=.58). Those results imply that an increase in the manufacturer's power has a stronger influence on the manufacturer's dependence on the unilateral control mechanism than does an increase in the supplier's power. That is, the manufacturer gives more weight on its power than the supplier's power when it comes to a decision on the unilateral control mechanism. Therefore, the effect of power magnitude on the manufacturer's reliance on the unilateral control mechanism is strongly influenced by the manufacturer's power over the supplier, not by the total power magnitude.

A strong influence of the manufacturer's power on the effect of power magnitude on the unilateral control mechanism means that the manufacturer is not afraid of using its power for its interest only, which might cause it to lose benefits due to the supplier's retaliation against the manufacturer's use of power. Since the supplier's power over the manufacturer is related to the manufacturer's need to maintain the relationship with the supplier, the fact that the manufacturer thinks little of the supplier's power means that the

manufacturer does not expect much benefit from the relationship. Thus, the manufacturer is likely to rely on the unilateral control mechanism for interest only.

V-A-2. Interpretation of the Influence of Environments on the Bilateral Control Mechanism

There were several findings concerning to the relationship between environments and the bilateral control mechanism. The results indicated that internal environments (power asymmetry and power magnitude) influenced the manufacturer's dependence on the norm of information sharing and the norm of flexibility. In contrast, among the external environments, only environmental volatility showed a significant relationship with the manufacturer's reliance on the norm of flexibility and the norm of information sharing.

The analysis of hypotheses 2A showed that the proposition for the negative relationship between environmental volatility and the norm of information sharing was supported at .10 significance level. The regression coefficient was negative (-.19, p=.066).

The analysis indicated that a higher level of environmental volatility makes a manufacturer depend less on the norm of flexibility. This finding is consistent with hypothesis 2B. With the analysis of hypothesis 1, it is concluded that environmental volatility positively influences the adoption of the unilateral control mechanism, whereas it negatively influences the dependence on the bilateral control mechanism.

The statistics indicated that a high level of absolute value of power asymmetry between the manufacturer and the supplier leads to a low level of the manufacturer's

reliance on the norm of information sharing. This finding supported hypothesis 6A. The results also showed that a high level of absolute value of power asymmetry between the manufacturer and the supplier had a negative relationship with the manufacturer's reliance on the norm of flexibility at .10 significance level (-1.69, p= .092). This finding supported hypothesis 6B.

The result also showed that as power magnitude between the manufacturer and the supplier increases, the manufacturer's reliance on the norm of information sharing and the norm of flexibility increases. This finding was consistent with hypothesis 8A and 8B. Thus, the findings from hypotheses 6A, 6B, 8A, and 8B support the general contention that each power structure supports different control mechanisms.

The statistical analysis indicated that several hypotheses were not supported. The analysis of hypotheses 4A and 4B concerning the relationships between environmental diversity and the norm of information sharing, and between environmental diversity and the norm of flexibility, did not show any significant result. As I already mentioned in V-A-1, these result could be the result of a poor measurement of environmental diversity. In addition to the problem of reliability, the means of four items for environmental diversity were 3.14, 2.66, 2.64, and 2.39 each, indicating that manufacturers in the sample operate in a relatively less diverse environment. This result leads to a low variance of environmental diversity, which might negatively influence the production of significant results.

In addition to the scale problem, there might be a theoretical explanation for the lack of relationship between environmental diversity and the bilateral control mechanism.

As environmental diversity increases, the supplier is more likely to behave opportunistically (Klein, Frazier, and Roth 1990). Therefore, even though the manufacturer tries to maintain a close relationship with its supplier to obtain more information about the parts, its supplier is more likely to behave opportunistically to take advantage of its better-informed position. Thus, two conflict conditions coexist in a diverse environment. The manufacturer's attempt to maintain a close relationship with its supplier creates a favorable condition for the development of relational norms, whereas the supplier's opportunistic behavior acts as a barrier for generating relational norms. Thus, there is no relationship between environmental diversity and the relational norms. This may be reason why we failed to find either a (-) or (+) relationship.

V-B. Interpretation of the Interaction between Control Mechanisms

The analysis indicated that hypotheses 9 concerning the influence of the bilateral control mechanism on the unilateral control mechanism was not supported. Thus, this study failed to show the negative relationship between the unilateral control mechanism and the bilateral control mechanism. Though the theoretical background was solid, the result did not support the hypothesis. In addition, the opposite influence on the performance - the negative relationship between the unilateral control mechanism and the performance, and the positive relationship between the bilateral control mechanism and the performance - implied that the manufacturer might prefer the bilateral control mechanism to the unilateral control mechanism. Thus, these results suggested that a manufacturer relying on the bilateral control mechanism was less likely to rely on the

unilateral control mechanism. However the suggestion of a negative relationship between them was not supported.

