ANTECEDENTS OF POWER IN THE DISTRIBUTION CHANNEL:
A TRANSACTION-COST PERSPECTIVE

DISSERTATION

Presented to the Graduate Council of the
University of North Texas in Partial
Fulfillment of the Requirements

For the Degree of

DOCTOR OF PHILOSOPHY

By

S. Altan Erdem, B.Sc., M.B.A.
Denton, Texas
August, 1991
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A discussion of reward, coercive, expert, legitimate, and referent power bases was the initial focus of this research. A review of the power sources literature suggested that vertical integration within a channel of distribution was a crucial precursor to develop a structure to facilitate the use of power without creating a significant conflict among channel participants. Elements of transaction cost analysis (TCA) were offered as being suitable for determining the existing level of vertical integration among respondent firms. Accordingly, the purpose of this study was to develop a tentative model to determine proper use of power within varying levels of vertical integration.

A self-administered survey was mailed to a sample of 776 electrical welding equipment supply dealers. The research instrument consisted of 58 statements. After two mailings, 322 responses (42 percent response rate) were received. A series of principal components factor analysis runs yielded 25 statements to be examined in the final model.

The proposed model was analyzed by using the Lisrel VII software package. The covariance structure model consisted of eight major constructs. The first and the second
construct were the exogenous variables, asset specificity and environmental uncertainty. The third construct was the intermediate endogenous variable, degree of vertical control. Constructs four through eight referred to the final endogenous variables, namely, the five power sources.

Data analysis began by examining the distributions of the observations. Cronbach's alphas were calculated to assess the reliability of each multi-item scale. Maximum likelihood estimates, the chi-square statistic, goodness-of-fit indices, root mean square residual, and squared multiple correlations were obtained using the Lisrel analysis package.

Since none of the structural equation coefficients were statistically significant, the research hypotheses were not supported. The major conclusion was that the measurement of the two TCA variables and the construct of vertical control must be improved.
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CHAPTER I

INTRODUCTION AND OVERVIEW

Distribution strategy, one of the functional components of the marketing mix, has changed significantly over the years. A traditional analysis of functional flows such as product, negotiation, ownership, information, and promotion flows (Vaile, Grether, and Cox 1952) appears to be insufficient to examine the complex nature of marketing channels. Although conventional channel structures with many intermediaries are widely used, alternative systems have become increasingly popular in recent years (Cohen 1984; Quelch and Takeuchi 1981; Shapiro and Wyman 1981). For example, accelerating technology is a rather common factor among channel members and it jeopardizes the customary components of channels.

A widespread acceptance of technological developments encourages channel members to take advantage of practices such as telemarketing, teleshopping, and computerized inventory systems (Rosenberg and Hirschman 1980; Vorhees and Coppett 1983). Since these improvements do not occur evenly or predictably over time, members in the existing channels are faced with uncertainty about their future and survival (Kiel 1984). The presence of uncertainty lowers the
satisfaction of these channel members. This satisfaction is defined as the channel participants' overall approval of the channel arrangement (Gaski 1986). Establishing a structure that channel members accept is one way of improving their satisfaction. In some cases, a common way of assuring the necessary cooperation from channel members to create an environment with which channel members are satisfied is through the vertical integration of the structure. As McCammon (1970, p. 43) stated:

...vertical marketing systems are rationalized and capital intensive networks designed to achieve technological, managerial, and promotional economies through the integration, coordination, and synchronization of marketing flows from points of production to points of ultimate use.

As a result of such an integration process, it is possible to create a channel structure which recognizes the individual needs and problems of its participants. This recognition increases channel member satisfaction with the overall network and improve efficiency in the distribution process.

There are various procedures that one can use to determine the right time that vertical integration should take place in a conventional channel environment. One of those techniques is called transaction cost analysis (TCA), developed by Williamson (1975). TCA represents an interdisciplinary approach which evaluates the costs of conducting various transactions in distribution channels.
Accordingly, it is designed to help managers determine the circumstances under which integrated distribution channels are more efficient than conventional arms-length arrangements between manufacturers and channel members.

To assure that channel members are satisfied with a particular level or type of integration, one needs to understand the proper implementation of the appropriate power type. Kanter (1979) defined power as the ability to mobilize resources to get things done. Since these resources can be quite different in every social context, there are several power bases (reward, coercive, expert, referent, and legitimate) that one needs to examine (French and Raven 1959). It is important to exercise the proper type(s) of power in a particular situation. While certain channel structures facilitate the use of specific power sources, others may require a totally different composition of those types. In other words, power composition should be taken as a variable that changes its components from one channel structure to another depending on the type or the level of integration in a particular structure.

Purpose of the Research

Various authors have explored the effects of the power types stated above on performance-related issues such as conflict, efficiency, and satisfaction. While they were examining these power bases as determinants of the channel
structure effectiveness, a different perspective was adopted in a few other studies. Authors such as Wrong (1979) and Brown, Lusch, and Muehling (1983) were interested in the integrated nature of the power exercised in channels. More specifically, they analyzed the interrelationships among the power sources to understand if using a certain power type increased or decreased the likelihood of using another power type.

The purpose of this study is to use transaction cost analysis (TCA) to assess the degree of vertical integration and determine the nature of various power sources in that particular integration. Specific research objectives in this study will include the following:

1. To review the fundamental power bases and their use in selected distribution channels;
2. To evaluate the role of TCA within vertically integrated channel structures;
3. To apply the two key components of TCA in estimating the degree of vertical integration within a channel; and
4. To locate the proper power source and begin to reveal the nature of the relationship between a given power source and a particular level of vertical integration.

This research will begin with the review of the current literature on sources of power within a distribution channel.
The importance of determining the appropriate power type in channels will be emphasized by examining the relationship between the power use and basic performance-related issues such as satisfaction and conflict. After this review, channel systems with differing vertical integration levels will be summarized and the significance of exercised power in these systems will be evaluated. Once differences of these structures are emphasized, an exploratory coverage of TCA will be presented. The crucial role of TCA in determining the degree of vertical integration will be outlined in this section. Finally, a model which combines selected components of TCA used to determine the level of vertical integration and the proper type of power will be proposed.

Justification of the Study

Since there are numerous viewpoints guiding the transactions being conducted by members, managing an interorganizational channel structure is a sophisticated process (Arndt 1979a; 1979b). Due to the competitive nature of an industry, each channel member needs to operate toward achieving firm-specific goals and objectives first. This individuality in operations is rather common in conventional channels where the participants at various levels are independently-owned businesses.

On the other hand, "power, hierarchy, and command" (Macneil 1980) can be maintained more efficiently when
parties are linked to each other, especially in an integrated network. Williamson (1979; 1983; 1984) states that enduring and stable relationships increase interfirm coordination over time and improve the overall efficiency of a channel structure. This assumption is a crucial development since it creates an environment within which channel members are satisfied.

A fairly comprehensive approach to determine when a firm should employ a vertically integrated channel structure is TCA. TCA has been used rather extensively in marketing studies (Anderson 1985; Anderson and Coughlan 1987; Anderson and Weitz 1988; Dwyer and Oh 1988; Heide and John 1988; John 1984; John and Weitz 1988; Klein 1989; Klein, Frazier, and Roth 1990; Leblebici and Salancik 1981; Ruekert, Walker, and Roering 1985). While they have been strong in their contribution, the development of a causal model is a necessary step at this stage to provide a rigorous foundation for future studies in this area.

Research Design

The data collection and the sampling design procedures are discussed briefly in the following sections. The details of the model specifications, statistical hypotheses, and the overall methodology are presented in Chapter III.
The Data Collection Instrument

Some of the statements utilized in this study were drawn from the studies by Gaski and Nevin (1985), Gaski (1986), and John (1984). The scale used by these authors was a modified version of a similar scale developed by French and Raven (1959) to measure various power sources. These statements were measured with five-item, five-point Likert scales.

The statements defining environmental uncertainty have been developed by Klein (1989) and Klein, Frazier, and Roth (1990). These authors expanded on the suggestions of Leblebici and Salancik (1981) and designed seven new items for their research. Klein (1989) and Klein, Frazier, and Roth (1990) also enlarged on the findings of Anderson (1985) to present the statements for asset specificity.

Degree of vertical integration was assessed by using two dimensions of vertical control (Reve 1980). A combination of the statements measuring centralization and formalization (John 1984) has been suggested to provide a single vertical control measure (Klein 1989) indicating the degree of integration.

As suggested by Klein (1989) and Klein, Frazier, and Roth (1990), environmental uncertainty, asset specificity, and vertical integration were measured on a seven-point Likert-like scale where (1) indicates "completely disagree" and (7) indicates "completely agree." Since Cox (1980) suggests using the number of points set between five and
nine, these five- and seven-point scales represents a reliable mix for the research instrument.

Sampling Design

Various studies in the literature suggest that samples should be large enough to possess the true representation of the variation in the population. When a particular statistical technique is to be used, the determination of sample size becomes a crucial issue to assure not only this representation but also functionalization of that technique. In a confirmatory factor analysis study, it is somewhat customary to have a minimum of 100 respondents (Boomsma 1985), although there are some cases in which very small samples (see Hayduk 1985, for as few as 22 cases) have been used.

As will be presented in Chapter III, the framework proposed in this study was composed of 58 statements. Of these, only 35 were used to assess the measurement model. Since Cox (1980) suggested having ten observations per statement, 350 responses would be necessary for the final analysis. Chapter III describes the response facilitators used in this study to increase the response rate. They included personalized letters assuring the confidentiality of the respondents' answers; self addressed and stamped envelopes; and follow-up mailing of the questionnaire (consistent with the suggestions of Heberlein and Baumgartner
Selection of a sample is an important task and it should not be overlooked due to an emphasis on a sample size (Berk 1983). The sample was composed of dealers who were currently working with one, two, or three manufacturers in different channel structures. Presidents, general managers, or owners of these dealer establishments were contacted and asked to fill out questionnaires.

Summary of the design

The model proposed in this study to outline the structural relationships in vertical integration decisions was analyzed using the lisrel procedure. The proposed lisrel model consists of eight major constructs (see Chapter III, Model Specifications for the details). The first and the second construct ($\xi_1$, $\xi_2$) are the exogenous variables asset specificity and environmental uncertainty, taken from the TCA framework. The third construct ($\gamma_1$) is the intermediate endogenous variable, degree of vertical control. Constructs four through eight ($\gamma_2$, $\gamma_3$, $\gamma_4$, $\gamma_5$, $\gamma_6$) refer to the final endogenous variables. They are the five major power bases, namely, coercive, reward, expert, legitimate, and referent power.

In total, there were 58 statements measuring the items stated above. Cronbach's (1951) coefficient alpha ("$\alpha$") was
used to check the level of internal consistency for each construct.

Limitations of the Research

Since some of the participants of this study were dealers working in vertically integrated channels, there was a slight possibility that they were not completely truthful in their answers about their suppliers. Thus, some of the respondents might distort the results of this study by providing a desired picture instead of an actual one. In order to minimize this possibility, the confidentiality of the responses were assured.

As is indicated above, it was desirable to have a final sample composed of 350 responses. Although response facilitators were included to enhance the likelihood of a suitable number of observations, there is always a possibility that the response rate may not be as high as desired. If this happens, one needs to examine the results of the study with caution for their validity and reliability.

Significance of the Study

The relevance (Lucas and Gresham 1985) and the effectiveness of a power type (Etgar 1978) change depending on the nature of the channel members, channel structure, and the environment (Etgar 1977; Frazier 1983; Lusch and Ross
Research efforts to assemble a causal model to determine the proper type of power to be applied across different levels of vertical integration should utilize an approach encompassing the factors underlying those integrated structures. TCA presents two crucial variables, asset specificity and uncertainty/complexity, that can be used for this purpose.

An in-depth analysis of these two major TCA variables together with different levels of vertical integration can provide researchers with a better understanding of power use in channels of distribution. Once this issue is fully understood, one can conduct a further inquiry of this design to formulate a managerial tool which companies could utilize to exercise the proper power type and improve the performance of their integrated channel structures.

Organization of the Dissertation

An overview of the study has been given in this chapter. The relevant studies in the literature are provided in Chapter II. The existing power typology is reviewed in that chapter and an alternative research framework combining the major power types with the two basic elements of TCA is also proposed.

The empirical formulation of the study is presented in Chapter III. The research design, estimation method, and
statistical hypotheses are the major elements of the methodology specifications.

Data analysis is reported in Chapter IV. The descriptive statistics and parameter estimates for the model are provided. This chapter is concluded by discussing the reliability indicators of the variables.

Finally, Chapter V is composed of the concluding remarks and the limitations of the study. The major points of the research are reviewed and recommendations are offered for further inquiry into improving and testing of the model.
CHAPTER REFERENCES


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CHAPTER II

POWER, VERTICAL INTEGRATION, AND TCA

This chapter reviews some of the literature about power in distribution channels, vertical integration, and transaction cost analysis (TCA). Once these constructs are presented, a tentative model will be offered showing the proposed relationships between various degrees of integration and the use of certain power types by using TCA framework.

The Issue of Power

The concept of power has been defined in various ways in the literature. It comes from the Latin word "potere" which simply means "being able" (Silber 1982). Russell's (1938) definition, "the production of intended effects," was later updated by Weber. Specifically, Weber (1947) defined power as the capability of a person to carry-out his own will despite others' resistance. Similarly, Kanter (1979) described power as the ability to mobilize resources to get things done.

Dahl (1957) provided the description of power which appears to be one of the popular definitions in marketing. Dahl (1957, pp. 203-204) stated that "if A can get B to do
something that B would not otherwise do, then A has power over B."

In 1959, French and Raven expanded on this formulation and provided a taxonomy of the bases of power. They can be summarized as follows:

1) Reward power (when B perceives that A has the ability to reward him);
2) Coercive power (when B perceives that A has the ability to punish him);
3) Expert power (when B perceives that A has a special expertise in a certain area);
4) Referent power (when B perceives that A has a very similar set of goals with him); and
5) Legitimate power (when B perceives that A has a formal right to tell him what to do).

