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Daniel H. McQuiston

Butler University, [dmcquist@butler.edu](mailto:dmcquist@butler.edu)

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Daniel H. McQuiston

# Novelty, Complexity, and Importance as Causal Determinants of Industrial Buyer Behavior

To successfully market their products, industrial vendors must determine who participates in an organizational purchase decision and what their influence is. Previous research has shown that participation and influence can vary across products and purchase situations. Though industrial marketing researchers would agree that there are different types of purchase situations, they would disagree on a taxonomy for describing them. The author uses past research as a point of departure and proposes a structural equations model that suggests the purchase situation attributes of novelty, complexity, and importance are causal determinants of participation and influence in an industrial purchase decision. The results indicate that these constructs, especially novelty and importance, provide a plausible typology for describing participation and influence in industrial purchase situations.

**T**HE primary objective of industrial marketers remains virtually the same today as that identified a half-century ago:

The major objective of all [industrial] marketing is to contact the man who actually brings about the purchase decision, regardless of his position or title. . . . (Frederick 1934)

The task now, as it was then, is twofold: to discover (1) who participates in the industrial purchase decision and (2) the factors that affect the interpersonal influence between the participants during the decision.

Industrial vendors need an understanding of organizational buying behavior if they are to market their products successfully. Unfortunately, general theories of industrial marketing to assist business firms with

this task have not been developed as fast as their counterparts in consumer behavior. Industrial marketers have benefited from several conceptual models of the industrial purchase process (e.g., Sheth 1973; Webster and Wind 1972); however, the purpose of these early models was mainly to define, describe, and categorize the purchase process. Hence they were by necessity highly descriptive and could not generate empirically testable hypotheses (Anderson and Chambers 1985; Anderson, Chu, and Weitz 1987; Johnston 1981).

An exception has been the theory of buyclasses proposed as part of the buygrid model of Robinson, Faris, and Wind (1967). This typology has been described as ". . . one of the most useful analytical tools for both academicians and practitioners interested in organizational buying behavior. . . ." (Moriarty 1983, p. 29). Researchers have had varying degrees of success using the buygrid framework to examine participation and influence. Some studies have shown that participation and influence do vary according to the buygrid framework (e.g., Doyle, Woodside, and Mitchell 1979; Pingry 1974), but other studies have shown that they do not (e.g., Bellizzi and McVey 1983; Jackson, Keith, and Burdick 1984).

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Whatever the results, the main contribution of the theory of buyclasses is that it proposes a *typology* of buying situations—an important consideration for researchers and practitioners alike. Researchers need a scheme to classify purchase situations in order to determine how the factors they want to study will vary in different situations. Practitioners are interested in the various types of purchasing categories because situations differ in terms of the marketing effort required. Once a workable typology has been developed, both practitioners and researchers can proceed to determine who participates under what circumstances and what each person's influence may be.

Most industrial marketing researchers would agree that work to date has shown that there are different types of purchase situations. They would disagree, however, about the attributes that should be used to classify them (Bellizzi and McVey 1983; Johnston 1981; Silk and Kalwani 1982). In this article the research to date is used as a point of departure for a more rigorous test of some attributes of the purchase situation that are hypothesized to affect behavior during the decision process. Specifically, the main purpose of the article is to propose and test a causal model suggesting that the novelty of the purchase to the organization, the complexity of the purchase situation, and the importance of the purchase situation are related causally to the extent to which an individual decision-making unit member participates in the purchase decision, as measured by the amount of communication offered and the extent of influence of that communication on other members of the decision-making unit.

## Literature Review

The industrial purchase process involves a multitude of complexities that make it more difficult to investigate than consumer buying (Johnston 1981; Moriarty 1983). Because of these complexities (e.g., difficulty of collecting reliable data, different individuals participating, each individual evaluating a product on different dimensions), research in this area has been somewhat fragmented and much that has been proposed is difficult to operationalize. Though the work to date has made a valuable contribution to our general understanding of how an organizational purchase decision transpires, for the most part the literature has not proposed empirically testable hypotheses (Anderson, Chu, and Weitz 1987; Moriarty 1983; Sheth 1973).

In contrast, the theory of buyclasses first proposed by Robinson, Faris, and Wind (1967) as part of the buygrid model suggests a taxonomy of three basic categories of purchase situations: new task, modified rebuy, and straight rebuy. Behavior during the purchase

process is hypothesized to vary according to how much experience the organization has had in previous situations (newness of the problem), how much information is needed to make a decision (information requirements), and the extent to which alternative product offerings were considered (consideration of new alternatives). The buygrid model has been a popular framework in empirical studies largely because of its simplicity and intuitive appeal (Anderson, Chu, and Weitz 1987; Moriarty 1983), and it has been used in several studies of participation and influence in organizational buying.