A possible explanation for this result was suggested during the depth interviews with purchasing managers. Though the key characteristics of the two control mechanisms are opposite, there is a possibility that some manufacturers use the both mechanisms simultaneously (Brandach and Eccles 1989). When a purchased item is crucial for a manufacturer, the manufacturer might rely on the unilateral control mechanism as a double check even though it has developed the bilateral control mechanism in relationship with its supplier.

V-C. Interpretation of the Influence of Control Mechanisms on Performance

The research results showed some significant findings about the influence of the control mechanisms on the supplier's performance. The multiple regression analysis indicated that the supplier's supplying performance was strongly influenced by the control mechanisms.

The analysis indicated that a higher level of the unilateral control mechanism over the supplier led to a lower level of the manufacturer's satisfaction with the supplier's performance at .10 significance level (-.12, p=.087). This finding moderately supported hypothesis 10.

The statistical results indicated that a higher level of the bilateral control mechanism led to a higher level of the manufacturer's satisfaction with the supplier's performance. A manufacturer's reliance on the norm of information sharing and the norm

of flexibility developed in the relationship with its supplier contributed to the supplier's higher performance. This finding supported hypothesis 11A and 11B.

However, additional tests about the relationship between objective measures of supplying performance and control mechanisms indicated a poor relationship between them. The relationships between the unilateral control mechanism and late delivery, and between the unilateral control mechanism and the delivery of defected parts, were not supported. The hypothesis testing the relationship between the norm of flexibility and the delivery of defecting parts was not supported ($t = -.58$, $p = .55$). The tests for the relationship between the norm of flexibility and late delivery and between the norm of information sharing and the delivery of defected parts were not supported. Only the relationship between the norm of information sharing and the objective measure of late delivery was supported at .10 significance level. This finding partially supported hypothesis 11B.

One of the possible reasons for these results is that the measures for late delivery and the delivery of defecting parts were not measured on the seven-point Likert scale, but rather were objective measures with arithmetic numbers. Arithmetic measures are vulnerable to the influence of extraneous variables such as history (Malhotra 1999). The extraneous variable of history is a unique event that is external to research but occurs at the same time as the research is conducted. For instance, if the overall supplying performance in a industry has improved due to the development of information technology, 'on-time delivery' measure might be higher than before. However, the manufacturer's judgement on the performance may not be 'satisfactory' since subjective

judgement takes the influence of information technology into account. Thus, objective measure of the supplier's performance could not reflect this external factor, which leads to poor measurement of the influence of the control mechanisms on the supplier's performance. Instead, in the subjective evaluation of the supplier's performance, respondents could compare the current supplier's performance with other competing vendors' performance, so that the subjective evaluation reflects the influence of control mechanisms on the supplying performance. Therefore, objective arithmetic measures cannot control the effect of history on the supplier's performance, whereas subjective evaluation of the supplier performance might be able to reflect the effect of history on the performance. Thus, the objective measures in the two performance variables might not be an accurate reflection of supplier performance.

V-D. Limitations of This Study

This study has several limitations. First, due to the limitation of the number of respondents, this study fails to clarify the effect of interaction between the external environments and the internal environments on control mechanisms. There might be several combinations of interactions between environments, such as two-way interactions between one of the external environments and one of the internal environments, or four-way interactions between the two external environments and the two internal environments. Since it is feasible that both environments simultaneously influence the manufacturer's decision on control mechanisms, the interaction effects on the manufacturer's reliance on control mechanisms might need to be explored. It is estimated

that 32 subgroups are needed to test the interaction effect. For instance, this research studies 4 antecedent and 1 mediating variables. Each antecedent variable can be divided into two conditions (high versus low) and the mediating variables consist of the unilateral control mechanism and the bilateral control mechanism. Therefore, this research needs 32 subgroups (2 volatilities $^{\times}$ 2 diversities $^{\times}$ 2 power magnitudes $^{\times}$ 2 power asymmetries $^{\times}$ 2 control mechanisms). Thus, it is more appropriate to use experimental design than mail survey in terms of collecting enough data on each subgroup. In the future research, it will be necessary to use experimental design to test the interaction effect.