Tedeschi and Bonoma (1972) introduced the "manipulative power source," defined as an attempt to control one's environment to create the desired changes in his/her behavior. This concept corresponds to what Raven and Kruglanski (1970) called " informational influence." More recent studies (e.g., Brown, Lusch, and Muehling 1983; Kasulis and Spekman 1980; Lusch and Brown 1982) have expanded on this idea and added "informational power" (A's ability to explicate information not considered by B) to this list. Gaski (1987) stated that although these power types had
merit, their use in empirical studies has been somewhat limited since their bases appeared to be captured by the framework developed by French and Raven.

French and Raven's (1959) taxonomy provided a structured perspective to the analysis of power. The issues of control, influence, and resistance associated with the use of power have been emphasized by various authors (e.g., Etzioni 1968; Miller and Butler 1969; and Price 1969). Along the same lines, the phrases of "capacity to make and carry out decisions even if others resist" (Mills 1963, p. 8) and "ability to help and ability to harm" (Nietzsche 1968, p. 193) emphasized, indirectly, two major power groups out of these five types: Coercive and Noncoercive.

Efforts by researchers to dichotomize power types continued. First, Etgar (1978) presented economic (including reward and coercive sources) and non-economic power bases to indicate the significance of economic foundations not only for reward but also for coercive power (see Frazier and Sheth 1985 for the economic and/or noneconomic reward and punishment strategies, and Frazier 1983a; Frazier and Summers 1984 for influence strategies, in general). Later, John (1984) introduced contingent and noncontingent power types indicating the importance of the situational variables on the existence of power. Finally, Cobb (1984) expanded beyond these dichotomies and expressed the actual (instead of
potential) alteration of another's behavior in general as "exercised power."

**Exercised Power in Marketing Channels**

The marketing channel is fundamentally a social system which is subject to basic behavioral dimensions such as power, role, communication, and conflict (Brown and Timmins 1981; Parsons and Smelser 1956; Stern and Reve 1980). Since power is one of those dimensions faced by the channel members, it has been examined in channels literature (Hunt, Ray, and Wood 1985).

There are various "exercised power sources" (Gaski 1984a; 1984b; 1988) available to channel members. These sources may be a function of the size of a certain member or the organization of a channel structure itself (Etgar 1977; Frazier 1983b; Lucas and Gresham 1985). It has been noted over time that it is rather common for those members to exercise power during the negotiation process to prevent (or resolve) conflict and facilitate the overall distribution.

Hunt and Nevin (1974) expanded on the coercive versus noncoercive power distinction and listed reward, expert, referent, and legitimate power in channels under noncoercive power sources. For example, they reported that franchisers had a considerable amount of coercive as well as noncoercive power. Similarly, Lusch (1976) conducted a study of distribution practices in the automobile industry and
presented six common ways to exercise coercive power. Their
eamples were slow delivery of vehicles, slow payment, threat
of termination, time consuming paperwork, turndown of
warranty, and improper distribution of vehicles.

The noncoercive sources, on the other hand, were
supportive programs such as national advertising, executive
training, sales promotion kits, dealer incentive programs,
and product warranties (Etgar 1979; Lusch 1977; Sibley and
Michie 1982). Almost all of the findings supported the
position that coercive power sources were positively related
to intrachannel conflict but negatively related to dealer
satisfaction (Gaski 1984a; Rosenberg and Stern 1971; Schul
and Babakus 1988; Schul, Lamb, Little 1981; Schul, Little,
and Pride 1985). On the other hand, noncoercive power
sources indicated the opposite case (for examples in various
cases, see Dwyer 1980; Michie and Stanley 1985; Wilkinson

Gaski and Nevin (1985) examined the differential effects
of exercised and unexercised power sources in channels and
stated that exercise would make a difference in these
relationships. For instance, even though exercise of the
coercive power sources by suppliers created stronger effect
on dealer satisfaction (more than their presence), exercise
of the reward power sources resulted in only a marginal
influence on the same variable.
Considering all these examples, one can tentatively conclude that power bases can be used to influence the marketing flows to create more effective and efficient allocation of resources within channel structures (El-Ansary and Stern 1972; Frazier and Rody 1991; Stern and El-Ansary 1988). Although the studies presented above were able to explore the power use in marketing channels, they did not attempt to relate it with various channel structures developed as a result of different levels of vertical integration. Therefore, it may be more meaningful at this step to explore the issue of power within the three major types of channel networks.

Channel Systems and Power Use

A vertical marketing system (VMS) appears to be one of the most important developments in channels over time (Arndt 1979a; 1979b). They present not only more professional management, but also scale economies associated with distribution tasks coordinated across various levels.

Vertical integration is the alignment of channel members in distribution channels into an organized and cohesive entity to make the whole system more competitive in the market (Macneil 1980). As a result of integration, cooperation among channel members is improved (Williamson 1979; 1983; 1984) and the participants become more satisfied with the channel environment.
Buzzell (1983) states that although a VMS offers all these benefits, one needs to make sure that the system is large enough to justify an integration and achieve these benefits. Especially in industrial markets, there are numerous factors such as size of a firm, stage in the product life cycle, degree of product standardization, and purchase size and frequency that one needs to examine before deciding on integrated channels (Lilien 1979). There are three major types of vertical integration (Davidson 1970; McCammon 1965; 1970; Stern and El-Ansari 1988): Corporate, Administered, and Contractual.

(1) Corporate Integration

This is the most organized VMS type in terms of overall control of the channel members (Warren 1972). Specifically, production and marketing facilities are under the same corporate ownership. When a manufacturer owns and operates the rest of the members, the system is described as a forwardly integrated structure (e.g., Sherwin-Williams, Firestone Tire and Rubber, Singer, and Goodyear). When a retailer or a wholesaler owns and operates the manufacturing unit, the system is called a backwardly integrated channel structure (e.g., Sears, Kroger, American Hospital Supply Corporation).

Legitimate, expert, and referent power types appear to be the major types of power in corporate systems. The
corporate ownership structure presents formal guidelines and emphasizes specific assignments in terms of who is in charge and of what that person is in charge. Since each member is given certain tasks, the obligations associated with those tasks are stated explicitly. As a result, a framework indicating legitimate rights (power) of the participants in the organization is enforced. This structural nature of the system also provides a significant opportunity for specialization through the arrangement of division of labor (Stigler 1951). As a result, channel members can acquire expertise in various functional areas and expand on expert power. Finally, the implementation of legitimate and expert power sources in the structure creates an atmosphere in which channel members develop some social relationships with each other. Once manufacturers establish personal contacts with those members, referent power becomes a very practical power type (Stern and El-Ansari 1988).

(2) Contractual Integration

Contractual integration takes place when independent members of a channel are linked together by a formal contractual agreement. Retail cooperative organizations (e.g., Ace Hardware, Associated Grocers, and Topco Associates, Inc.), wholesaler-sponsored voluntary chains (e.g., Independent Grocers Alliance, Western Auto, Super Value, and Ben Franklin), and franchised systems (e.g.,
Howard Johnson's, McDonald's, Avis, and Midas) are the three forms of contractual integration (Hall 1964; Harrigan 1983; McCammon, Doody, and Davidson 1969; Stephenson and House 1971; Uihlein 1984).

Since all these forms of contractual integration are based on comprehensive contracts, legitimate power becomes the fundamental power type. In retail cooperative organizations, retailers have the expert power since they have face-to-face relationships with the consumers (Kotler 1984; Mallen 1963).

In wholesaler-sponsored voluntary chains, retailers relinquish some of their autonomy and depend on certain wholesalers who possess the expertise in that market. As a result, those particular wholesalers hold more expert power in voluntary systems.

Finally, expert and legitimate power types are customary in franchised systems. A franchiser gains cooperation from franchisees by using the special expertise in that particular line of business (Guiltinan, Rejob, Rodgers 1980) and the legitimate rights given to franchiser by the franchise contract agreement (which usually allows more power to the franchiser than to the franchisees, see Hunt 1972 and Hunt and Nevin 1975 for details). One may also consider coercive power as another common power type in franchising. It is somewhat frequent practice for the franchisers to force their franchisees to engage in certain business arrangements.
These franchisers have considerable authority through comprehensive contracts and do not hesitate to use it in various ways (Hunt 1977; Hunt and Nevin 1975). It is very important to assess how proper some of these practices are to assure the future cooperation of the channel members (see Hunt and Nevin 1974 and Lusch 1976 for their findings indicating the strong correlation between the coercive power use and the channel conflict in franchised systems).

(3) Administered Integration

The remaining form of VMS to be discussed entails the case which has a fairly loose structural organization. Administered integration occurs when one of the channel members dominates the rest of the structure by using its popularity earned through customer support. Although there is no formal organizational (and/or corporate ownership) structure, one member is able to "administer" the marketing activities of the whole system (e.g., Samsonite, Magnavox, Scott Lawn Products, Corning Glass, and Villager). Historically, manufacturers used to be the channel leaders coordinating this type of integration for a long time, but wholesalers and retailers have been getting to be more influential in this process (Lewis 1968; Little 1970; McVey 1960; Rosenbloom 1979).

Expert and reward power types appear to be the two major types of power used in an administered system. An effective
channel leader is the one who is knowledgeable enough to earn others' confidence and cooperation. This basically provides that party with a base for expert power. As a result, channel members comply with the directions of an expert. Nevertheless, there are times that administered integration occurs just because the leader is wealthy enough to pay the other members for their cooperation. Since the rest of the members are independently owned units, it helps if the leader has the resources to reward them when they are willing to cooperate. This may be true in the majority of the cases.

Finally, it should be added that the same channel leader may choose to use its coercive power bases from time to time. It is important for the leader not to hesitate to exercise coercive power when a situation requires someone to be decisive and take an immediate action. The same person should recognize that an excessive use of coercion may decrease satisfaction (and autonomy) and result in a channel conflict (Gaski 1984a; Lusch and Brown 1982; Schul, Pride, and Little 1983). Various studies have suggested that cooperation and conflict are inversely related (Anderson and Narus 1984; Gattorna 1978; Pearson and Monoky 1976). Consequently, the use of coercive power is not very common in these administered systems.

Before closing the discussion on this section, one needs to examine one more channel system. This is a rather traditional network called conventional structure.
Conventional Structure

Since channel members behave independently in this channel network, trade relations are established on the basis of market transactions and are regulated by market mechanisms. Decisions are tradition-oriented and decision makers are emotionally committed to traditional operations (Stern and El-Ansari 1988). This structure possesses a very low level of effective inter-organizational management (Etgar 1976).

Conventional channels tend to be relatively unstable since the participants usually have somewhat limited commitment (Stern and El-Ansari 1988). When this is the case, the power types which can be implemented in a short period of time become more practical for the manufacturers. Therefore, reward and coercive power sources are commonly used in conventional structures (Etgar 1978a; 1978b; Stern and El-Ansari 1988).

As it can be understood from the differences in the power types exercised in the channel systems above, each of these structures possesses distinctive features. Figure A.1, in the Appendix, shows these networks in terms of the differences in their integration levels (Anderson and Weitz 1986). Corporate integration indicates the highest level of vertical integration while administered integration refers to the lowest level. Finally, conventional structure represents no integration at all.
There are various approaches that attempt to determine the right timing and the degree of the vertical integration process. The following section includes one of those techniques called the transaction cost analysis (TCA).

**TCA Explanation of Vertical Integration**

TCA is a rather unique technique introduced into the marketing area by recent studies (e.g., Anderson 1985; Anderson and Coughlan 1987; Anderson and Weitz 1986; Dwyer and Oh 1988; Heide and John 1988; John 1984; John and Weitz 1988; Klein 1989; Klein, Frazier, and Roth 1990; Leblebici and Salancik 1981; Ruekert, Walker, and Roering 1985). It is an interdisciplinary procedure which combines organization theory, economics, and contract law to explain why and when managers select different structures to facilitate their exchange processes (Williamson 1975). The ultimate objective of TCA (Anderson and Weitz 1986, p.6) is to determine under what conditions transactions are performed more efficiently within an organization under hierarchical control (achieved through vertical integration), as opposed to between independent entities under market control (achieved through contracting in the market).

Transaction costs are defined as the costs of conducting various transactions in distribution. These costs include expenses associated with negotiation, monitoring, bargaining, and information gathering (Stern and El-Ansari 1988).
Managers can use TCA and examine if transaction costs are beyond a critical level or not. This is an important assessment since managers, at that specific point, are faced with the following "make-or-buy" question (Anderson and Weitz 1986, p. 3): Should marketing activities be performed within the firm by company personnel (a "make" decision) or should the firm contract with external agencies to perform those activities (a "buy" decision)? TCA helps those managers compare their channel options and choose the one which maximizes efficiency (ratio of output over the sum of production and transaction costs) in a particular situation.

TCA assumes that people have limited cognitive abilities in problem solving and arriving at objective reasoning (Williamson 1975). They do not possess unbounded rationality and are also opportunistic in fulfilling their obligations. Opportunism (defined by Williamson (1975, p. 26) as self-interest seeking with guile) is one of the key variables which increase the transaction costs of interacting with independent distributors. These agents mostly watch out for their own benefits and pursue the routes which satisfy their needs. If this would not be the case, dealing with independent agents would always be efficient.

When markets are competitive, the threat of replacement is high enough to check such opportunistic behavior. When markets fail, however, opportunistic practices can be restricted only through close supervision on the part of the
manufacturer. The firm may find it more efficient to replace independent agents with its own personnel to facilitate a better control. Thus, market failure is the principal determinant of integration.