Some researchers have found that participation and influence of individuals within the buying firm vary according to the buygrid classification. Pingry (1974) found that engineering was influential in new tasks, whereas purchasing tended to dominate straight rebuys. In a study of 14 industrial firms in the United Kingdom, Doyle, Woodside, and Mitchell (1979) found that such factors as initiating the need to buy, composition of the buying group, and length of time of the decision varied according to whether the buying task was a new task/modified rebuy or a straight rebuy. Naumann, Lincoln, and McWilliams (1984) asked purchasing agents to rate the influence of eight different functional areas during a purchase decision. They found that influence varied by both the type of purchase situation and the stage of the buying process. Anderson, Chu, and Weitz (1987) took the novel approach of asking sales managers their perceptions of the purchase situation in an attempt to develop empirical support for the components of the buygrid model. They concluded that newness and information needs were related and associated with buyer behavior, whereas consideration of alternatives was related only weakly to the first two and associated less strongly with buyer behavior.

Several other researchers have not found empirical support for the purchase classes of the buygrid. Bellizzi and McVey (1983) asked a sample of building contractors for their perception of buying influences using the buygrid classification. Their results indicated that the buyclass variables were not a good general predictor of who was most influential in the buying process. Ferguson (1979) found that the buygrid framework did not provide a good general explanation for describing industrial buying behavior of distribution executives selecting a public warehouse. Jackson, Keith, and Burdick (1984) administered a role-playing exercise to purchasing agents and found that perceived influence of certain functional roles varied across product classes but not across buyclasses. Mayer (1983) surveyed executives in 30 manufacturing companies in an attempt to discover whether buyer preferences for a supplier differed significantly among new buy, rebuy, and contract buy situations. He found no sig-

nificant differences in attribute importance across the three situational categories.

Though the buygrid has achieved a degree of popularity due largely to its simplicity and ease of application, critics have cited this simplicity as its primary shortcoming. Specifically, they have suggested that the model overstates the newness of the task as a primary descriptor and should be expanded to include such factors as the complexity and importance of the purchase situation (Anderson, Chu, and Weitz 1987; Johnston 1981; Silk and Kalwani 1982). Expanding this typology through the use of causal modeling is the main focus of this article.

Most researchers would agree that conceptual and empirical work to date has demonstrated the existence of some sort of buyclass taxonomy. The model proposed here draws upon this research to suggest that the purchase situation attributes of novelty, complexity, and importance are causal determinants of participation and influence in an industrial purchase decision. Before the research is described, the theoretical underpinnings of each of the latent constructs are examined, an attempt is made to operationalize them, and hypotheses about their relationships to each other are proposed.

## Participation and Influence

### Overview

Finding a workable definition for measuring participation and influence in an industrial decision-making unit is a difficult task. Bonoma, Zaltman, and Johnston (1977) and Silk and Kalwani (1982) have pointed out that the dynamics of an industrial purchase give the decision-making unit a fluid nature, with different individuals coming and going depending on the type of decision and the particular phase of the process. Because of this fluid nature, previous attempts to determine who participated in a purchase decision and what their influence was have had only limited success. In most studies, participation has been measured by asking a question along the lines of "who was involved" in the decision and influence has been measured by asking "how much say" that individual had. The ambiguities of these measures could be largely responsible for the inconsistent findings in this area (Silk and Kalwani 1982).

Social influence theorists have defined interpersonal influence as a *process* that occurs between individuals rather than a characteristic of a particular person (Cartwright 1965; Dahl 1968; Tedeschi, Schlenker, and Lindskold 1972). This influence process involves a focal person, called a "receiver," whose state is affected by the actions of another person, called the "sender." (A person's state refers to any attribute or set of attributes characterizing the person—atti-

tude, behavior, etc.). Exactly how the sender influences the receiver is established as the two parties interact over a period of time. This interaction ultimately takes place in the communication patterns that are established and only through the communication of information can one individual influence another (Calder 1977; Thomas 1984). Therefore, if one is to study who participates in an organizational purchase decision and what their influence is, a logical first step would be to examine how an individual participates in the purchase process by communicating information to other members of the decision-making unit and how this communication influences the behavior of the receiver.

### Participation

Organizational theorists have proposed that to carry out a decision task, individuals establish a communication network through which they send and receive the information needed to make that decision (Fence 1970; O'Reilly 1983). Researchers in industrial buying behavior also have studied this sending and receiving of information through communication networks as a means of determining who participates in a purchase decision. Calder (1977) proposed the concept of functional role theory, whereby individuals who participate in a purchase decision are connected by various tasks and the subsequent communication patterns that develop to accomplish those tasks. Johnston (1979) examined the various dyadic communication links that developed between individuals during the decision process in an effort to determine the structural dimensions of the decision-making unit. Johnston and Bonoma (1981) found that the decision-making unit existed as a communication network and derived its configuration from the regularized patterns of communication that reflected the individuals involved and the relationships between them.