Second, this study did not employ a longitudinal design. Since most of the hypotheses in this research suggest a causal relationship between independent variables and dependent variables, the longitudinal design is the best way to test the hypotheses. 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 internal and external environments to influence the development of relational norms between exchange parties. Thus, the model of control mechanisms could get a more robust result from the longitudinal design.

Another limitation is that this research explores only a subset of the unilateral control mechanism. There are other unilateral control mechanisms whose effect on the supplying performance might be different than the power-based unilateral control mechanism. For instance, a unilateral contract that is in favor of a party over the partner might belong to the unilateral control mechanism. Since the contract legally binds exchange parties to do a specific thing mentioned in the contract, its effect on supplying

performance might produce opposite results that the power based unilateral control mechanism produces. If the supplier fails to perform its duty, its buyer could sue it. Thus, the performance of the supplier might be positively correlated with the extent of coercive contract. In sum, another subset of the unilateral control mechanism could be developed to test its relationships with environments and performance.

V-E. Implications for Practitioners

This study has several managerial implications. First, this study shows that developing relational norms is one of the key factors for the manufacturer to achieve a high level of buying performance. Thus, a manufacturer should develop the norm of information sharing and the norm of flexibility to achieve a high performance.

This study shows that relational norms develop in the conditions of a symmetric power relationship and of a high power magnitude. Thus, it is suggested that power asymmetry between exchange parties should be reduced, and power magnitude should be increased to develop relational norms. The manufacturer with a relative power over its supplier could reduce power asymmetry and elevate total power through increasing dependence on its supplier. For example, the manufacturer could ask the supplier to participate in developing a new product, which increases the supplier's power over the manufacturer and augments the total power.

In the case that a supplier has relative power over its customer (a manufacturer), the manufacturer could increase its power over its supplier by reducing the portion of its purchasing volume from the supplier. The manufacturer could increase the sales volume

of its products by increasing its marketing effort over the consumer or by its production efficiency or product quality, which would lead to a high demand for the manufacturer's products by final consumer. Then, the manufacturer would order an extra volume of parts that would be used to produce the extra volume of its products from other suppliers. Through this procedure, the manufacturer could reduce the supplier's relative power.

Second, this study suggests that depending on the unilateral control mechanism does not produce an increase in the supplier's supplying performance. This result is due to the supplier's negative reaction to the manufacturer's use of power over it (Ouchi 1979). The unilateral control mechanism is likely to insult the supplier's sense of autonomy, which would result in a complaint response from the partner. Thus, the negative feeling prohibits the supplier from actively responding to the manufacturer's request.

The costs involved with the unilateral control mechanism also negatively influence the manufacturer's satisfaction of its supplier's performance. The unilateral control mechanism requires a substantial amount of time and resources, which leads to high costs (Stump and Heide 1996). For example, delay in delivery and a lower produce quality may require the manufacturer to spend time and resources to put pressure on suppliers for on-time delivery and product quality (Noordewier, John, and Nevin 1990). Thus, it is suggested that manufacturers should avoid using power to obtain parts, and try to develop relational norms in the relationship with their suppliers.

V-F. Implications for Future Research

The test of control mechanisms in different research settings could enhance our understanding of control mechanisms. A different relationship setting might have different environments. For instance, the research setting for the relationship between a manufacturer and its dealer might be involved with different external environments, such as the environments of the consumer market place. It might be productive to explore how diverse or volatile consumer markets influence control mechanisms in the relationship between a manufacturer and its dealers.

The longitudinal effect of control mechanisms on the performance might be another research topic. As the relationship goes through the stage of exploration, buildup, maturity, and decline stages, the effect of control mechanisms on the relationship quality between exchange parties changes (Jap and Ganesan 2000). Thus, it is curious as to how a manufacturer's dependence on the control mechanisms changes, as the relationship stage with its supplier goes on.

Cultural influence on the manufacturer's dependence on control mechanisms could increase our understanding of control mechanisms. Hofstede (1991) suggests five cultural dimensions. Among the five cultural dimensions, collectivism and long-term orientation might influence the manufacturer's reliance on control mechanisms. For instance, collectivist culture forces its members to cooperate with each other to achieve collective goals. Relational norms relate to the collective rather than the individual goals of the exchange parties (Gundalch and Achrol 1993). Thus, collectivist culture is more likely to contribute to the development of relational norms between a manufacturer and its supplier.