There are two basic antecedents of market failure. The first one is called "asset specificity" and refers to the degree to which human and physical assets (tangible or intangible) are found in the channel (Heide and John 1988). The importance of these assets comes from the fact that they are tailored to a particular transaction (or relationship) and cannot be easily transferred to other transactions (Klein, Frazier, and Roth 1990). If there are a very few firms which possess these assets, they are the only ones qualified to participate in a channel. This situation leads to "small numbers bargaining." Since these agents become irreplaceable, they may decide to exploit their relationship with the manufacturer and shirk responsibilities by being opportunistic. Since the manufacturer needs to monitor and enforce the contracts with those agents, the costs of performing these functions increase, considerably. Therefore, some form of vertical integration may be more efficient for that particular manufacturer than working in an unregulated market (Stern and El-Ansari 1988). Dealing with independent agents is an efficient process if an agent who fails to perform can be replaced easily (Anderson and Coughlan 1987).
The second antecedent of market failure is called "environmental uncertainty" and refers to the high level of complexity and turbulence that occur in a firm's environment. It requires frequent reassessments and redefinitions of marketing tasks (Anderson and Weitz 1986; Klein 1989). Numerous studies (e.g., Achrol, Reve, and Stern 1983; Achrol and Stern 1988) have emphasized that marketing channel structures are open to various influences from the surrounding environment. When managers are faced with serious uncertainty in their environment, the information necessary to cope with the environment begins to exceed their abilities to process it due to their bounded rationality. The volatility in the environment creates serious difficulties for the managers in preparing comprehensive contractual arrangements. Once again, opportunism increases and escalates the transaction costs. Therefore, some kind of vertical integration is preferred by the majority of the members since integrated channels (can) establish a somewhat predictable (and/or controllable) environment (Bhasin and Stern 1982; Dwyer and Oh 1988; Dwyer and Welsh 1985; Etgar 1976; Guiltinan 1974; Klein, Crawford, and Alchian 1978; Spekman and Stern 1979; Williamson 1975; 1981).

**TCA and Power in Vertical Integration**

What is needed at this step is a development of a tentative model which is comprehensive enough to employ TCA
variables in the assessment of the proper degree of vertical integration. This model is then extended to predict the type of power sources associated with a given channel system. The basic motive underlying the use of power is to improve the coordination efforts in a channel and create a more efficient structure. John (1984) reported that reward and coercive power were positively correlated with opportunism. This represents an important step since it employs TCA in the power research.

The following chapter includes a model which examines the relative importance of power sources employed in integrated channels when the level of integration is determined by using TCA. It is hoped that this model will serve as a step toward a better understanding of vertical integration and exercised power in integrated channels.


(1979), "Sources and Types of Intrachannel Conflict," Journal of Retailing, 55 (Spring), 61-78.


CHAPTER III

OPERATIONALIZING THE STUDY

This chapter includes information about the empirical configuration of the research. The model specifications, statistical hypotheses, and the research design comprise the major sections of this chapter.

Model Specifications

The model proposed in this study describes the structural relationships in vertical integration decisions, and was analyzed by using the lisrel procedure. The lisrel model consisted of two parts: a measurement model and a structural equation model. These two components of the model are presented in Figure A.2, in the Appendix.

A measurement model defines the relationships between the observed and latent variables, and suggests the validity and reliability of the data utilized (Jöreskog and Sörbom 1986; Stewart 1981). The squares in Figure A.2 correspond to the observed variables (e.g., $X_1, X_2, Y_1, Y_2$) while the circles represent the latent variables (e.g., $\xi_1, \xi_2, \gamma_1, \gamma_2$). Since these measures are not perfect, there are errors.
(e.g., $\delta_1$, $\delta_2$, $\epsilon_1$, $\epsilon_2$) associated with each of the observed variables.

A structural equation model defines a causal structure among the latent variables presented above (Fassinger 1987; Pedhazur 1982). It is used to describe the causal effects and the amount of unexplained variance (Jöreskog and Sörbom 1986).

Both components of the covariance structure model presented in Figure A.2 can be written as follows:

\[
Y = \Lambda_Y \xi + \epsilon
\]
\[
X = \Lambda_X \xi + \delta
\]

where

$Y$ and $X$ are the vectors of measures;

$\xi$ (xi) is a vector of unobserved independent variables;

$\Lambda$ (lambda) is a matrix of the loadings of observed variables on the relevant unobserved variables;

$\epsilon$ (epsilon) is a vector of errors on $X$;

$\delta$ (delta) is a vector of errors on $Y$;

for the measurement model.

\[
\xi = \Lambda \eta + \epsilon
\]
where

\( \gamma (\eta) \) is a vector of dependent variables;

\( \xi (\xi) \) is a vector of independent variables;

\( \beta (\beta) \) is a matrix of coefficients relating dependent variables to one another;

\( \Gamma (\gamma) \) is a matrix of coefficients relating independent variables with dependent variables;

\( \zeta (\zeta) \) is a vector of errors in equations;

for the structural equation specification.

It is assumed that:

1. \( \zeta \) is uncorrelated with \( \xi \);
2. \( \epsilon \) is uncorrelated with \( \gamma \);
3. \( \delta \) is uncorrelated with \( \xi \);
4. \( \zeta, \epsilon, \delta \) are mutually uncorrelated; and
5. \( \beta \) has zeroes in the diagonal and \( I-B \) is non-singular.

In this particular situation, the structural equations can be expressed in matrix form as follows:

\[
\begin{bmatrix}
\gamma_1 \\
\gamma_2 \\
\gamma_3 \\
\gamma_4 \\
\gamma_5 \\
\gamma_6
\end{bmatrix}
= \begin{bmatrix}
0 & 0 & 0 & 0 & 0 & 0 \\
\beta_{21} & 0 & 0 & 0 & 0 & 0 \\
\beta_{31} & 0 & 0 & 0 & 0 & 0 \\
\beta_{41} & 0 & 0 & 0 & 0 & 0 \\
\beta_{51} & 0 & 0 & 0 & 0 & 0 \\
\beta_{61} & 0 & 0 & 0 & 0 & 0
\end{bmatrix}
\begin{bmatrix}
\gamma_1 \\
\gamma_2 \\
\gamma_3 \\
\gamma_4 \\
\gamma_5 \\
\gamma_6
\end{bmatrix}
+ \begin{bmatrix}
\gamma_{11} & \gamma_{12} \\
0 & 0 \\
0 & 0 \\
0 & 0 \\
0 & 0
\end{bmatrix}
\begin{bmatrix}
\xi_1 \\
\xi_2
\end{bmatrix}
+ \begin{bmatrix}
\delta_1 \\
\delta_2 \\
\delta_3 \\
\delta_4 \\
\delta_5 \\
\delta_6
\end{bmatrix}
\]
As indicated in previous studies (e.g., Gaski 1986; John 1984), the five power bases are correlated with each other.

The observed variables (i.e., the statements used to measure the TCA variables and basic power types) are given in Table A.1, in the Appendix. There were 58 statements measuring the constructs specified in the model above. The TCA variables were measured on a seven-point Likert-like scale where (1) indicates "completely disagree" and (7) indicates "completely agree." On the other hand, the five power types were measured on a five-item, five-point Likert scale. Categories were stated as strongly agree, somewhat agree, unsure, somewhat disagree, and strongly disagree.

The statements about the power sources were drawn from the studies by Gaski and Nevin (1985), Gaski (1986), and John (1984). The scale employed in these papers was a modified version of a similar scale suggested by French and Raven (1959).

The statements defining environmental uncertainty have been used by Klein (1989) and Klein, Frazier, and Roth (1990). These authors modified the items used by Leblebici and Salancik (1981) and presented separate measures for the two types of uncertainty. Uncertainty-complexity indicates the extent to which the respondent perceives the environment as simple or complex and uncertainty-dynamism refers to the frequency at which changes in the environment occur (Klein 1989). Klein (1989) reports that the seven Likert scale
items that he developed to measure these dimensions (three for complexity, four for dynamism) are fairly similar to perceived environmental uncertainty measures developed by Spekman and Stern (1979).

Asset specificity refers to the degree to which human and physical assets that are required (and specialized) to support specific exchange relationships that are found in the channel (Heide and John 1988). Similarly, Klein (1989) and Klein, Frazier, and Roth (1990) expanded on the scale used by Anderson (1985) and introduced new statements to express asset specificity.

The intermediate endogenous construct, degree of vertical integration, was measured by using two dimensions of a surrogate called vertical control (John 1984; Klein 1989; Reve 1980). The first dimension, centralization, indicates the degree to which power to make and implement channel decisions is under the control of the firm (Dwyer and Oh 1988; John and Reve 1982; Klein 1989). The second one, formalization, shows the extent to which rules, policies, and procedures govern the transaction (Dwyer and Oh 1988; Scott 1981; Klein 1989). Each one of these components was operationalized by using three Likert scale items adapted from the statements developed by Reve (1980).

Before closing, one should recognize that LISREL may be subject to certain problems. In a measurement model, correspondence rules between the latent and the observable
variables possess a bias originated from the philosophical background of the subject itself (Bagozzi 1981). Furthermore, sensitivity of some tests (such as chi-square) to sample size, distribution constraints, and the subjective assessment of the model fit can be listed under the limitations of the technique (Boomsma 1985; Jöreskog and Sörbom 1982).

**Statistical Hypotheses**

This study was conducted to achieve the specific objectives stated in Chapter I. Based on the findings about those relationships between various power types, integrated channel structures, and TCA discussed in Chapter II, the following research hypotheses were developed:

- **H_1**: A positive relationship exists between the amount of transaction-specific assets and the degree of vertical integration of distribution channels;

- **H_2**: A positive relationship exists between the level of environmental uncertainty surrounding a transaction in a market and the degree of vertical integration of distribution channels.

The reasoning for the two hypotheses above have been given in the TCA framework, in Chapter II. Various authors (e.g., Anderson 1985; Anderson and Coughlan 1987; Anderson
and Weitz 1986; John and Weitz 1988) provided empirical support for the positive effect of asset specificity on channel integration. When there is a considerable amount of transaction specific assets required, the channel members with those assets become rather opportunistic in their actions. If this is the case, it may be better to engage in vertical integration to minimize transaction costs. Similarly, since the environmental uncertainty stimulates even more opportunistic practices in the market, transaction costs of dealing with independent distributors increase. After a certain level, these additional costs become large enough to make the vertical integration of the whole channel structure more affordable (Klein, Frazier, and Roth 1990; Williamson 1975).

$H_3$: A negative relationship exists between the degree of vertical integration and the likelihood of suppliers' (manufacturers) exercising coercive power sources over dealers;

$H_4$: A negative relationship exists between the degree of vertical integration and the likelihood of suppliers' exercising reward power sources over dealers;

$H_5$: A positive relationship exists between the degree of vertical integration and the likelihood of
suppliers' exercising expert power sources over dealers;

H₆: A positive relationship exists between the degree of vertical integration and the likelihood of suppliers' exercising legitimate power sources over dealers;

H₇: A positive relationship exists between the degree of vertical integration and the likelihood of suppliers' exercising referent power sources over dealers.

When the channel is not vertically integrated, it is rather difficult for the manufacturer to have the cooperation of the rest of the channel members. Since independent dealers operate toward achieving their own objectives, a supplier has to offer some incentives to assure their collaboration. Therefore, a supplier engages in various rewarding practices (e.g., providing dealers with personnel training, business advice, ordering assistance). This situation is simply the use of reward power to achieve effective performance in the short term. Once dealers get accustomed to being rewarded, having their commitment becomes rather expensive. Then, the supplier has to switch to a different base and exercise coercive power. This can occur when a supplier delays deliveries to dealers, charges dealers higher prices, or distributes to dealers unwanted products.
(Frazier and Summers 1984; Gaski 1986; Stern and El-Ansari 1988). It is very important to make this transition in power base smoothly to reduce the possibility of having channel conflict (Lusch 1976; Lusch and Brown 1982; Schul, Pride, and Little 1983).

As channels become more vertically integrated, the reasons to reward and/or coerce the members change their forms and make other power sources more relevant. Although it takes a longer time for a manufacturer to acquire and exercise these power bases, their impacts are longer-lasting and more effective than coercive and reward power use (Hunt and Nevin 1974; Kasulis and Spekman 1980; Lusch 1976; Wilkinson 1979; 1981).

When a channel is vertically integrated, members are assigned specific roles and responsibilities. Since all the participants know who is in charge and what that person is in charge of, it is possible to locate the member with special expertise when there is a need for it. Such an environment provides manufacturers with an opportunity to employ their resources to acquire special knowledge and use expert power over their dealers. At the same time, this division of labor is based on a contractual agreement which gives manufacturers legitimate power sources (Stern and El-Ansari 1988).

Finally, as the level of integration increases, channel members are brought closer to each other. As a result of this development, it becomes easier for manufacturers to
establish personal contacts with the rest of the members. Once the manufacturers form social relationships with their dealers, they can exercise referent power over them (Stern and El-Ansari 1988).

Research Design

Self-administered questionnaires were mailed to the presidents, general managers, or owners of various dealer establishments which were currently operating in various channels. This was a similar approach to "key informant" method (Campbell 1955) and has been justified previously in various studies in the literature (Gaski 1986; Gaski and Nevin 1985).

Numerous studies in the literature suggest that samples should be large enough to possess the true representation of the variation in the population. According to Bearden, Sharma, and Teel (1982), the sample of two hundred serves to this purpose. Indeed, it is somewhat customary to have minimum of one hundred respondents in confirmatory factor analysis studies (Boomsma 1985).

Although the model proposed in this study was composed of 58 statements (see Table A.1), 35 of them were going to be used for the main measurement model. Since Cox (1980) suggested having ten observations per each statement, 350 responses would be desirable for the final analysis. In order to facilitate a significant response rate and receive
350 returned questionnaires, a personalized letter (as suggested by Yu and Cooper 1983) indicating the significance of participating in this study was enclosed with each questionnaire. The letter assured the confidentiality of the respondents' answers. Self addressed and stamped envelopes were provided (as stated by Jobber 1986). Finally, at a point 30 days after the first mailing, a second copy of the questionnaire was sent (as proposed by Heberlein and Baumgartner 1981; Walker, Kirchmann, and Conant 1987).
CHAPTER REFERENCES


and Torger Reve (1982), "Reliability and Validity of Key Informant Data from Dyadic Relationships in Marketing Channels," *Journal of Marketing Research*, 19 (November), 517-524.


CHAPTER IV

REPORT OF FINDINGS

This chapter details the empirical findings in the study. The sampling frame and the selection criteria of the firms included in the data analysis are discussed in the first section of this chapter. The electrical welding equipment dealers who participated in the study are profiled and compared to their respective population.

The second section of this chapter contains the details of the instrument evaluation process. The statements presented in Chapter III (see also Table A.1 in the Appendix) were empirically scrutinized using the SPSS-X (1990) software package.