Therefore, to participate in the industrial purchase process, an individual must be a part of the communication network. Before one can influence another individual, one must participate in the communication process by *sending* some information that is *received* by another person. For purposes of this research, then, *participation* in the decision-making unit (DMU) is defined as *the total amount of written or verbal communications offered to others in the DMU for consideration during the course of the purchase decision.*<sup>1</sup>

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<sup>1</sup>Implicit in this notion is the thought that an individual first must receive some applicable information and then process, store, and re-code it before transmitting it to another individual. As this study concentrated on measurement of participation and influence other than self measurements, the respondents were thought to be better able to estimate the amount of information others provided than the amount others received. Also, given that past research has shown it is the communication offered by the sender that influences the receiver, that same effect was measured here.

It includes formal communications, as in a written memo, and informal communications, such as a hallway conversation.

### **Influence**

Previous research has indicated that influence in organizational decision making gravitates to individuals who are best able to cope with the critical problems and uncertainties facing the organization (Anderson 1982; Brass 1984; Salancik and Pfeffer 1977). An example of such uncertainty is when an organization is faced with a new purchase situation and having enough information about each alternative becomes critical for an adequate evaluation of the products. The outcome of the interpersonal influence process is the degree of change in the receiver's state caused by the information provided by the sender. Therefore, for the sender to influence the receiver during a purchase decision, he or she must provide some information that will have an impact on the receiver's evaluation and choice of a product (Burnkrant and Cousineau 1975; Cohen and Golden 1972). There can be multiple sources of influence and neither the sender nor the receiver need hold a central position in the process to be influential (Brass 1984). Therefore *influence* is defined here as *the extent to which the communication offered by an individual for consideration is perceived to affect the actions of other participants in the decision-making unit*. Because an individual can influence another only by providing some information through the communication network, one would expect that the more an individual participates by offering some communication, the greater is the possibility of that person influencing others (Stogdill 1974).

H<sub>1</sub>: The amount of communication offered (participation) by the members of the decision-making unit is related positively to their perceived influence ( $\beta_{21} > 0$ ).<sup>2</sup>

## **Expanding the Typology**

### **Novelty**

The novelty of the purchase to the organization, or the lack of experience of individuals in the organization with similar purchase situations, has been shown to affect both participation and influence in the industrial decision process. In a case study of three organizations, Robinson, Faris, and Wind (1967) found that the amount of information required and the degree of experience in similar purchase situations were the most significant factors in explaining the behavior of industrial purchasers. In his model of organiza-

tional buyer behavior, Sheth (1973) mentions the effect a "once-in-a-lifetime" decision would have on joint versus autonomous decision making in terms of more versus less information required to reach a decision. Empirically, Grønhaug (1975b) found joint buying decisions to be more common in nonroutine buying situations in which the amount of organizational experience was low and more information was needed to make a decision. Reve and Johansen (1982) showed that who participated in the purchase of capital equipment and their most salient evaluative criteria were dependent on the novelty (i.e., lack of buying experience) of the purchase situation to the buying organization. In a study of the effectiveness of industrial print advertisements across different product categories, Hanssens and Weitz (1980) found that the uniqueness of the purchase situation to the organization affected buying behavior.

These studies all indicate that the novelty of the purchase to the organization can affect various aspects of organizational buying behavior. In industrial buying decisions, the purchasing organization is represented by a group of individuals who have varying degrees of experience with similar purchase situations. The less experience these people have, the more novel the purchase is to them and therefore to the organization. Hence, *novelty* is defined here as *the lack of experience of individuals in the organization with similar purchase situations*. Industrial buying theory states that when faced with uncertainty in a purchase decision, individuals in the decision-making unit seek more information to reduce that uncertainty (Anderson 1982; Sheth 1973). Conventional wisdom suggests that they also place a premium on having adequate information and have a greater tendency to share that information (DeBruicker and Summe 1985; Jackson 1985).

H<sub>2</sub>: The novelty of the purchase to the organization is related positively to the amount of communication offered to others for consideration ( $\gamma_{11} > 0$ ).