Long-term orientation culture might also nurture relational norms. Long-term orientation culture pushes its members into having long-term relationship with their partners. Relational norms evolve through repeated exchange. Thus, manufacturers in a long-term orientation culture are more likely to rely on the bilateral control mechanism. These cultural factors might either directly influence the control mechanism, or indirectly influence it by interacting with internal and external environments. Therefore, one must explore the influence of culture on the adoption of control mechanisms.

V-G. Conclusion

There is a general problem facing the manufacturer in environmental uncertainty: how does one conduct exchanges with suppliers that possess power in that relationship? A hypothesis derived from transaction cost theory is that vertical control over the partner resolves the problem. However, recent research about relational norms suggests that the bilateral control mechanism could be an alternative to vertical control mechanisms. Therefore, the key question for the manufacturer is which control mechanism is more suitable in dealing with environmental uncertainty and the different power configurations in the relationship.

In this research I propose hypotheses for control mechanisms that deal with internal and external environments and additional hypotheses concerning the effect of control mechanisms on the manufacturer's buying performance. A control mechanism model for the buyer-seller relationship is proposed.

Through a mail survey, several important results were found. The manufacturer's reliance on the unilateral control mechanism increases as interdependence asymmetry, manufacturer's power, and environmental volatility increase. In contrast, reliance on bilateral control mechanisms increases as the interdependence magnitude increases, and also as the interdependence asymmetry and environmental volatility decrease. A manufacturer's buying performance increases as its reliance on the bilateral control mechanism increases, and also as its dependence on the unilateral control mechanism decreases.

Appendix

<Cover Letter>

November 8, 2000

«FirstName» «LastName»
«Company»
«Address1»
«City», «State» «PostalCode»

Dear Mr. «LastName»,

A research team from Baruch College - New York is conducting an international study on buyer-seller relationships. The purpose of this study is to expand our understanding of how buyers and sellers interact in different cultures.

We ask your cooperation in completing the enclosed questionnaire. Your support is extremely important and will be greatly appreciated. Your responses could lead to the development of strategies necessary for building and maintaining effective relationships between buyers and sellers operating in international markets.

Your answers will not be identified with you or your company in any way. All information gathered in this study is confidential.

If you have any questions, please contact me at (212) 802 - 6507 (e-mail: sryu@gc.cuny.edu).

Thanks very much for your time and participation.

Sincerely,

Sungmin Ryu,
ABD in Marketing Department

<Follow-Up Letter>

November 25, 2000

«FirstName» «LastName»
«Company»
«Address1»
«City», «State» «PostalCode»

Dear Mr. «LastName»,

About three weeks ago, a research team from Baruch College - New York sent a questionnaire to you asking for your opinion on various aspects of the buyer-seller relationship in different cultures.
This is an area which is poorly understood by purchasing managers, policy makers, and others who might impact the buyer-seller relationship.

If you have not sent in your completed questionnaire, we repeat our request, please complete it. Each response is extremely important to us. We will use your responses to develop strategies necessary for building and maintaining effective relationships between buyers and sellers operating in international markets.

Your answers will not be identified with you or your company in any way. All information gathered in this study is confidential.

If you have any questions, please contact me at (212) 802 - 6507 (e-mail: sryu@gc.cuny.edu).

Thanks very much for your time and participation.

Sincerely,

Sungmin Ryu
ABD in Marketing Department

<Questionnaire for Pre-test>

SECTION 1. SUPPLIER RELATIONS

In this questionnaire, we would like you to provide information about your company's working relationship with your* Major Supplier *(the supplier from which your company made the largest amount of parts purchases during 1999).* Major Product *will refer to the main product your company purchase from your major supplier.

How long has your company been doing business with Main supplier?

_____

How long have you been working in your company? _____

How long have you occupied current position? _____

Please indicate the extent to which you agree with the following descriptions with respect to your company's relationship with Major supplier.