The measurement and structural components of the covariance structure model used for the lisrel VII analysis are reviewed in the last section of this chapter. The model specifications and the key indices are reported to facilitate a better interpretation of empirical findings.

Sample

A mailing list was obtained from the National Welding Supply Association, located in Philadelphia, PA. The list
was composed of 900 names and addresses of member welding dealers across the United States and Canada. After a careful review of these businesses and their business descriptions, it was understood that all of the 114 Canadian businesses were owned by the major suppliers. In order not to bias the analysis, these firms were excluded from the sample prior to mailing. The managers of ten independent welding supply dealers were randomly selected for a field pretest of the survey instrument. Since these businesses participated in the pretest phase of the research, they were also excluded from the sample.

Following these deletions, the first mail-out sample was composed of 776 welding supply dealers. A self-administered questionnaire was mailed to the president, general manager, or owner of the electrical welding equipment dealerships listed in the membership roster. At a point 30 days after the first mailing, a second mailing was made to 543 dealers who did not respond to the first mail-out. Following the second mail-out, a total of 322 complete and usable responses were received. This total resulted in a 42 percent response rate.

Of 322 observations received, those businesses which reported having at least ten percent of their total dollar sales being generated from electric welding machines and supplies were retained. Dealers who were involved in carrying gas welding equipment and industrial gases were not
included. A final sample of 213 independently-owned electric welding equipment dealers was obtained as a result of these procedures.

Profile of Dealers

As a result of the selection process presented above, all the businesses represented in the study were comparable with each other in terms of their functional relationships with their suppliers. The relative importance of a particular brand (and, then, the supplier) for these participants was in congruency across different respondents in the sample. In other words, this selection resulted in a creation of a homogeneous sample of dealers not unlike the sample composition of earlier industrial channel studies (e.g., Gaski and Nevin 1985; Gaski 1986).

Forty-nine (23 percent) of the 213 welding dealers reported carrying only one basic line of electric welding machine. The dealers with two lines (43.2 percent) reported that at least 50 percent of their electric welding machine sales were coming from their primary supplier. The same ratio was 34 percent (and greater) for the dealers with three (27.2 percent), and 25 percent (and greater) for the ones with four lines (6.6 percent).

Miller was the primary supplier to 108 (50.7 percent) welding supply dealers in the sample. A total of 68 (31.9 percent) dealers reported purchasing from Lincoln, while 30
(14.1 percent) stated buying from Hobart. Seven dealers (3.3 percent) did not identify their electric welder suppliers.

Analysis of Data

After 213 cases were examined for missing data (by using listwise deletion), there were 171 valid observations left for the data analysis. The results which are presented in this chapter were based on an effective sample size of 171 (which was the 22 percent of the total mail-out). Table 4.1 presents a summary of the stages resulting in the 171 welding supply dealers for the final analysis.

Table 4.1
Sampling Framework

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>The number of names in the initial mailing list</td>
<td>900</td>
</tr>
<tr>
<td>Effective sample size (used for both mail-outs)</td>
<td>776</td>
</tr>
<tr>
<td>The number of responses received</td>
<td>322</td>
</tr>
<tr>
<td>Response rate (in percentages)</td>
<td>42</td>
</tr>
<tr>
<td>The number of responses selected for data analysis</td>
<td>213</td>
</tr>
<tr>
<td>The number of responses after listwise deletion</td>
<td>171</td>
</tr>
</tbody>
</table>

The prelis program was used to generate the sample covariance matrix for the analysis. Table 4.2 introduces a brief overview of the missing values deleted from the sample for the final analysis.
Table 4.2  
Distribution of Missing Values

<table>
<thead>
<tr>
<th>Number of missing values</th>
<th>Number of cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>171</td>
</tr>
<tr>
<td>1</td>
<td>32</td>
</tr>
<tr>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>6</td>
<td>0</td>
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<td>7</td>
<td>0</td>
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<td>8</td>
<td>0</td>
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<td>9</td>
<td>0</td>
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<td>10</td>
<td>0</td>
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<td>11</td>
<td>0</td>
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<td>12</td>
<td>0</td>
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<td>13</td>
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<td>14</td>
<td>0</td>
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<td>0</td>
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<tr>
<td>16</td>
<td>0</td>
</tr>
<tr>
<td>17</td>
<td>1</td>
</tr>
<tr>
<td>18</td>
<td>0</td>
</tr>
<tr>
<td>19</td>
<td>0</td>
</tr>
<tr>
<td>20</td>
<td>1</td>
</tr>
</tbody>
</table>

Total number of cases .................... 213

The Finalized Statements for the Data Analysis

Following the data collection stage, the statements presented in Chapter III were analyzed using the SPSS-X (1990) software package. As a result of statement purification by using a series of factor analysis runs, "garbage items" (Churchill 1979, p. 69) were deleted and the remaining 25 statements were selected to be tested in the final covariance structure model (see Figure A.3).
Table 4.3 includes these 25 statements and their respective reliability indices indicating how well they were loading to their respective factors. The first indicator in the table is Cronbach alpha (Cronbach 1951). As Churchill states "coefficient alpha absolutely should be the first measure one calculates to assess the quality of the instrument" (1979, p. 68).

As shown, alpha coefficients ranged from 0.4447 to 0.9434. Nunnally (1978, p. 191) suggests that alpha values of 0.50 to 0.60 indicate reliable instruments. In that sense, the majority of the factors (Factors 1; 3; 4; 5; 7) displayed the proper levels for alpha coefficients.

Table 4.3 also includes some information about the total variation explained by each factor. As presented, the smallest explained variance was 48 percent (by Factor 8), while the largest one was 78 percent (by Factor 5).

Table 4.3
The Selected Statements Used to Specify the Covariance Structure Model

Factor 1: Vertical Control

Suppliers have considerable influence on the development of advertising and trade promotion (V202)

Suppliers require that the product carry a certain symbol or logo (V203)

Total variation explained by the factor: 70.2 percent
Cronbach's alpha: 0.5706
Table 4.3 (Continued)

Factor 2: Coercive Power

We comply with the demands of our supplier as long as the supplier does not take legal actions against us (V223)

We comply with the demands of our supplier as long as the supplier does not refuse to sell (V224)

We comply with the demands of our supplier as long as the supplier does not delay warranty claims (V225)

We comply with the demands of our supplier as long as the supplier does not deliver unwanted products (V227)

We comply with the demands of our supplier as long as the supplier does not delay delivery (V228)

We comply with the demands of our supplier as long as the supplier does not withdraw certain needed services from us (V229)

Total variation explained by the factor: 76.5 percent
Cronbach's alpha: 0.9434

Factor 3: Reward Power

We comply with the demands of our supplier as long as the supplier demonstrates products (V219)

We comply with the demands of our supplier as long as the supplier uses its abilities to reward us (V220)

We comply with the demands of our supplier as long as the supplier favors us on some occasions (V221)

Total variation explained by the factor: 71.2
Cronbach's alpha: 0.7901
Table 4.3 (Continued)

Factor 4: Expert Power

We comply with the demands of our supplier since the supplier has very knowledgeable people (V234)

We comply with the demands of our supplier since the supplier is familiar with its products (V240)

We comply with the demands of our supplier since we trust our supplier's judgment (V241)

Total variation explained by the factor: 67.4
Cronbach's alpha: 0.7251

Factor 5: Legitimate Power

We comply with the demands of our supplier since the supplier has the right to tell us what to do (V236)

We comply with the demands of our supplier since it is our duty to do as requested (V239)

Total variation explained by the factor: 77.8
Cronbach's alpha: 0.6783

Factor 6: Referent Power

We comply with the demands of our supplier since we like our supplier (V41)

We comply with the demands of our supplier since we really admire the way our supplier performs (V45)

We comply with the demands of our supplier since we consider our supplier an ideal firm (V237)

Total variation explained by the factor: 77.3
Cronbach's alpha: 0.8269
Table 4.3 (Continued)

Factor 7: Asset Specificity

A large investment in equipment and facilities is needed to supply this product to us in the way we need it delivered, handled, etc. (V245)

Supplier requires us to have specialized facilities in marketing this product (V246)

To be effective in dealing with this product, a salesperson would take a long time to get to know us (V63)

Total variation explained by the factor: 54.2
Cronbach's alpha: 0.5681

Factor 8: Environmental Uncertainty

We are often surprised by the actions of our competitors (V214)

It is rather difficult to predict the reactions of our customers (V215).

Our immediate customers change suppliers very frequently (V212)

Total variation explained by the factor: 48.2
Cronbach's alpha: 0.4447

As shown the twenty-five items were grouped into the eight factors listed in Table 4.3. Six of these factors represented the endogenous variables, while two represented the exogenous variables in the tested covariance structure model (Figure A.3, in the Appendix). The following section presents an overview of these factors.
Factor 1: Vertical Control

This factor represents the endogenous variable relating to the degree of vertical integration within the channel. It suggests the extent to which power to make and implement channel decisions is under the control of the firm (Dwyer and Oh 1988; John and Reve 1982; Klein 1989). There are two statements given in Table 4.3 developed to determine the extensiveness of this control process. If suppliers are influential on the functional issues such as designing the advertising campaigns, trade promotions, and deciding on the type of logo displayed on the product, one can conclude that there is a significant amount of vertical control implemented by that supplier (Klein 1989, Reve 1980).

Factor 2: Coercive Power

Coercive power is one of the five types of power. When dealers perceive that the supplier has the ability to punish them, the supplier acquires a base from which to exercise coercive power over those dealers (French and Raven 1959; Gaski and Nevin 1985; Gaski 1986; and John 1984). There are six statements given in Table 4.3 which elaborate on various actions that a supplier may take to coerce its dealers. Pursuing legal cases, delaying warranty claims, and delivering unwanted products are just some of the examples for these actions (Lusch 1976).
Factor 3: Reward Power

Reward power is another major type of power. When dealers perceive that the supplier has the ability to reward them, the supplier acquires a base from which to exercise reward power over those dealers (French and Raven 1959; Gaski and Nevin 1985; Gaski 1986; and John 1984). There are three statements given in Table 4.3 which deal with certain practices that a supplier may engage in to reward its dealers. Demonstrating the products and/or favoring the dealers on various occasions are two of the examples for the reward power use (Etgar 1979; Lusch 1977; Sibley and Michie 1982).

Factor 4: Expert Power

Expert power is the fourth endogenous variable. When dealers perceive that the supplier has a special expertise in a certain area, the supplier acquires a base from which to exercise expert power over those dealers in that specific area (French and Raven 1959; Gaski and Nevin 1985; Gaski 1986; and John 1984). There are three statements listed in Table 4.3 that relate to expert power. Having knowledgeable sales representatives, and being familiar with the products supplied are some of the attributes which provide suppliers with expert power base (Gaski and Nevin 1985; Gaski 1986).
Factor 5: Legitimate Power

Legitimate power is represented by Factor 5. When dealers perceive that the supplier has a formal right to tell them what to do, the supplier acquires a base from which to exercise legitimate power over those dealers (French and Raven 1959; Gaski and Nevin 1985; Gaski 1986; and John 1984). There are two statements given in Table 4.3 which attempt to assess dealers' perception of their suppliers. These statements are formulated to learn if dealers accept their respective supplier's demands without having any hesitance. This acceptance without questioning creates a base for suppliers' legitimate power (Gaski and Nevin 1985; Gaski 1986).

Factor 6: Referent Power

The final type of power is discussed under Factor 6. When dealers perceive that the supplier has a very similar set of goals with theirs, the supplier acquires a base from which to exercise referent power over those dealers (French and Raven 1959; Gaski and Nevin 1985; Gaski 1986; and John 1984). There are three statements given in Table 4.3 which relate to dealers' attitudes about their suppliers. These are the statements designed to measure if suppliers are liked and/or admired by their dealers. If a supplier is respected by its dealers to the extent that the dealers consider that
supplier an ideal firm to work with, there is an opportunity for referent power use by the supplier (Gaski and Nevin 1985; Gaski 1986).

Factor 7: Asset Specificity

Asset specificity is the first exogenous variable determining the level of vertical control in the covariance structure model. It refers to the degree to which certain human and physical assets are found the channel (Heide and John 1988). They are transaction-specific assets in the sense that they are tailored to certain transactions only (Klein, Frazier, and Roth 1990). There are three statements given in Table 4.3 which attempt to discover if there is a certain reason for the dealers to work with their respective suppliers in terms of the assets owned by those suppliers. In that sense, having various specialized facilities, complicated products, and extensive maintenance may be considered as having transaction-specific (tangible and intangible, respectively) assets (Anderson 1985; Klein 1989; Klein, Frazier, Roth 1990).

Factor 8: Environmental Uncertainty

Environmental uncertainty is the next exogenous variable determining the degree of vertical control in the covariance structure model. It refers to the frequency at which changes
in the environment occur (Klein 1989). There are three statements given in Table 4.3 which assess the dynamic nature of the environment. Frequent changes in the composition of competition, reactions of customer, and disposition of suppliers create a rather unstable environment which increases environmental uncertainty (Klein 1989; Klein, Frazier, Roth 1990).

The last two factors, asset specificity and environmental uncertainty, were the only ones with somewhat low reliability indicators (Table 4.3). As one would expect, it became rather difficult to interpret some of the findings when they were associated with these exogenous variables. Chapter 5 includes a section that presents an explanation for the disposition of these two factors.

Normal Distribution Assessments

As stated in Chapter III, one of the limitations of LISREL is using certain statistical indicators such as the maximum likelihood estimators and the Chi-Square statistic both of which are sensitive to distribution constraints. Although maximum likelihood estimates can still be used in case of moderate violation of multivariate normality (Anderson and Gerbing 1988; Browne 1984; and Tanaka 1984), the Chi-Square test statistic might not be interpreted properly. Accordingly, over an extended period of time, various studies (e.g., Babakus, Ferguson, and Jöreskog 1987;
Bentler 1983; and Browne 1982; 1984) have been emphasizing the importance and the necessity of relaxing the assumption of multivariate normality.