No relationship is predicted between novelty and influence. Though the members of the decision-making unit may have interacted previously, the nuances of each particular purchase situation make each interaction different from previous ones. As the decision process unfolds, individuals communicate with each other and, on the basis of that communication, form perceptions of each other's expertise in coping with that particular situation. Influence then gravitates toward members who are perceived as having greater expertise (Patchen 1974; Thomas 1984). However, in all likelihood influence patterns do not become evident until the decision-making unit has had sufficient communication among its members to establish each individual's expertise. Therefore, the novelty of the

<sup>2</sup>These parameters refer to their correspondent paths in Figure 1.

purchase has a direct effect on participation, but does not have a direct effect on influence.<sup>3</sup>

### Complexity

In studying the construct of "complexity" and its impact on participation and influence in industrial buying, researchers have examined two general areas: complexity of the purchase situation and complexity of the product. Several researchers have noticed that the complexity of the buying task affects purchasing behavior. In one of the first examinations of task complexity, Cyert, Simon, and Trow (1956) proposed that purchase decisions could be placed on a continuum based on the complexity of the decision process, the extremes being programmed (i.e., repetitive) and nonprogrammed (nonrepetitive). Grønhaug (1975a) discovered that the complexity of the buying task was correlated positively with the amount of information sought to make that decision, whereas Grashof (1979) found that complexity of the decision task was likely to result in a shared versus an individual decision. In a study of manufacturing firms in West Germany, Kirsch and Kutschker (1982) derived a path diagram of what they title the "transaction episode." They found that the complexity of the decision situation affected the number of participants as well as the frequency of conflict between them.

Other researchers have focused on the complexity of the product and its effect on organizational buying. Fisher (1976) proposed that one of the two main dimensions of the buying organization's perception of the purchase situation is the perceived complexity of the product and its proposed application. In a study of the decision-making process in the metalworking industry, Lilien and Wong (1984) grouped products with similar decision-making structures and used a hierarchical cluster analysis to describe the dimensions of the differences between the groups. Their results suggest that a single underlying dimension entitled "product complexity" could best explain the differences between groupings.

As the purpose of the research reported here was to study the complexity of the purchase situation, special attention was paid to the work in that area. Assimilating these findings into one construct is difficult. However, a general finding of these studies appears to be that increased complexity of the purchase situation leads to greater uncertainty for the

members of the decision-making unit. Organizational buying theory states that when members of a decision-making unit are faced with uncertainty, they seek to reduce it through the gathering of more information (Cyert and March 1963; Sheth 1973; Webster and Wind 1972). Individuals or departments gathering the most applicable information are perceived as best able to cope with this uncertainty and influence gravitates to those entities (Anderson 1982; Salancik and Pfeffer 1977). Therefore, the *complexity* of the purchase decision is defined here as *how much information the organization must gather to make an accurate evaluation of the product*.

H<sub>3a</sub>: The complexity of the purchase situation is related positively to the amount of communication offered to others for consideration ( $\gamma_{12} > 0$ ).

H<sub>3b</sub>: The complexity of the purchase situation is related positively to the perceived influence of the sender ( $\gamma_{22} > 0$ ).

### Importance

The importance of the purchase, here defined as the perceived impact of the purchase on organizational profitability and productivity, also has been shown to affect participation and influence during the buying process. Early work in this area showed that the greater the perceived impact of the purchase, the greater the perceived risk of the decision for the individual participants, and also examined the strategies participants employ to reduce this risk (Sheth 1973; Sweeney, Mathews, and Wilson 1973; Webster and Wind 1972). Emphasis then shifted to studying the risk of the purchase to the organization as a whole, with Fisher (1976) hypothesizing the effect of the magnitude of costs and the impact of the purchase on the organization. More recent studies have examined the specific construct of "importance" and the effect it has on participation and influence. In the Hanssens and Weitz (1980) study of the effectiveness of industrial advertising, another factor that affected the buying behavior of the individual participants was labeled "importance of purchasing decision." In a study of the purchasing patterns of the offshore drilling industry in Norway, Reve and Johansen (1982) found importance of the purchase decision to the organization to be one of the factors that affected both the number of participants and their behavior throughout the purchase process. Kirsch and Kutschker (1982) showed that the relative value of the investment to the purchasing organization had a major impact on the firm's perception of the purchase situation and on the behavior of the individuals involved.

In these studies, the focus is how the decision outcome affects the production or profitability of the organization. Hence, *importance* is defined here as *the perceived impact of the purchase on organizational profitability and productivity*.

<sup>3</sup>It is assumed that a person must be a member of the DMU before he or she can influence other members. In isolated cases a highly visible person (CEO, etc.) may have some tacit influence even though not involved in the actual decision. However, in the data collection procedure used here, every attempt was made to identify and survey all members who participated in the process. Therefore, this tacit influence was not considered to be a factor in this research.