	Strongly disagree						**Strongly agree**
1) Your company expects the relationship with Major supplier to continue for a long time.	1	2	3	4	5	6	7
2) The relationship with Major supplier can be characterized as mutually trusting.	1	2	3	4	5	6	7
3) Major supplier keeps the promises it makes to your company.	1	2	3	4	5	6	7
4) Major supplier fulfills its commitments exactly as specified.							
5) Your firm is sure that what Major supplier says is true.	1	2	3	4	5	6	7
6) Even when Major supplier gives your company a rather unlikely explanation, you are confident that the supplier is telling the truth.	1	2	3	4	5	6	7
7) Major supplier always gives your company honest information.	1	2	3	4	5	6	7
8) When making important decisions, Major supplier is concerned about your company's welfare.	1	2	3	4	5	6	7
9) Major supplier is genuinely interested in the success of your company's business.	1	2	3	4	5	6	7
10) When making decisions, Major supplier considers your company's business growth.	1	2	3	4	5	6	7

	Strongly disagree						Strongly agree
11) The periodical renewal of the relationship with Major supplier is virtually automatic.	1	2	3	4	5	6	7
12) Major supplier and your firm have major disagreements on certain key issues.	1	2	3	4	5	6	7
13) Your firm and Major supplier frequently argue about key decisions involving our relationship.	1	2	3	4	5	6	7
14) Your firm and Major supplier have spent much time in resolving disagreements on certain issues.	1	2	3	4	5	6	7
15) The relationship with Major supplier is a long-term alliance.	1	2	3	4	5	6	7
16) Major supplier puts your firm's welfare on the same level as the supplier's own welfare.	1	2	3	4	5	6	7
17) A high degree of conflict exists between Major supplier and your firm.	1	2	3	4	5	6	7
18) Major supplier fulfills its duty as your company expects.	1	2	3	4	5	6	7
19) The relationship with Major supplier is enduring.	1	2	3	4	5	6	7
20) Major supplier is always honest in its dealing with your firm.	1	2	3	4	5	6	7
21) The service provided by Major supplier is very satisfactory.	1	2	3	4	5	6	7
22) Your company is satisfied with Major supplier's product quality.	1	2	3	4	5	6	7
23) There are variety of product features in the market.	1	2	3	4	5	6	7
24) Availability of Major product in the market is highly uncertain.	1	2	3	4	5	6	7
25) Prices for Major product in the market is volatile.	1	2	3	4	5	6	7
26) Both your company and Major supplier expect that each company will be flexible to the other company's request for changes.	1	2	3	4	5	6	7
27) Both your company and Major supplier expects to be able to make any adjustments necessary to cope with changing circumstances.	1	2	3	4	5	6	7
28) When an unexpected situation arises, both your company and Major supplier would prefer to amend agreement rather than to hold each other to the original terms.	1	2	3	4	5	6	7

	Strongly disagree						Strongly agree
29) It is expected that your company and Major supplier will be flexible to each other if it can help the other company.	1	2	3	4	5	6	7
30) Your company is supposed to exchange information with Major supplier regularly.	1	2	3	4	5	6	7
31) The performance of Major supplier is very satisfactory.	1	2	3	4	5	6	7
32) The price of products in the market is diverse.	1	2	3	4	5	6	7
33) Uncertainty in the production of Major product in the market is a real problem.	1	2	3	4	5	6	7
34) It is expected that both our company and this supplier provide proprietary information if it can help the other company.	1	2	3	4	5	6	7
35) Major supplier's production processes are entirely determined by your company's requirements.	1	2	3	4	5	6	7
36) Major supplier's engineering changes are entirely determined by your company's requirements.	1	2	3	4	5	6	7
37) Major supplier's level of inventory (raw material, semifinished and finished components) is entirely decided by your company.	1	2	3	4	5	6	7
38) The selection of Major supplier's subsuppliers is entirely decided by your company.	1	2	3	4	5	6	7
39) Major supplier's quality control procedures are entirely decided by your company.	1	2	3	4	5	6	7
40) It is expected that both your company and Major supplier keep each other informed about changes that may affect the other firm.	1	2	3	4	5	6	7
41) There are many suppliers who could provide Major product for your company.	1	2	3	4	5	6	7
42) The supply of Major product is not stable.	1	2	3	4	5	6	7
43) The quality of products in the market is diverse.	1	2	3	4	5	6	7
44) It would be difficult for Major supplier to replace the sales and profits realized from your firm with another customer.	1	2	3	4	5	6	7
45) Major supplier's total costs of switching to another comparable customer would be prohibitive.	1	2	3	4	5	6	7
46) Major supplier could find other customers to replace your company in your trade area, if the supplier wanted to.	1	2	3	4	5	6	7