Alternative procedures such as generalized least squares (GLS), asymptotically distribution-free generalized least squares (ADFGLS) or weighted least squares (WLS), diagonally weighted least squares (DWLS), and asymptotically distribution-free reweighted least squares (ARLS) are some of the estimates developed for circumstances in which multivariate normality does not hold. Although these are important theoretical improvements, the degree to which they can be used properly for skewed distributions has not yet been determined (Anderson and Gerbing 1988).

The multivariate normal distribution assumes that each variable has zero skewness and zero kurtosis (Anderson and Gerbing 1988). Lisrel estimation is robust for symmetric distributions with normal kurtosis (Boomsma 1985). Kurtosis is an indicator that shows the amount of peakedness of a distribution (Norusis 1986).

The mode and the median can also be used to assess the normality of the distributions. If a distribution is skewed, the mode and the median will differ—indicating an asymmetric dispersion of the observations (Bohrnstedt and Knoke 1982). Table 4.4 includes measures to assess skewness: mean, kurtosis, median, and mode. As suggested by Table 4.4, the departures from normality were considerably low. For
instance, 17 variables out of 25 had an equal median and mode. The difference between the median and the mode values was very small (one point) for the remainder of the variables.

Table 4.4
Univariate Statistics for the Continuous Variables Used in the Covariance Structure Model

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Kurtosis</th>
<th>Median</th>
<th>Mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>V202</td>
<td>5.351</td>
<td>0.047</td>
<td>6.000</td>
<td>7.000</td>
</tr>
<tr>
<td>V203</td>
<td>5.450</td>
<td>-0.221</td>
<td>6.000</td>
<td>7.000</td>
</tr>
<tr>
<td>V223</td>
<td>4.287</td>
<td>1.826</td>
<td>5.000</td>
<td>5.000</td>
</tr>
<tr>
<td>V224</td>
<td>4.351</td>
<td>2.262</td>
<td>5.000</td>
<td>5.000</td>
</tr>
<tr>
<td>V225</td>
<td>4.099</td>
<td>1.295</td>
<td>4.000</td>
<td>5.000</td>
</tr>
<tr>
<td>V227</td>
<td>4.222</td>
<td>1.217</td>
<td>5.000</td>
<td>5.000</td>
</tr>
<tr>
<td>V228</td>
<td>4.187</td>
<td>1.686</td>
<td>5.000</td>
<td>5.000</td>
</tr>
<tr>
<td>V219</td>
<td>3.772</td>
<td>0.961</td>
<td>4.000</td>
<td>4.000</td>
</tr>
<tr>
<td>V220</td>
<td>3.316</td>
<td>-0.885</td>
<td>4.000</td>
<td>4.000</td>
</tr>
<tr>
<td>V221</td>
<td>3.257</td>
<td>-0.835</td>
<td>4.000</td>
<td>4.000</td>
</tr>
<tr>
<td>V234</td>
<td>4.251</td>
<td>1.597</td>
<td>4.000</td>
<td>4.000</td>
</tr>
<tr>
<td>V240</td>
<td>4.398</td>
<td>3.218</td>
<td>5.000</td>
<td>5.000</td>
</tr>
<tr>
<td>V241</td>
<td>3.596</td>
<td>0.330</td>
<td>4.000</td>
<td>4.000</td>
</tr>
<tr>
<td>V236</td>
<td>1.713</td>
<td>0.800</td>
<td>1.000</td>
<td>1.000</td>
</tr>
<tr>
<td>V239</td>
<td>2.333</td>
<td>-0.891</td>
<td>2.000</td>
<td>2.000</td>
</tr>
<tr>
<td>V41</td>
<td>4.047</td>
<td>1.879</td>
<td>4.000</td>
<td>4.000</td>
</tr>
<tr>
<td>V45</td>
<td>3.860</td>
<td>-0.024</td>
<td>4.000</td>
<td>4.000</td>
</tr>
<tr>
<td>V237</td>
<td>3.550</td>
<td>-0.182</td>
<td>4.000</td>
<td>4.000</td>
</tr>
<tr>
<td>V245</td>
<td>4.813</td>
<td>-0.934</td>
<td>5.000</td>
<td>7.000</td>
</tr>
<tr>
<td>V246</td>
<td>3.690</td>
<td>-1.125</td>
<td>4.000</td>
<td>5.000</td>
</tr>
<tr>
<td>V63</td>
<td>3.749</td>
<td>-1.012</td>
<td>4.000</td>
<td>5.000</td>
</tr>
<tr>
<td>V214</td>
<td>5.135</td>
<td>-0.738</td>
<td>6.000</td>
<td>7.000</td>
</tr>
<tr>
<td>V215</td>
<td>3.778</td>
<td>-0.726</td>
<td>4.000</td>
<td>4.000</td>
</tr>
<tr>
<td>V212</td>
<td>2.269</td>
<td>1.574</td>
<td>2.000</td>
<td>2.000</td>
</tr>
</tbody>
</table>

The peakedness indicator for a given distribution, kurtosis, displayed a somewhat different assessment. Five of the variables ("V202," "V203," "V241," "V45," and "V237") had
kurtosis values between -0.5 and 0.5 indicating a (mesokurtic) distribution which was very close in shape to a normal distribution. For eight variables ("V220," "V221," "V239," "V245," "V246," "V63," "V214," and "V215"), a negative kurtosis value indicated that more responses fell into the tails of the distributions than would be expected vis-a-vis a normal curve. These measures, ranging in value from -1.125 to -0.726, suggested platykurtic distribution of the data (Norusis 1986). The remainder of the statements displayed positive kurtosis, thus indicating leptokurtic distributions. In other words, a larger number of responses occurred near the central tendency than what would be expected for a normal distribution. Considering these findings about the distributions, one should be cautious in the interpretation from the results of the lisrel procedure used in the study.

The Covariance Structure Model

This covariance structure model combines the measurement and structural equation components presented in the previous chapter (see Figures A.2 and A.3). The lisrel commands for the model are shown in Table A.2 in the Appendix.

The sample covariance matrix was generated using prelis. Prelis is used to handle raw data problems and compute an appropriate matrix to use in lisrel. In that sense, it is simply a companion program to lisrel (Jöreskog and Sörbom
The observed covariances are given in Table A.3 in the Appendix.

The matrices were specified based on the configuration of the relationships indicated in Figure A.3. The first matrix, Beta (B), was expressed as a subdiagonal matrix. Since that was a lower triangular matrix with diagonal elements equal to zero, the paths between the first endogenous variable (i.e., vertical control) and the other endogenous variables (i.e., five types of power) had to be defined as fixed elements so that they could be estimated. The Gamma (Γ) matrix, which includes the paths between the construct of vertical control and the exogenous variables (asset specificity and environmental uncertainty), was initially defined as a fixed full matrix. Following this specification, the coefficients representing the two paths from these variables to the first specific endogenous variable were set free to be calculated. Similarly, the Psi (Ψ) matrix was assumed to be fixed and the entries on the diagonal were freed so they each could be estimated.

Phi (φ) was defined as a symmetric matrix with the fixed elements in the diagonal. The rest of the matrices were left at their default forms. Specifically, Lambda-Y (Λy), and Lambda-X (Λx) were full matrices. Since these two were fixed matrices with certain entries set to one (which were necessary for the identification of the model), some of the coefficients had to be freed up to be determined (the
estimates for these free elements are given in respective matrices presented in the section "Lisrel Estimates").

Finally, Theta-Epsilon ($\Theta_\varepsilon$) and Theta-Delta ($\Theta_\delta$) were diagonal matrices, indicating no correlations among the error terms. All of the matrices were positive definite, thus assuring that the model was completely identified (Jöreskog and Sörbom 1983).

**Quality of Model**

The goodness-of-fit measures are provided in Table 4.5. The large chi-square value, suggesting a significant deviation between the data and the hypothesized model, was not unexpected. This statistic was affected by several factors that were present in the sample of data explained above (see the section "Normal Distribution Assessments"). Moderate deviations from normality were major contributors to the magnitude of the resulting chi-square value. Therefore, it is very important to emphasize that a root mean square residual value was only 0.153. Furthermore, the difference between the goodness-of-fit index and the adjusted goodness-of-fit index (AGFI) was 0.04. As stated by Anderson and Gerbing (1988), this AGFI is the result of significant coefficients in the measurement model, as well as the ones in the structural equation model used for the research hypotheses. All of these indices should be evaluated to
judge how well the model fits (although the chi-square value is still statistically significant).

Table 4.5
Goodness-of-Fit Measures for the Covariance Structure Model

<table>
<thead>
<tr>
<th>Summary Measure</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chi-square with 267 degrees of freedom:</td>
<td>510.730</td>
</tr>
<tr>
<td>Calculated probability level:</td>
<td>( p &lt; 0.001 )</td>
</tr>
<tr>
<td>Goodness-of-Fit Index:</td>
<td>0.816</td>
</tr>
<tr>
<td>Adjusted Goodness-of-Fit Index:</td>
<td>0.776</td>
</tr>
<tr>
<td>Root Mean Square Residual:</td>
<td>0.153</td>
</tr>
</tbody>
</table>

Lisrel Estimates

This section contains information about \( \lambda_Y \), \( \lambda_X \), \( \beta \), \( \gamma \), \( \psi \), \( \phi \), \( \theta_{\epsilon} \), and \( \theta_{\delta} \) matrices. These matrices represent the major components of the covariance structure model. The lisrel analysis resulted in the following estimates:

**Lambda-Y:**

\( \Lambda_Y \) matrix consisted of nineteen rows of variables that corresponded to one of the six factors. The maximum likelihood estimates are shown in Table 4.6 on the following page.
Table 4.6
Lambda-Y (Λ_y) Estimates for the Covariance Structure Model

<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>V202</td>
<td>-0.109</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>V203</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>V223</td>
<td>1.000</td>
<td>1.028*</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>V224</td>
<td></td>
<td>1.075*</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>V225</td>
<td></td>
<td>1.289*</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>V227</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>V228</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.179*</td>
<td></td>
</tr>
<tr>
<td>V229</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.142*</td>
<td></td>
</tr>
<tr>
<td>V219</td>
<td></td>
<td></td>
<td></td>
<td>0.651*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>V220</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>V221</td>
<td></td>
<td></td>
<td>0.840*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>V234</td>
<td></td>
<td></td>
<td></td>
<td>0.713*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>V240</td>
<td></td>
<td></td>
<td>0.496*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>V241</td>
<td></td>
<td></td>
<td></td>
<td>1.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>V236</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.000</td>
<td>1.163*</td>
</tr>
<tr>
<td>V239</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>V41</td>
<td></td>
<td></td>
<td></td>
<td>1.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>V45</td>
<td></td>
<td></td>
<td></td>
<td>1.251*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>V237</td>
<td></td>
<td></td>
<td></td>
<td>1.171*</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(*) Significant at 0.10 alpha level

The columns represent the six endogenous variables. The coefficients indicate the expected change in the observed variable for a one unit change in the defined latent variable (Jöreskog and Sörbom 1982). These values are estimated for the free elements only. The variables stated as constraints have the coefficient of one.
Table 4.7
Standard Error Estimates for the Covariance Structure Model (in relation to Lambda-Y matrix)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Observed Vari.:</td>
<td>Control</td>
<td>Power</td>
<td>Power</td>
<td>Power</td>
<td>Power</td>
<td>Power</td>
</tr>
<tr>
<td>V202</td>
<td>1.728</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>V203</td>
<td>0.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>V223</td>
<td></td>
<td>0.000</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>V224</td>
<td></td>
<td>0.095</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>V225</td>
<td></td>
<td>0.094</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>V227</td>
<td></td>
<td>0.101</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>V228</td>
<td></td>
<td>0.092</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>V229</td>
<td></td>
<td>0.086</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>V219</td>
<td></td>
<td></td>
<td>0.085</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>V220</td>
<td></td>
<td></td>
<td></td>
<td>0.074</td>
<td></td>
<td></td>
</tr>
<tr>
<td>V221</td>
<td></td>
<td></td>
<td></td>
<td>0.104</td>
<td></td>
<td></td>
</tr>
<tr>
<td>V234</td>
<td></td>
<td></td>
<td></td>
<td>0.072</td>
<td></td>
<td></td>
</tr>
<tr>
<td>V240</td>
<td></td>
<td></td>
<td></td>
<td>0.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>V241</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.000</td>
<td></td>
</tr>
<tr>
<td>V236</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.000</td>
</tr>
<tr>
<td>V239</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.292</td>
</tr>
<tr>
<td>V41</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.000</td>
</tr>
<tr>
<td>V45</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.116</td>
</tr>
<tr>
<td>V237</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.109</td>
</tr>
</tbody>
</table>

On the other hand, standard error estimates of the lambda-y matrix appeared to be rather small, ranging from 0.072 to 0.292, for the majority of the elements. As it is shown in Table 4.7 above, the variable "V202" had the largest (1.728) standard error estimate. This particular variable appeared to be somewhat questionable throughout the various stages of the study (as will be explained later).
Table 4.8
T-Values for the Covariance Structure Model (in relation to Lambda-Y matrix)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Observed Vari.:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>V202</td>
<td>-0.063</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>V203</td>
<td>0.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>V223</td>
<td>0.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>V224</td>
<td>10.857</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>V225</td>
<td>11.379</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>V227</td>
<td>12.744</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>V228</td>
<td>12.794</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>V229</td>
<td>13.204</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>V219</td>
<td></td>
<td>7.641</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>V220</td>
<td></td>
<td>0.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>V221</td>
<td></td>
<td>8.103</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>V234</td>
<td></td>
<td></td>
<td>9.608</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>V240</td>
<td></td>
<td></td>
<td>6.874</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>V241</td>
<td></td>
<td></td>
<td></td>
<td>0.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>V236</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.000</td>
<td></td>
</tr>
<tr>
<td>V239</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3.980</td>
<td></td>
</tr>
<tr>
<td>V41</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.000</td>
</tr>
<tr>
<td>V45</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>10.742</td>
<td></td>
</tr>
<tr>
<td>V237</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>10.788</td>
<td></td>
</tr>
</tbody>
</table>

* Critical t-value (t.10) = 1.28

As one would guess, the same variable ("V202") had a t-value which was not statistically significant (at 0.10 alpha level). On the other hand, all the other elements of the matrix were statistically significant (t-values ranging from 3.980 to 13.204) as presented in Table 4.8 above. Therefore, one can be confident about the way that the five of the six endogenous variables (five types of power) are measured by their respective variables.
Lambda-X:

Lambda-X (\(\Lambda_X\)) matrix consisted of six rows of variables that corresponded to one of the two factors. The lisrel (maximum likelihood estimates) for this matrix are shown in Table 4.9. The columns represent the two exogenous variables. One may note that since this was a symmetric matrix, there were no elements defined as constraints.