H<sub>4a</sub>: The importance of the purchase is related positively to the amount of communication offered for consideration ( $\gamma_{13} > 0$ ).

H<sub>4b</sub>: The importance of the purchase is related positively to the perceived influence of the sender of the communication ( $\gamma_{23} > 0$ ).

### **Novelty, Complexity, and Importance in Previous Research**

Two previous attempts have been made to study the combined effects of constructs similar to the novelty, complexity, and importance ones defined here. Using a path diagram of purchaser behavior in an industrial transaction, Kirsch and Kutschker (1982) were able to provide support for their theory that the elements of novelty of the relevant activities, complexity of the purchase situation, and absolute investment volume are related causally to such factors as the total number of participants and negotiation intensity. Johnston and Bonoma (1981) used the factors novelty, complexity, and importance to categorize the purchase situation in their research. They defined novelty as the purchase situation being either a new task, modified rebuy, or straight rebuy, complexity as the amount of time to complete the decision process, and importance as an average of the entire buying center's perceived importance of the situation. They found that the number of participants in the buying center network was affected significantly by (1) the vertical and lateral involvement, extensivity, and connectedness of the organization and (2) the attributes of the purchase situation, with the importance and complexity of the situation having the greatest effect.

## **Research Design**

### **Overview**

Structural equation modeling in the form of the computer program LISREL provides a method for implementing the suggested approach of focusing on the purchase process at a collective level of analysis while retaining the essence of individual behavior (Bonoma, Bagozzi, and Zaltman 1978; Johnston 1981). The combination of the novelty, complexity, and importance constructs affords an inclusive typology that is well suited for studying the rich and intricate nature of the purchase process by examining the causal relationship between those constructs. This approach has sufficient generalizability to contribute to the theoretical framework and is parsimonious enough to be described accurately, yet is rigorous enough to produce hypotheses that can be tested empirically. In using this procedure, multiple-item scales are recommended to increase the chances of a normal distribution for the variables (Sujan 1986). However, even the use of these scales cannot ensure that the variables are normally distributed. Jöreskog and Sörbom (1982) state that de-

partures from normality have the effect of inflating the chi square. They propose that one way to compensate for this possible departure from normality is to compare the differences in chi square rather than standard errors to determine the significance of the individual paths in the proposed model. Such analysis is used here.

### **The Model**

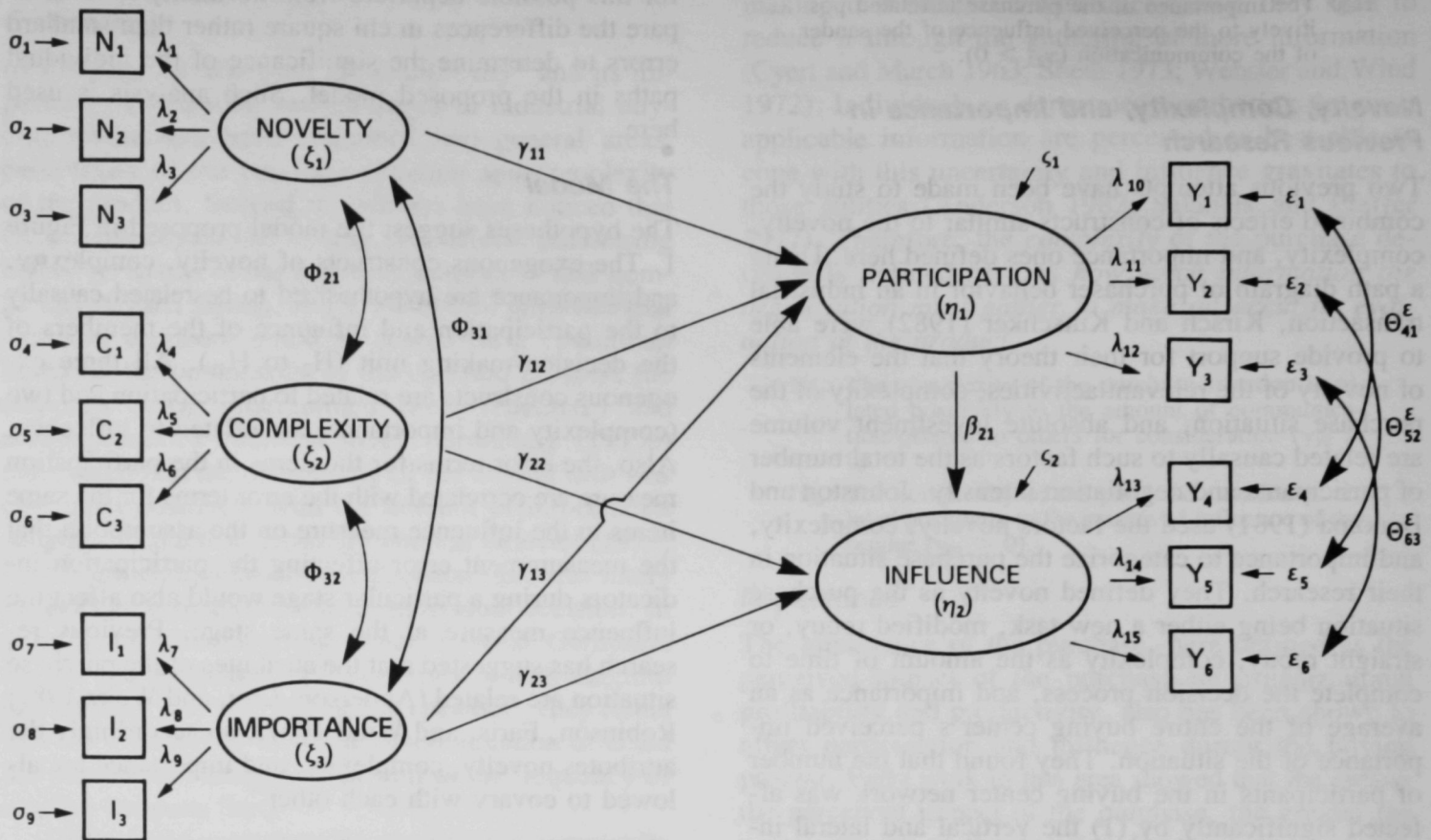
The hypotheses suggest the model proposed in Figure 1. The exogenous constructs of novelty, complexity, and importance are hypothesized to be related causally to the participation and influence of the members of the decision-making unit (H<sub>2</sub> to H<sub>4b</sub>). All three exogenous constructs are related to participation and two (complexity and importance) are related to influence. Also, the error terms for the items in the participation measure are correlated with the error terms for the same items in the influence measure on the assumption that the measurement error affecting the participation indicators during a particular stage would also affect the influence measure at the same stage. Previous research has suggested that the attributes of the purchase situation are related (Anderson, Chu, and Weitz 1987; Robinson, Faris, and Wind 1967), so accordingly the attributes novelty, complexity, and importance are allowed to covary with each other.<sup>4</sup>