	Strongly disagree						Strongly agree
47) Major supplier is strongly dependent on your company.	1	2	3	4	5	6	7
48) It would be difficult for your firm to replace Major supplier's products with another supplier's product line.	1	2	3	4	5	6	7
49) The total costs of switching to another comparable supplier would be prohibitive for your firm.	1	2	3	4	5	6	7
50) If your company wanted to, you could find other suppliers who could provide your firm with comparable product lines.	1	2	3	4	5	6	7
51) It would be costly lose to lose Major supplier.	1	2	3	4	5	6	7
52) Your company is strongly dependent on this supplier.	1	2	3	4	5	6	7
53) It is expected that both your company and Major supplier share information that might help the other company.	1	2	3	4	5	6	7
54) The timeliness of delivery of Major supplier is satisfactory	1	2	3	4	5	6	7
55) There are a variety of purchasing terms in the market.	1	2	3	4	5	6	7

	I do not have any knowledge						I do great deal of knowledge
56) How much do you know about Major supplier's sales volume?	1	2	3	4	5	6	7
57) How much do you know about Major supplier's profits?	1	2	3	4	5	6	7
58) How much do you know about Major supplier's switching costs to another customer?	1	2	3	4	5	6	7
59) How much do you know about Major supplier's dependence on your company?	1	2	3	4	5	6	7
60) How much do you know about the product that is supplied by your main supplier?	1	2	3	4	5	6	7
61) What percentage of orders (deliveries) of products from Major supplier are late?_____ %	1	2	3	4	5	6	7
62) What percentage of products delivered by Major supplier are defective, not up to specifications, the wrong items, or otherwise unacceptable? _____%	1	2	3	4	5	6	7

Thank You Very Much

<Questionnaire for Main Survey>

SECTION 1. SUPPLIER RELATIONS

In this section, we would like you to provide information about your company's working relationship with your **Major Supplier** (the supplier from which your company made the largest dollar amount of purchases during 1999). **Major Product** refers to the main product your company purchases from your major supplier.

How long has your company been doing business with this supplier? _____year(s).

How long have you been employed in your company? _____ year(s).

How long have you occupied current position? _____ year(s).

Please indicate the extent to which you agree with the following descriptions with respect to your company's relationship with this supplier.

	Strongly disagree						**Strongly agree**
1) Your firm expects the relationship with **Major Supplier** to continue for a long time.	1	2	3	4	5	6	7
2) Your relationship with **Major Supplier** can be characterized as mutually trusting.	1	2	3	4	5	6	7
3) **Major Supplier** keeps the promises it makes to your firm.	1	2	3	4	5	6	7
4) **Major Supplier** fulfills its commitments exactly as specified.	1	2	3	4	5	6	7
5) Your firm is sure that what **Major Supplier** says is true.	1	2	3	4	5	6	7
6) Even when **Major Supplier** gives your firm a rather unlikely explanation, your firm is confident that the supplier is telling the truth.	1	2	3	4	5	6	7
7) **Major Supplier** always gives your firm honest information.	1	2	3	4	5	6	7
8) When making important decisions, **Major Supplier** is concerned about your firm's welfare.	1	2	3	4	5	6	7
9) **Major Supplier** is genuinely interested in the success of your firm's business.	1	2	3	4	5	6	7
10) When making decisions, **Major Supplier** considers your firm's business growth.	1	2	3	4	5	6	7

	Strongly disagree						Strongly agree
11) The periodical renewal of your firm's relationship with **Major Supplier** is virtually automatic.	1	2	3	4	5	6	7
12) **Major Supplier** and your firm have major disagreements on certain key issues.	1	2	3	4	5	6	7
13) Your firm and **Major Supplier** frequently argue about key decisions involving the relationship.	1	2	3	4	5	6	7
14) Your firm and **Major Supplier** have spent much time in resolving disagreements on certain issues.	1	2	3	4	5	6	7
15) Your firm's relationship with **Major Supplier** is a long term alliance.	1	2	3	4	5	6	7
16) **Major Supplier** puts your firm's welfare on the same level as its own welfare.	1	2	3	4	5	6	7
17) A high degree of conflict exists between **Major Supplier** and your firm.	1	2	3	4	5	6	7
18) **Major Supplier** fulfills its duty as your firm expects.	1	2	3	4	5	6	7
19) Your firm's relationship with **Major Supplier** is enduring.	1	2	3	4	5	6	7
20) **Major Supplier** is honest in its dealings with your firm.	1	2	3	4	5	6	7
21) Your firm is satisfied with **Major Supplier's** product quality.	1	2	3	4	5	6	7
22) The service provided by **Major Supplier** is satisfactory.	1	2	3	4	5	6	7
23) In making product, your firm requires a large variety of materials (parts, raw materials, etc).	1	2	3	4	5	6	7
24) Availability of **Major Product** in the market is highly uncertain.	1	2	3	4	5	6	7
25) Price for **Major Product** in the market is volatile.	1	2	3	4	5	6	7
26) Both your firm and **Major Supplier** expect that each firm will be flexible to the other company's request for changes.	1	2	3	4	5	6	7
27) Both your firm and **Major Supplier** expect to be able to go along with the other company's request for changes (e.g., rush orders, or drop the price of parts)	1	2	3	4	5	6	7