Table 4.9
Lambda-X (\(\Lambda_X\)) Estimates for the Covariance Structure Model

<table>
<thead>
<tr>
<th>Observed Vari.:</th>
<th>Exogenous Variables</th>
<th>Asset Specificity</th>
<th>Environmental Uncertainty</th>
</tr>
</thead>
<tbody>
<tr>
<td>V245</td>
<td></td>
<td>1.400*</td>
<td></td>
</tr>
<tr>
<td>V246</td>
<td></td>
<td>1.080*</td>
<td></td>
</tr>
<tr>
<td>V63</td>
<td></td>
<td>0.657*</td>
<td></td>
</tr>
<tr>
<td>V214</td>
<td></td>
<td></td>
<td>0.697*</td>
</tr>
<tr>
<td>V215</td>
<td></td>
<td></td>
<td>1.041*</td>
</tr>
<tr>
<td>V212</td>
<td></td>
<td></td>
<td>0.450*</td>
</tr>
</tbody>
</table>

(*): Significant at 0.10 alpha level

Similar to the case for the lambda-y matrix, standard error estimates of the lambda-x matrix appeared to be fairly small. As presented in Table 4.10 on the following page, they were ranging from 0.148 to only 0.290. These values suggest that the elements of the lambda-x matrix would probably be statistically significant (at 0.10 alpha level).
Accordingly, Table 4.11, lists the significant t-values, ranging from 3.041 to 5.909, for those variables. This significance assured that the exogenous variables were measured properly by their respective variables.

Table 4.10
Standard Error Estimates for the Covariance Structure Model (in relation to Lambda-X matrix)

<table>
<thead>
<tr>
<th>Exogenous Variables</th>
<th>Asset Specificity</th>
<th>Environmental Uncertainty</th>
</tr>
</thead>
<tbody>
<tr>
<td>Observed Vari.:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>V245</td>
<td>0.237</td>
<td></td>
</tr>
<tr>
<td>V246</td>
<td>0.207</td>
<td></td>
</tr>
<tr>
<td>V63</td>
<td>0.161</td>
<td></td>
</tr>
<tr>
<td>V214</td>
<td></td>
<td>0.225</td>
</tr>
<tr>
<td>V215</td>
<td></td>
<td>0.290</td>
</tr>
<tr>
<td>V212</td>
<td></td>
<td>0.148</td>
</tr>
</tbody>
</table>

Table 4.11
T-Values for the Covariance Structure Model (in relation to Lambda-X matrix)

<table>
<thead>
<tr>
<th>Exogenous Variables</th>
<th>Asset Specificity</th>
<th>Environmental Uncertainty</th>
</tr>
</thead>
<tbody>
<tr>
<td>Observed Vari.:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>V245</td>
<td>5.909</td>
<td></td>
</tr>
<tr>
<td>V246</td>
<td>5.208</td>
<td></td>
</tr>
<tr>
<td>V63</td>
<td>4.069</td>
<td></td>
</tr>
<tr>
<td>V214</td>
<td></td>
<td>3.104</td>
</tr>
<tr>
<td>V215</td>
<td></td>
<td>3.587</td>
</tr>
<tr>
<td>V212</td>
<td></td>
<td>3.041</td>
</tr>
</tbody>
</table>

* Critical t-value (t.10) = 1.28
Beta:

Beta (B) matrix contained rather high coefficients, presented in Table 4.12. Each one of these elements is simply an estimate of the relationship between the construct of vertical control and the five types of power.

The estimates for expert, legitimate, and referent power sources were higher than the estimates for coercive and reward power bases. In other words, it appears that expert, legitimate, and referent power sources were more responsive to a unit increase in the degree of vertical control than were coercive and reward power sources (this is not an accurate assessment due to the insignificance of the relationships which will be shown in Table 4.14, later).

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Vertical Control</td>
<td>0.996</td>
<td>2.882</td>
<td>9.682</td>
<td>3.491</td>
<td>7.580</td>
</tr>
</tbody>
</table>

As shown in Table 4.13 on the next page, some of the standard error estimates for the elements of the beta matrix were somewhat larger than the others. Although one may use the magnitude of these estimates to question the appropriateness of the linkages between vertical control and
the five types of power, the construct of vertical control should be subject to further inquiry instead.

As explained later, the findings about the power types supported the way these power types were defined and incorporated into the model. Unfortunately, the findings about the construct of vertical control raised various questions about the way this construct was defined and measured previously in the literature.

Table 4.13
Standard Error Estimates for the Covariance Structure Model (in relation to Beta matrix)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2.007</td>
<td>5.300</td>
<td>17.798</td>
<td>6.468</td>
<td>13.936</td>
</tr>
</tbody>
</table>

As presented in Table 4.14 on the following page, all the linkages between vertical control and the five power types were not statistically significant (at 0.10 alpha level). Due to this insignificance, technically, it would not be correct to interpret the magnitudes presented in Table 4.12 above. This is one of the crucial findings that will be used later to question the construct of vertical control and the way it was measured in the model.
Table 4.14
T-Values for the Covariance Structure Model (in relation to Beta matrix)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.496</td>
<td>0.532</td>
<td>0.544</td>
<td>0.540</td>
<td>0.544</td>
</tr>
</tbody>
</table>

* Critical t-value (t_{10}) = 1.28

Gamma:

Gamma (\Gamma) matrix was composed of somewhat small coefficients shown in Table 4.15. These elements are the lisrel (maximum likelihood) estimates of the paths between the construct of vertical control and, first, asset specificity and, secondly, environmental uncertainty. The small magnitudes of these coefficients (and their insignificance as given in Table 4.17, later) raised similar concerns about the accuracy of the vertical control construct.

Table 4.15
Gamma (\Gamma) Estimates for the Covariance Structure Model

<table>
<thead>
<tr>
<th>Vertical Control</th>
<th>Asset Specificity</th>
<th>Environmental Uncertainty</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.025</td>
<td>0.005</td>
</tr>
</tbody>
</table>
Table 4.16 includes the standard error estimates for the gamma matrix. These estimates were fairly small. Although one would like to see small standard error estimates, the lisrel estimates were so small that the insignificance was almost inevitable.

Accordingly, the t-values for the elements of the matrix were not statistically significant (at 0.10 alpha level). This insignificance given in Table 4.17 reinforces the doubts about the appropriateness of the vertical control construct.

<table>
<thead>
<tr>
<th></th>
<th>Asset Specificity</th>
<th>Environmental Uncertainty</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vertical Control</td>
<td>0.046</td>
<td>0.014</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Asset Specificity</th>
<th>Environmental Uncertainty</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vertical Control</td>
<td>0.534</td>
<td>0.374</td>
</tr>
</tbody>
</table>

* Critical t-value \( (t_{.10}) = 1.28 \)
Psi:

Psi (\(\psi\)) matrix contained rather small coefficients, presented in Table 4.18. Each one of these elements represents LISREL estimate of the covariance among the errors in respective equations. As shown in the table, the covariance between the error terms of vertical control and reward power appeared to be the highest (1.204).

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>0.007</td>
<td>0.750*</td>
<td>1.204*</td>
<td>0.023</td>
<td>0.460*</td>
<td>0.109*</td>
</tr>
</tbody>
</table>

(*) Significant at 0.10 alpha level

Table 4.19 on the following page, includes the standard error estimates for the psi matrix. The standard error estimates for the elements of the psi matrix were fairly small, ranging from 0.027 to 0.208.

The values in Table 4.20 on the same page, suggest that the majority of the elements of the psi matrix would be statistically significant (at 0.10 alpha level). As shown in the table, the t-values for expert power (0.212) and vertical control (0.272) were the smallest ones. Specially, the insignificance of vertical control confirmed the necessity of
having the previous doubts about the appropriateness of the
construct of vertical control.

### Table 4.19
**Standard Error Estimates for**
the Covariance Structure Model
(in relation to Psi matrix)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Vertical Control</td>
<td>0.027</td>
<td>0.129</td>
<td>0.208</td>
<td>0.108</td>
<td>0.141</td>
</tr>
</tbody>
</table>

### Table 4.20
**T-Values for the**
Covariance Structure Model
(in relation to Psi matrix)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Vertical Control</td>
<td>0.272</td>
<td>5.799</td>
<td>5.783</td>
<td>0.212</td>
<td>3.271</td>
</tr>
</tbody>
</table>

* Critical t-value (t.10) = 1.28

**Phi:**

Phi (φ) matrix indicates the association between the two
factors, asset specificity and environmental uncertainty. As
explained earlier, these factors had somewhat weak
reliability indicators. Table 4.21 includes the lisrel
estimate for this association which appears to be somewhat
low (and insignificant at 0.10 alpha level).
Table 4.21
Phi (φ) Estimate for the Covariance Structure Model

<table>
<thead>
<tr>
<th>Environmental Uncertainty</th>
<th>Asset Specificity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.086</td>
</tr>
</tbody>
</table>

Table 4.22 presents the standard error estimate for the phi matrix. As shown in the table, the estimate was rather large compared to the association given in the previous table.

<table>
<thead>
<tr>
<th>Environmental Uncertainty</th>
<th>Asset Specificity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.133</td>
</tr>
</tbody>
</table>

The next table, Table 4.23, shows the t-value for the phi estimate. As given below, the association between asset specificity and environmental uncertainty was not statistically significant (at 0.10 alpha level). Considering the fact that these two factors were the determinants of vertical control, one could suggest that the insignificance was consistent with the previous findings. They simply presented a somewhat questionable picture of the construct of vertical control and its components.
Table 4.23
T-Value for the Covariance Structure Model (in relation to Phi matrix)

<table>
<thead>
<tr>
<th>Environmental Uncertainty</th>
<th>Asset Specificity</th>
<th>0.649</th>
</tr>
</thead>
</table>
* Critical t-value (t.10) = 1.28

Theta-Epsilon:

Theta-Epsilon ($\theta_\varepsilon$) matrix represents the variances of the error terms for the observed variables used to determine endogenous variables. The lisrel (maximum likelihood) estimates for this matrix are given in Table 4.24 on the following page.

Table 4.24 also includes the squared multiple correlations (SMC) which indicate the strength of association between those observed variables and the relevant endogenous variables (Jöreskog and Sörbom 1982; 1983). As shown in this previous table, the majority of the variables used in the study contained higher SMCs than their theta-epsilon variances. The variables "V202" and "V203" had the smallest SMCs among all the variables.
Table 4.24
Theta-Epsilon ($\theta_e$) Estimates and the Squared Multiple Correlations (SMC) for the Covariance Structure Model

<table>
<thead>
<tr>
<th>Observed Vari.:</th>
<th>Theta-Epsilon Values:</th>
<th>SMC:</th>
</tr>
</thead>
<tbody>
<tr>
<td>V202</td>
<td>3.429*</td>
<td>0.000</td>
</tr>
<tr>
<td>V203</td>
<td>3.923*</td>
<td>0.002</td>
</tr>
<tr>
<td>V223</td>
<td>0.542*</td>
<td>0.583</td>
</tr>
<tr>
<td>V224</td>
<td>0.510*</td>
<td>0.611</td>
</tr>
<tr>
<td>V225</td>
<td>0.450*</td>
<td>0.661</td>
</tr>
<tr>
<td>V227</td>
<td>0.327*</td>
<td>0.794</td>
</tr>
<tr>
<td>V228</td>
<td>0.265*</td>
<td>0.799</td>
</tr>
<tr>
<td>V229</td>
<td>0.186*</td>
<td>0.841</td>
</tr>
<tr>
<td>V219</td>
<td>0.698*</td>
<td>0.435</td>
</tr>
<tr>
<td>V220</td>
<td>0.396*</td>
<td>0.762</td>
</tr>
<tr>
<td>V221</td>
<td>0.767*</td>
<td>0.539</td>
</tr>
<tr>
<td>V234</td>
<td>0.324*</td>
<td>0.550</td>
</tr>
<tr>
<td>V240</td>
<td>0.450*</td>
<td>0.298</td>
</tr>
<tr>
<td>V241</td>
<td>0.417*</td>
<td>0.651</td>
</tr>
<tr>
<td>V236</td>
<td>0.424*</td>
<td>0.568</td>
</tr>
<tr>
<td>V239</td>
<td>0.634*</td>
<td>0.543</td>
</tr>
<tr>
<td>V41</td>
<td>0.461*</td>
<td>0.554</td>
</tr>
<tr>
<td>V45</td>
<td>0.355*</td>
<td>0.716</td>
</tr>
<tr>
<td>V237</td>
<td>0.300*</td>
<td>0.723</td>
</tr>
</tbody>
</table>

(*) Significant at 0.10 alpha level

The majority of the standard error estimates for the theta-epsilon matrix appeared to be fairly small, ranging from 0.050 to 0.194. As presented in Table 4.25 on the next page, the standard error estimates for the two variables ("V202" and "V203") measuring the construct of vertical control were the only ones which were slightly larger than the others.
Table 4.25
Standard Error Estimates for The Covariance Structure Model (in relation to Theta-Epsilon matrix)

<table>
<thead>
<tr>
<th>Observed Vari.</th>
<th>Standard Error Estimates for the Theta-Epsilon Values:</th>
</tr>
</thead>
<tbody>
<tr>
<td>V202</td>
<td>0.372</td>
</tr>
<tr>
<td>V203</td>
<td>0.426</td>
</tr>
<tr>
<td>V223</td>
<td>0.064</td>
</tr>
<tr>
<td>V224</td>
<td>0.061</td>
</tr>
<tr>
<td>V225</td>
<td>0.055</td>
</tr>
<tr>
<td>V227</td>
<td>0.045</td>
</tr>
<tr>
<td>V228</td>
<td>0.037</td>
</tr>
<tr>
<td>V229</td>
<td>0.029</td>
</tr>
<tr>
<td>V219</td>
<td>0.093</td>
</tr>
<tr>
<td>V220</td>
<td>0.133</td>
</tr>
<tr>
<td>V221</td>
<td>0.122</td>
</tr>
<tr>
<td>V234</td>
<td>0.045</td>
</tr>
<tr>
<td>V240</td>
<td>0.053</td>
</tr>
<tr>
<td>V241</td>
<td>0.070</td>
</tr>
<tr>
<td>V236</td>
<td>0.142</td>
</tr>
<tr>
<td>V239</td>
<td>0.194</td>
</tr>
<tr>
<td>V41</td>
<td>0.060</td>
</tr>
<tr>
<td>V45</td>
<td>0.058</td>
</tr>
<tr>
<td>V237</td>
<td>0.050</td>
</tr>
</tbody>
</table>

All of the t-values for the elements of the theta-epsilon matrix were statistically significant (at 0.10 alpha level). As given in Table 4.26 on the next page, the t-values ranged from 2.979 to 9.219.