### **Measures**

Measures for the latent factors of novelty, complexity, and importance were developed through an examination of the relevant literature and a focus group conducted with management personnel of the vendor company, the result being a tentative list of indicators for each of the three constructs. The questions were pretested on 10 actual purchasers of the product. The constructs novelty, complexity, and importance were explained briefly, then the subjects were shown the list of indicators and asked to rate them for clarity, understanding, and appropriateness. These individuals also were asked to add any questions to the list they deemed appropriate. This stage was hampered somewhat by the practitioners' difficulty in comprehending the subjective nature of the constructs. The use of a 5-, 6-, and 7-point scale was pretested and the 5-point scale was the overwhelming favorite as the easiest to understand. The results of this pretest generated a list of five indicators for novelty and importance and four for complexity on a 5-point scale (strongly disagree, disagree, neutral, agree, strongly

<sup>4</sup>Additional analysis not included here showed the three purchase situation attributes to be correlated significantly and positively with each other. The correlation between novelty and complexity is .463, between complexity and importance .120, and between novelty and importance .129.

**FIGURE 1**  
**Model of Participation and Influence in an Industrial Purchase Decision**



agree). This list was pretested on another set of five actual purchasers. These prospective respondents were able to understand all the questions, so no additions or clarifications were made to the list. Because the number of potential respondents was limited and the number used in the pretest was relatively small (15), those individuals were included in the survey.

The measurement model was tested by using LISREL VI (Jöreskog and Sörbom 1984) with all 14 measures of the exogenous constructs. Modifications were made as dictated by the computer output. When the nine measures shown in Figure 1 were used (three for each construct), the model achieved its best fit. A confirmatory factor analysis was undertaken and the resultant factor loadings are reported in Table 1. The measures for both the endogenous and exogenous constructs and their internal consistency (coefficient alpha) are reported in Table 2. Because of the well-documented upward bias of self-reported influence (e.g., Cooley, Jackson, and Ostrum 1977; Grashof and Thomas 1976), self ratings of participation and influence were excluded. Only the participation and influence ratings that DMU members made of each other were included.