	Strongly disagree						Strongly agree
27) When an unexpected situation arises, both your firm and **Major Supplier** could amend your agreement rather than insisting on original terms.	1	2	3	4	5	6	7
29) It is expected that both your firm and **Major Supplier** change policies to help each other when market conditions change.	1	2	3	4	5	6	7
30) Your firm is expected to exchange information with **Major Supplier** regularly.	1	2	3	4	5	6	7
31) Your firm is satisfied with the overall supplying performance of **Major Supplier.**	1	2	3	4	5	6	7
32) The purchasing terms for the parts your firm buys are very different from another.	1	2	3	4	5	6	7
33) Uncertainty in the production of **Major Product** is a real problem in the market.	1	2	3	4	5	6	7
34) Your firm regularly conducts performance reviews with **Major Supplier.**	1	2	3	4	5	6	7
35) Your firm monitors this supplier's inventory level.	1	2	3	4	5	6	7
36) Your firm addresses this supplier's performance through a formal vendor evaluation program.	1	2	3	4	5	6	7
37) The relationship your firm has with **Major Supplier** makes use of many business controls.	1	2	3	4	5	6	7
38) It is expected that both your firm and **Major Supplier** may provide proprietary information if it can help the other company.	1	2	3	4	5	6	7
39) **Major Supplier's** production processes are to a large extent determined by your firm's requirements.	1	2	3	4	5	6	7
40) **Major Supplier's** engineering changes are to a large extent determined by your firm's requirements.	1	2	3	4	5	6	7
41) **Major Supplier's** level of inventory (raw material, semifinished and finished components) is to a large extent decided by your firm.	1	2	3	4	5	6	7
42) Your firm influences to a large extent **Major Supplier's** part-price.	1	2	3	4	5	6	7
43) **Major Supplier's** quality control procedures are to a large extent determined by your firm's requirements.	1	2	3	4	5	6	7

	Strongly disagree						Strongly agree
44) It is expected that both your firm and **Major Supplier** keep each other informed about changes that may affect the other company.	1	2	3	4	5	6	7
45) The parts your firm uses come from a large variety of supplier types.	1	2	3	4	5	6	7
46) The supply of **Major Product** is not stable.	1	2	3	4	5	6	7
47) Your firm receives supplier proposals that differ from one another substantially.	1	2	3	4	5	6	7
48) It would be difficult for **Major Supplier** to replace the sales and profits realized from your firm with another customer.	1	2	3	4	5	6	7
49) **Major Supplier's** total costs of switching to another comparable customer would be prohibitive.	1	2	3	4	5	6	7
50) **Major Supplier** could find other buyers to replace your firm in your trade area, if the supplier wanted to.	1	2	3	4	5	6	7
51) **Major Supplier** is strongly dependent on your firm.	1	2	3	4	5	6	7
52) It would be difficult for your firm to replace **Major Supplier's** product with another supplier's product line.	1	2	3	4	5	6	7
53) The total costs of switching to another comparable supplier would be prohibitive for your firm.	1	2	3	4	5	6	7
54) If your firm wanted to, you could find other suppliers who could provide your company with comparable product lines.	1	2	3	4	5	6	7
55) Your firm is strongly dependent on **Major Supplier**.	1	2	3	4	5	6	7
56) It is expected that both your firm and **Major Supplier** share information that might help the other company.	1	2	3	4	5	6	7
57) Your firm is satisfied with the on-time delivery performance of **Major Supplier.**	1	2	3	4	5	6	7

57) What percentage of orders (deliveries) of products from **Major Supplier** are late?_____ %

58) What percentage of products delivered by **Major Supplier** are defective, not up to specifications, the wrong items, or otherwise unacceptable? _____%

Thank You Very Much

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