Interestingly, the t-values for the variances of the error terms for two specific variables ("V202" and "V203" measuring the construct of vertical control) were the largest ones. All these findings indicate that these two variables and the construct that they were trying to measure in this study had some problems.
Table 4.26
T-Values for the Covariance Structure Model (in relation to Theta-Epsilon matrix)

<table>
<thead>
<tr>
<th>Observed Vari.:</th>
<th>T-Values for the Theta-Epsilon Values:</th>
</tr>
</thead>
<tbody>
<tr>
<td>V202</td>
<td>9.219</td>
</tr>
<tr>
<td>V203</td>
<td>9.216</td>
</tr>
<tr>
<td>V223</td>
<td>8.497</td>
</tr>
<tr>
<td>V224</td>
<td>8.407</td>
</tr>
<tr>
<td>V225</td>
<td>8.209</td>
</tr>
<tr>
<td>V227</td>
<td>7.184</td>
</tr>
<tr>
<td>V228</td>
<td>7.119</td>
</tr>
<tr>
<td>V229</td>
<td>6.421</td>
</tr>
<tr>
<td>V219</td>
<td>7.495</td>
</tr>
<tr>
<td>V220</td>
<td>2.979</td>
</tr>
<tr>
<td>V221</td>
<td>6.279</td>
</tr>
<tr>
<td>V234</td>
<td>7.159</td>
</tr>
<tr>
<td>V240</td>
<td>8.535</td>
</tr>
<tr>
<td>V241</td>
<td>5.946</td>
</tr>
<tr>
<td>V236</td>
<td>2.995</td>
</tr>
<tr>
<td>V239</td>
<td>3.275</td>
</tr>
<tr>
<td>V41</td>
<td>7.744</td>
</tr>
<tr>
<td>V45</td>
<td>6.128</td>
</tr>
<tr>
<td>V237</td>
<td>6.018</td>
</tr>
</tbody>
</table>

* Critical t-value \( t_{10} = 1.28 \)

Theta-Delta:

Similarly, Theta-Delta \( (\Theta_\delta) \) matrix represents the variances of the error terms for the observed variables used to determine the exogenous variables in the measurement model (Jöreskog and Sörbom 1982; 1983). The LISREL (maximum likelihood) estimates for this matrix are shown in Table 4.27. The table also includes the SMC which indicates the strength of association between those observed variables and
the related exogenous variables (Jöreskog and Sörbom 1982; 1983). As listed in the table, all of the variables contained smaller SMCs than their theta-delta variances.

Table 4.27
Theta-Delta (θδ) Estimates and the Squared Multiple Correlations (SMC) for the Covariance Structure Model

<table>
<thead>
<tr>
<th>Observed Vari.:</th>
<th>Theta-Delta Values:</th>
<th>SMC:</th>
</tr>
</thead>
<tbody>
<tr>
<td>V245</td>
<td>1.818*</td>
<td>0.519</td>
</tr>
<tr>
<td>V246</td>
<td>2.579*</td>
<td>0.311</td>
</tr>
<tr>
<td>V63</td>
<td>2.370*</td>
<td>0.154</td>
</tr>
<tr>
<td>V214</td>
<td>2.678*</td>
<td>0.154</td>
</tr>
<tr>
<td>V215</td>
<td>1.385*</td>
<td>0.439</td>
</tr>
<tr>
<td>V212</td>
<td>1.254*</td>
<td>0.139</td>
</tr>
</tbody>
</table>

(*) Significant at 0.10 alpha level

The standard error estimates for the elements of the theta-delta matrix are given in Table 4.28 on the next page. It should be noted that the majority of the estimates were rather low, indicating small error terms.

Accordingly, as shown in Table 4.29 on the same page, all of the t-values for the elements of the theta-delta matrix were statistically significant (at 0.10 alpha level). These values were as large as 8.141.
Table 4.28
Standard Error Estimates for the Covariance Structure Model
(in relation to Theta-Delta matrix)

<table>
<thead>
<tr>
<th>Observed Vari.:</th>
<th>Standard Error Estimates for the Theta-Delta Values:</th>
</tr>
</thead>
<tbody>
<tr>
<td>V245</td>
<td>0.591</td>
</tr>
<tr>
<td>V246</td>
<td>0.438</td>
</tr>
<tr>
<td>V63</td>
<td>0.291</td>
</tr>
<tr>
<td>V214</td>
<td>0.386</td>
</tr>
<tr>
<td>V215</td>
<td>0.581</td>
</tr>
<tr>
<td>V212</td>
<td>0.173</td>
</tr>
</tbody>
</table>

Table 4.29
T-Values for the Covariance Structure Model
(in relation to Theta-Delta matrix)

<table>
<thead>
<tr>
<th>Observed Vari.:</th>
<th>T-Values for the Theta-Delta Values:</th>
</tr>
</thead>
<tbody>
<tr>
<td>V245</td>
<td>3.074</td>
</tr>
<tr>
<td>V246</td>
<td>5.888</td>
</tr>
<tr>
<td>V63</td>
<td>8.141</td>
</tr>
<tr>
<td>V214</td>
<td>6.937</td>
</tr>
<tr>
<td>V215</td>
<td>2.382</td>
</tr>
<tr>
<td>V212</td>
<td>7.265</td>
</tr>
</tbody>
</table>

* Critical t-value (t.10) = 1.28

Hypothesis Testing

This section follows from the discussion in Chapter III on the research hypotheses. The results of the analysis as they relate to these hypotheses are presented below.
Research Hypothesis 1 (H₁):  

A positive relationship was expected between the amount of transaction-specific assets and the degree of vertical integration of distribution channels. This hypothesis was not supported in this study. As shown in Table 4.15, the lisrel estimate between asset specificity and the construct of vertical control was 0.025 which had a t-value of 0.534 (not significant at 0.10 alpha level). This insignificance suggests that the hypothesis could not be supported.

Research Hypothesis 2 (H₂):  

A positive relationship was expected between the level of environmental uncertainty surrounding a transaction in a market and the degree of vertical integration of distribution channels. As shown in Table 4.15, the lisrel estimate between environmental uncertainty and the construct of vertical control was only 0.005 with a t-value of 0.374 (not significant at 0.10 alpha level). Due to the insignificance of the t-value, the hypothesis was not supported.

Research Hypothesis 3 (H₃):  

A negative relationship was expected between the degree of vertical integration and the likelihood of suppliers' (manufacturers) exercising coercive power sources over dealers. This hypothesis was not supported in this study.
As shown in Table 4.12, the LISREL estimate between the construct of vertical control and the coercive power use was 0.996 which had a t-value of 0.496 (not significant at 0.10 alpha level). Therefore, it should be concluded that the hypothesis could not be supported.

Research Hypothesis 4 (H₄):

A negative relationship was expected between the degree of vertical integration and the likelihood of suppliers' (manufacturers) exercising reward power sources over dealers. As shown in Table 4.12, the LISREL estimate between the construct of vertical control and the reward power use was 2.882 which had a t-value of 0.532 (not significant at 0.10 alpha level). Unfortunately, similar to the previous case about coercive power use, the t-value of this coefficient was not significant. As a result, the hypothesis could not be supported.

Research Hypothesis 5 (H₅):

A positive relationship was expected between the degree of vertical integration and the likelihood of suppliers' (manufacturers) exercising expert power sources over dealers. As shown in Table 4.12, the LISREL estimate between the construct of vertical control and the expert power use was 9.682 which had a t-value of 0.544 (not significant at 0.10
alpha level). Due to insignificance of the t-value, this hypothesis was not supported in the study.

**Research Hypothesis 6 (H₆):**

A positive relationship was expected between the degree of vertical integration and the likelihood of suppliers' (manufacturers) exercising legitimate power sources over dealers. As shown in Table 4.12, the lisrel estimate between the construct of vertical control and the legitimate power use was 3.491 with a t-value of 0.540 (not significant at 0.10 alpha level). As a result, this hypothesis was not supported in the study.

**Research Hypothesis 7 (H₇):**

A positive relationship was expected between the degree of vertical integration and the likelihood of suppliers' (manufacturers) exercising referent power sources over dealers. As shown in Table 4.12, the lisrel estimate between the construct of vertical control and the referent power use was 7.580 which had a t-value of 0.544 (not significant at 0.10 alpha level). Similar to the cases which were relevant for the hypotheses discussed above, this hypothesis was not supported in the study.

Given the statistically insignificant outcomes for the research hypotheses, one should not attempt to interpret
direction nor magnitude of the coefficients. The next chapter will discuss this issue further and provide a possible explanation for the presence of insignificance.
CHAPTER REFERENCES


Cronbach, Lee (1951), "Coefficient Alpha and the Internal Structure of Tests," *Psychometrika*, 16 (September), 297-334.

Etgar, Michael (1979), "Sources and Types of Intrachannel Conflict," Journal of Retailing, 55 (Spring), 61-78.


_________ and Torger Reve (1982), "Reliability and Validity of Key Informant Data from Dyadic Relationships in Marketing Channels," Journal of Marketing Research, 19 (November), 517-524.


CHAPTER V

ANALYSIS AND RECOMMENDATIONS

This study examined the use of various power bases in vertically integrated channels. First, two key components of transaction cost analysis (TCA), asset specificity and environmental uncertainty have been used to determine the degree of vertical integration in a channel. Once a certain level of integration was established, the study focused on understanding the relationships between that particular integration level and five different types of power used in the channel structure.

In this chapter, a general overview of the empirical findings will be presented. After this brief review of the findings, the research instrument will be discussed in terms of the reliability of the constructs used in the study. The statements measuring some of the constructs will be examined in terms of the ways they have been developed prior to this study by other authors. After the discussion of the limitations of the research, the chapter will be completed by proposing various suggestions which may underline significant avenues for forthcoming studies.
General Overview of Findings

As presented in Table 4.5, the covariance structure model tested in this study had a good fit. Even though the model had a statistically significant (p < 0.001) chi-square value (which was 510.730 with 267 degrees of freedom), goodness-of-fit, adjusted goodness-of-fit, and root mean square residual indices exhibited figures which indicated a proper model specification.

Unfortunately, the research hypotheses listed in Chapter III were not supported based on the findings of the study (see the section "Hypothesis Testing" in the previous chapter). As given in Table 4.14 (composed of the t-values for the Beta matrix) and Table 4.17 (composed of the t-values for the Gamma matrix), the lisrel estimates for the coefficients of the paths in the covariance structure model were not statistically significant (p > 0.10). Due to this lack of statistical significance (see Figure A.4 in the Appendix), one would have to interpret these coefficients to be "zero" during the hypotheses testing stage.

Research Instrument

As presented in Chapter III, the data collection instrument originally contained 58 statements (see Table A.1 in the Appendix). Following a statement purification process using a series of factor analysis runs (as suggested by
Churchill 1979), 25 statements were retained for the final lisrel model. These statements were grouped under the eight factors listed in Table 4.3. Given the need to re-examine some of the information given in that table, the following section presents an evaluation of the findings about the reliability of those factors.

Reliability Assessment

As stated by Churchill (1979, p. 68), the alpha coefficient is a reliability measure that one should calculate to assess the quality of a multi-item scale instrument. Table 5.1, on the next page, lists the respective alpha coefficients together with the variation explained by each factor.

With the exception of factors 1, 7, and 8, the alpha coefficients for all of the factors were quite acceptable. They ranged from a low of 0.6783 to a high of 0.9434. Similarly, explained variation figures for these factors were also acceptable, ranging from 67.4 to 77.8 percent.

Factors 1, 7, and 8 were the TCA variables which constituted the measurement side of the covariance structure model used in the study. The alpha coefficients for the constructs of vertical control (0.5706), asset specificity (0.5681) and environmental certainty were (0.4447) the lowest of the eight. The vertical control factor was able to explain 70.2 percent of the total variation, while the
factors of asset specificity and environmental uncertainty were able to explain 54.2 and 48.2 percent of the variation in the data set, respectively.

Table 5.1
The Reliability Indicators for the Factors of the Covariance Structure Model

<table>
<thead>
<tr>
<th>Factors:</th>
<th>Total Variation Explained by the Factor: (percent)</th>
<th>Cronbach's Alpha:</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Vertical Control</td>
<td>70.2</td>
<td>0.5706</td>
</tr>
<tr>
<td>(2) Coercive Power</td>
<td>76.5</td>
<td>0.9434</td>
</tr>
<tr>
<td>(3) Reward Power</td>
<td>71.2</td>
<td>0.7901</td>
</tr>
<tr>
<td>(4) Expert Power</td>
<td>67.4</td>
<td>0.7251</td>
</tr>
<tr>
<td>(5) Legitimate Power</td>
<td>77.8</td>
<td>0.6783</td>
</tr>
<tr>
<td>(6) Referent Power</td>
<td>77.3</td>
<td>0.8269</td>
</tr>
<tr>
<td>(7) Asset Specificity</td>
<td>54.2</td>
<td>0.5681</td>
</tr>
<tr>
<td>(8) Environmental Uncertainty</td>
<td>48.2</td>
<td>0.4447</td>
</tr>
</tbody>
</table>

Given these results, one should be aware of these scale differences vis a vis the other five factors -- especially when interpreting results on these particular constructs in the covariance structure model.
Statement Analysis

Since only three factors appear to be somewhat problematic, one may desire to re-evaluate the statements listed under these factors. This section offers an explanation for the problems affiliated with these factors by reviewing those statements and the way they have been used in this study.