Respondents were asked to rate the participation and influence of other DMU members at each of six

stages in the decision process<sup>5</sup> and also to give a global measure of others' participation and influence throughout the process on a 5-point scale using the measures of Spekman and Stern (1979).<sup>6</sup> To determine whether any stage was more important to purchasers in this type of purchase decision, in the pretest individuals were asked whether they felt any stages were more critical to the success of the purchase situation than other stages. The general consensus was that the stages closest to making the decision were most crucial, especially the evaluation of product alternatives and the choice of a supplier. With this finding in mind, three measures were used as indicators for each construct: participation/influence at stage 5 (evaluating proposals) and at stage 6 (selecting final supplier), and the global measure. The global measure was added to the other two stages in an attempt to obtain an overall rating throughout the process. Table

<sup>5</sup>Conversations with management personnel of the vendor company and actual purchasers revealed that decisions of this type typically go through six stages: recognition of need, securing preliminary estimates and authorization, determining product specifications and cost information, selecting suppliers from whom to get quotes, evaluating proposals, and selecting final supplier.

<sup>6</sup>Spekman and Stern used the following scale in their research: little or none, some, quite a lot, a great deal, a very great deal.



**TABLE 1**  
Factor Loadings of Exogenous Measures<sup>a</sup>

	Factor 1	Factor 2	Factor 3
N <sub>1</sub>	-.583	.246	-.097
N <sub>2</sub>	.855	-.167	.159
N <sub>3</sub>	.683	-.251	.110
C <sub>1</sub>	.572	.339	.441
C <sub>2</sub>	.425	.270	.257
C <sub>3</sub>	.432	.323	.388
I <sub>1</sub>	.132	.364	-.347
I <sub>2</sub>	.217	.514	.402
I <sub>3</sub>	.050	.546	.395
% of variance explained	.625	.206	.167

<sup>a</sup>Factor loadings for the measures chosen for each construct are shown in boldface.

3 gives the alpha coefficients for the internal consistency measures of participation and influence.<sup>7</sup>

### Data Collection

Data were collected with the assistance of a sponsoring organization, a large manufacturer of capital equipment. Because the company did not have complete records on sales attempts that had not been successful, the study was limited to attempts resulting in a purchase. Customers that had purchased one of three different models of a product line (commercial weighing equipment) within the 18 months immediately preceding the study (company records prior to that time were incomplete) were chosen. Though these models are part of the same product line, there is enough variation in size, features, benefits, and cost that they usually are considered different products. Each model has several different options, so a buyer can purchase the entire "package" or only a portion of it. The product is highly technical and represents a major expenditure (\$25,000) for most firms when they purchase the entire package.

The data are from a self-administered questionnaire mailed to respondents. Sales representatives of the vendor company provided the name of one individual in each of the purchasing organizations whom they felt was their key informant. These key informants were sent a prenotification letter and then contacted by telephone. The purpose of the telephone call was not only to secure their cooperation in the study, but also to obtain the names of other individuals in the organization who had provided some input to the purchase decision. These other individuals were contacted by telephone to verify their participation in the decision, secure their cooperation in the study, and

<sup>7</sup>Only organizations that had two or more respondents were used to determine the internal consistency.

**TABLE 2**  
Indicators for Novelty, Complexity, and Importance and Their Alpha Coefficients

Novelty Indicators	
N <sub>1</sub>	Before the purchase, some people in the organization had experience in purchasing this product line
N <sub>2</sub>	We did not have much information from past purchases when we were defining the specifications for this product
N <sub>3</sub>	Few people in the organization had much technical knowledge about this type of product before we purchased this one
Coefficient alpha = .791	
Complexity Indicators	
C <sub>1</sub>	Because of the complex nature of this product, we had to involve more people than we usually do for capital equipment purchases
C <sub>2</sub>	The purchase of this product required a change in our office procedures
C <sub>3</sub>	We had to gather more information before purchasing this product than we usually do for capital equipment purchases
Coefficient alpha = .712	
Importance Indicators	
I <sub>1</sub>	The purchase was necessary to better monitor the weight of inbound and outbound shipments
I <sub>2</sub>	We anticipated this purchase would make a significant improvement in our operations
I <sub>3</sub>	This purchase was important to our overall profitability
Coefficient alpha = .650	
Participation	
Y <sub>1</sub>	Amount of communication offered to others for consideration during alternative evaluation stage
Y <sub>2</sub>	Amount of communication offered to others for consideration during the choice stage
Y <sub>3</sub>	The total amount of communication offered to others for consideration during the entire process
Coefficient alpha = .892	
Influence	
Y <sub>4</sub>	The perceived influence of the communication offered for consideration at the alternative evaluation stage
Y <sub>5</sub>	The perceived influence of the communication offered for consideration at the choice stage
Y <sub>6</sub>	The total amount of perceived influence of that individual during the entire process
Coefficient alpha = .892	

identify other members of the DMU. Because obtaining the information from the key informants was considered crucial, no limit was placed on the number of calls needed to reach them. Four attempts were made to contact the other individuals named by the key informant.