The statements measuring the "degree of vertical control," the surrogate for "vertical integration," were proposed by Klein (1989). In his study, Klein (1989) simply combined the measures for two subcomponents called centralization and formalization. Centralization indicates the extent to which power is under the control of a firm (Dwyer and Oh 1988; John and Reve 1982; Klein 1989). Formalization, on the other hand, displays the extent to which rules and regulations govern the transaction (Dwyer and Oh 1988; Scott 1981; Klein 1989).

Even though these are two distinct concepts (John 1984; Reve 1980), Klein (1989) suggests that their summation can provide a single vertical control measure. Since Klein (1989) was using regression for his analysis, he simply summed the factor scores for each component. Unfortunately, the use of lisrel requires a different approach. In lisrel, it is necessary for each measure to be unidimensional (Anderson and Gerbing 1988; Hattie 1985; McDonald 1981). In other words, a construct such as vertical control which is
composed of two distinct elements would not be acceptable. Therefore, it was decided to utilize only one of the two components to measure the vertical control concept. At the end of the preliminary factor runs, the centralization component was selected because of its stronger measurement quality compared to the formalization component. The statements which were listed as "V202" and "V203" (see Table 4.3) were the two statements used to measure the construct of vertical control through centralization perspective.

The statements measuring the construct of environmental uncertainty were developed in the same manner. The items proposed by Leblebici and Salancik (1981) indicated that separate measures be used for the two types of uncertainty called "complexity" and "dynamism." Complexity indicates the extent to which the respondent perceives the environment as simple or complex, while dynamism refers to the frequency at which the changes in the environment occur (Klein 1989). Even though these were two distinct components, Klein (1989) combined them and developed a single measure for environmental uncertainty in the same fashion. Again, due to the necessity of having unidimensional measures for a proper lisrel use, only one of these two scales could be utilized. After the initial factor runs, the dynamism component was selected because of its stronger measurement properties. The statements shown as "V245," "V246," and "V63" (see Table 4.3)
were the three statements used to measure the construct of environmental uncertainty through dynamism perspective.

Even though the selection process for the statements of vertical control and environmental uncertainty was justifiable given the requirements of lisrel, one may question the overall efficacy of the outcome since those scales could measure their respective constructs partially. In other words, the centralization items may not be comprehensive enough to measure the construct of vertical control unless they had been accompanied by the formalization items. Similar reasoning may hold for the dynamism items when it comes to the construct of environmental uncertainty. Therefore, it appears to be necessary to have a detailed and cautious assessment when it comes to interpreting the empirical findings. Future inquiry of these issues are strongly recommended.

Finally, the statements measuring the construct of asset specificity were proposed by Klein (1989) and Klein, Frazier, and Roth (1990). These authors expanded on an earlier scale developed by Anderson (1985) and introduced new statements to express asset specificity. In both of the studies (Klein 1989; Klein, Frazier, and Roth 1990), the authors used Canadian export firms as their sampling frames. The statements generated for asset specificity were quite effective in uncovering the issues associated with the acquisition of transaction-specific assets by these firms.
On the other hand, the nature of the dealers who participated to this study were fairly different vis a vis Canadian export firms. They were all electrical welding supply dealers working in an oligopolistic industry (i.e., Miller, Lincoln, and Hobart are the three major suppliers of electrical welding equipment in this industry and the relative asset requirements appear similar across these suppliers). Overall, transaction-specificity of their assets were significantly lower than the ones owned by the Canadian export firms. Although one could reason that the scales for these assets were still relevant, it was possible that these scales have never been "systematically related" (Hunt 1983) for cases other than the ones presented in studies by Klein (1989) and Klein, Frazier, and Roth (1990). In other words, there is a likelihood that the peculiar characteristics of the welding industry could require different statements. Future inquiry of this subject appears to be necessary.

Limitations of the Study

The major limitation of this study is the weaker reliability measures of vertical control, asset specificity, and environmental uncertainty. The statements developed to measure these three factors do not appear to be appropriate for the covariance structure model utilized in this study. These concerns about the reliability of the items influence the rest of the model and cause the overall results to be
somewhat difficult to interpret. Failure to have significant t-values to support the research hypotheses could possibly be one of the end-results of the problems associated with those items and the way they were operationalized in this particular study.

Even though the 42 percent response rate secured in the study was expected, the number of responses selected for data analysis after listwise deletion was limited to 171 (see Table 4.1, in Chapter IV). The analysis may improve if the final sample size could be increased to 250, since the research instrument finally had 25 statements. As indicated by Cox (1980), it would be desirable to have at least ten observations for each statement.

It was found during this analysis that the electrical welding equipment dealers had mostly standardized assets which were not necessarily tailored to certain transactions. Furthermore, there appeared to be no systematic variability in the existence of transaction-specific assets across members of the sample. All of these conditions could also distort the measurement of the vertical control construct since asset specificity was one of its determinants in the measurement side of the covariance structure model.

Suggestions for Future Research

Determination of the proper power type in a channel appears to be a significant task for various channel members.
In today's channel structure, retailers represent one critical group of participants who are subject to continuous changes and pressure from the surrounding business environment. Technological improvements, computerized inventory control systems, advanced communication networks, international competition, and changing consumption habits are just few examples of the challenges faced by retail establishments.

It is rather difficult for retailers to capture the ability to be independent and successful due to these—sometimes unexpected—developments. This ability requires a significant amount of power exercised by retailers over the rest of the channel members. One may like to examine if a framework tested in this study would be relevant for retailers when they decide to engage in backward integration and use their power bases over the other members of the channel. In other words, could we examine the same covariance structure model by replacing primary suppliers with retail chains? It is hoped that an in-depth review of this study would provide the researchers with added incentives to inquire additional viewpoints such as the one presented above.
CHAPTER REFERENCES


John and Torger Reve (1982), "Reliability and Validity of Key Informant Data from Dyadic Relationships in Marketing Channels," Journal of Marketing Research, 19 (November), 517-524.


Table A.1
Proposed Statements for Major Power Types and TCA Variables
Note: Company A (Co. A) below represents the supplier company that the participant dealers are working with.

<table>
<thead>
<tr>
<th>Asset Specificity ($s_1$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) It is difficult for an outsider to learn our ways of doing things</td>
</tr>
<tr>
<td>2) To be effective, a salesperson has to take a lot of time to get to know the customers</td>
</tr>
<tr>
<td>3) It takes a long time for a salesperson to learn about this product thoroughly</td>
</tr>
<tr>
<td>4) A salesperson's inside information on our procedures would be very helpful to our competitors</td>
</tr>
<tr>
<td>5) Specialized facilities are needed to market this product</td>
</tr>
<tr>
<td>6) A large investment in equipment and facilities is needed to market this product</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Environmental Uncertainty ($s_2$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dynamism Component</td>
</tr>
<tr>
<td>7) Our immediate customers change suppliers very frequently</td>
</tr>
<tr>
<td>8) We are often surprised by the actions of retailers and wholesalers</td>
</tr>
<tr>
<td>9) We are often surprised by the actions of our competitors</td>
</tr>
<tr>
<td>10) We are often surprised by customer reactions</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Complexity Component</th>
</tr>
</thead>
<tbody>
<tr>
<td>11) There are many final users of this product in this market</td>
</tr>
<tr>
<td>12) There are many competitors for this product in this market</td>
</tr>
<tr>
<td>13) We have only a few immediate customers for this product in this market</td>
</tr>
</tbody>
</table>
Table A.1 (continued)

Vertical Control ($T_1$)

Centralization Component

14) We make all the decisions relating to transportation and physical delivery.
15) We have considerable influence on the development of advertising and trade promotion.
16) We require that the product carry a certain symbol or logo.
17) We have to ask Co. A's representatives before we do almost anything in our business.
18) In our dealings with Co. A, even quite small matters have to be referred to someone higher up for a final answer.

Formalization Component

19) Relations between ourselves and outside parties are governed by written contracts, specifying all aspects of performance.
20) Complaints and returns to us are handled through standard procedures.
21) We receive regular and thorough feedback on customer relations.
22) Our dealings with Co. A are subject to a lot of rules and procedures stating how various aspects of our job are to be done.
23) Our contracts with Co. A and Co. A representatives are on a formal, preplanned basis.

Coercive Power ($T_2$)

I would comply with the demands of Co. A as long as

24) Co. A does not take legal actions against my establishment.
25) Co. A does not refuse to sell me.
26) Co. A does not delay warranty claims.
27) Co. A does not delay delivery.
28) Co. A does not charge me high prices.
Table A.1 (continued)

29) Co. A does not deliver me unwanted products
30) Co. A does not take actions that would reduce my profits
31) Co. A does not withdraw certain needed services from me

Reward Power (73)

I would comply with the demands of Co. A as long as

32) Co. A gives business advice
33) Co. A provides service
34) Co. A grants ordering assistance
35) Co. A supplies inventory management assistance
36) Co. A demonstrates products
37) Co. A would use its ability to reward me
38) I would be favored on some occasion by Co. A

Expert Power (74)

I would comply with the demands of Co. A BECAUSE

39) I believe that Co. A is an expert in this field
40) I respect the Co. A representatives
41) I get good advice from Co. A
42) The people from Co. A know what they are doing
43) The Co. A people are familiar with their products
44) I trust Co. A's judgment regarding the matter
45) Co. A have more information than I do regarding the matter

Legitimate Power (75)

I would not object Co. A's interference to my business SINCE

46) Co. A has the right to expect my cooperation
47) Co. A has the right to tell me what to do
48) Co. A is my supplier
49) Suppliers have a right to expect dealers to follow instructions
50) It is my duty to do as requested
51) Co. A can point out a contract clause that obligates me to do as asked
Table A.1 (continued)

Referent Power (?6)

I would comply with the demands of Co. A BECAUSE

52) I like the Co. A people I deal with
53) I care about what Co. A thinks of me
54) I consider Co. A an ideal company
55) The approval of the Co. A people means a lot to me
56) I admire Co. A and I want to act in a way to merit the respect of Co. A
57) Co. A and I have similar feelings about the way a business should be run
58) I really admire the way Co. A performs
### Table A.2
Lisrel Commands for the Covariance Structure Model

```
PRELIS VAR=V202 V203 V223 V224 V225 V227 V228 V229
       V219 V220 V221 V234 V240 V241 V236 V239 V41 V45
       V237 V245 V246 V63 V214 V215 V212/
TYPES=COVARIANCE/
MATRIX=OUT(*)
/PRINT=NONE

LISREL
"VERTI COER REW EXP LEGI REFE ASST ENV"I
/DA NI=25 MA=CM
/MI NY=19 NE=6 NK=2 BE=SD PS=FI GA=FI PH=ST
/IF BE(3,2) BE(4,2) BE(4,3) BE(5,2) BE(5,3)
/IF BE(5,4)
/IF BE(6,2) BE(6,3) BE(6,4) BE(6,5)
/FR GA(1,1) GA(1,2)
/FR PS(1,1) PS(2,2) PS(3,3) PS(4,4) PS(5,5)
/FR PS(6,6)
/FR LY(1,1)
/FR LY(4,2) LY(5,2) LY(6,2) LY(7,2) LY(8,2)
/FR LY(9,3)
/FR LY(12,4) LY(13,4)
/FR LY(16,5)
/FR LY(18,6)
/VA 1 LY(2,1) LY(3,2) LY(10,3) LY(14,4) LY(15,5)
/VA 1 LY(17,6)
/FR LX(1,1) LX(2,1) LX(3,1) LX(4,2) LX(5,2)
/FR LX(6,2)
/OU ALL
```
Table A.3
The Covariance Matrix

<table>
<thead>
<tr>
<th>V202</th>
<th>V203</th>
<th>V223</th>
<th>V224</th>
<th>V225</th>
<th>V227</th>
<th>V228</th>
</tr>
</thead>
<tbody>
<tr>
<td>V202</td>
<td>3.429</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>V203</td>
<td>1.482</td>
<td>3.931</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>V223</td>
<td>-0.101</td>
<td>0.094</td>
<td>1.300</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>V224</td>
<td>-0.059</td>
<td>0.076</td>
<td>1.117</td>
<td>1.311</td>
<td></td>
<td></td>
</tr>
<tr>
<td>V225</td>
<td>0.071</td>
<td>-0.116</td>
<td>0.813</td>
<td>0.888</td>
<td>1.325</td>
<td></td>
</tr>
<tr>
<td>V227</td>
<td>-0.055</td>
<td>-0.159</td>
<td>0.936</td>
<td>0.957</td>
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Figure A.1
Vertical Marketing Systems with Different Integration Levels
Figure A. 2
Measurement and Structural Components of the Proposed Covariance Structure Model

where:

\( \xi_1 \) Asset Specificity

\( \xi_2 \) Environmental Uncertainty

\( \gamma_1 \) Degree of Vertical Control

\( \gamma_2 \) Coercion

\( \gamma_3 \) Reward

\( \gamma_4 \) Expert

\( \gamma_5 \) Legitimate

\( \gamma_6 \) Referent
Figure A. 3
Measurement and Structural Components of the Tested Covariance Structure Model

where:

\( \xi_1 \), Asset Specificity
\( \xi_2 \), Environmental Uncertainty
\( \gamma_1 \), Degree of Vertical Control
\( \gamma_2 \), Coercion
\( \gamma_3 \), Reward
\( \gamma_4 \), Expert
\( \gamma_5 \), Legitimate
\( \gamma_6 \), Referent
Figure A.4
Significance of the Tested Covariance Structure Model

where:

- $\xi_1$: Asset Specificity
- $\xi_2$: Environmental Uncertainty
- $\eta_1$: Degree of Vertical Control
- $\eta_2$: Coercion
- $\gamma_3$: Reward
- $\gamma_4$: Expert
- $\gamma_5$: Legitimate
- $\gamma_6$: Referent

Critical t-value at 0.10 alpha level = 1.28
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