Each questionnaire was prepared individually for

**TABLE 3**  
**Interjudge Reliability of Respondents' Rating of**  
**Other Members of the Decision-Making Unit**  
**(by functional group)**

Functional Role	Alpha Coefficients	
	Participation	Influence
Purchasing	.720	.915
Plant management	.780	.831
Engineering	.856	.782
Operations	.745	.836

each respondent. The researcher filled in the names and titles of each DMU member obtained in the limited "snowballing" procedure. For example, suppose in the XYZ company the sales representative named the engineer as the key informant. In the telephone call to the engineer, he or she mentioned that the production foreman, purchasing agent, and plant manager had participated in the purchase decision. The engineer would then receive a questionnaire asking him or her to rate the participation and influence of the other three DMU members, by name, at each stage of the decision as well as globally throughout the process. The other members, after being contacted by telephone, would also receive a questionnaire asking them to rate the other members of the DMU, again by name. If during the snowballing procedure a name was mentioned that had not been given previously, it was included on all questionnaires sent to individuals in that company. Those DMU members not contacted by telephone received a slightly different cover letter that described the nature of the study, gave the name of the key informant as a reference, and asked for their participation. Individuals were given 21 days to respond to the initial questionnaire. If the questionnaire was not returned, another was sent with a reminder letter. As an incentive to respond, DMU members were offered a copy of an executive summary of the results of the study.

### Sample Characteristics

A total of 273 questionnaires were sent, of which 182 were returned and usable for the research (67%). The sponsoring company made information available on 136 firms that had purchased either the total package or one of its components. Of these, 19 were single-person DMUs and were excluded; 19 chose not to participate and in six companies the key informant was no longer with the company or was deceased. DMU members in the remaining 92 companies were contacted. Responses were received from individuals in 82 different companies representing such industries as paper, chemicals, food processing, petroleum, and agribusiness. The 182 respondents made a total of 412 ratings of others' participation and influence, an av-

erage of 2.26 ratings per person. Other selected sample statistics are given in Table 4.

## Results

### Model Testing

The analysis was carried out in three stages. The first stage tested the fit of the measurement model over the null model. In the second stage the structural relationships were added and the overall fit of the model was tested. The final stage was an examination of the detailed measures of fit for the individual parameters.

In the first stage of the analysis, the improvement in fit of the measurement model over the null model is .708. (This improvement in fit is not to be confused with the Bentler and Bonett fit index; see Sujan 1986 for an explanation). Though Bentler and Bonett (1980) do not mention a specific cutoff value, the improve-

**TABLE 4**  
**Selected Sample Statistics**

<b>Major Reason for Purchasing Equipment (%)</b>		
Control of incoming and outgoing shipments		62
Replacement for existing equipment		18
Satisfy government regulations		4
Directive from corporate headquarters		2
Other		14
<b>Number of People Employed by Purchasing Firm (%)</b>		
Under 25		4
25-99		20
100-250		11
Over 250		65
<b>Number of Vendors Considered (%)</b>		
One		5
Two		30
Three		45
Four		15
Five		5
<b>Functional Role in Organization</b>		
	<b>No.</b>	<b>%</b>
Purchasing	39	21
Management	41	23
Engineering	56	31
Operations personnel	46	25
	182	100
<b>Distribution of Respondents</b>		
Number of individuals in DMU who responded	Number of companies with this number of respondents	
1	27	
2	29	
3	14	
4	9	
5	2	
6	1	
	82	

ment in fit appears to be substantial.

In the second stage of the analysis, with the hypothesized relationships added ( $H_1$ - $H_{4b}$ ), the model fits the data very well. The chi square test generated by the computer program is insignificant (164.90, 77 d.f.,  $p = .000$ ), which is not surprising given the sensitivity of this measure to large samples. The other measures of fit are much more promising. The LISREL goodness-of-fit index is .951, the adjusted goodness-of-fit index is .923, the root mean square residual is .060, and the Bentler and Bonett (1980) fit index is .950. All of these values indicate that the constructs novelty, complexity, and importance provide a plausible representation of attributes of the purchase situation that causally affect the participation and influence of the members of the decision-making unit in an industrial buying decision.

### Testing Individual Parameters

The next stage of the analysis was a test of the over-identifying restrictions of the individual relationships hypothesized in the original model. This procedure consisted of adding to the model, one path at a time, relationships hypothesized not to be present or subtracting from the model, one path at a time, relationships hypothesized to be present. The significance of each relationship then was tested at one degree of freedom. The results are reported in Table 5.

### Relationships of the Constructs to Participation and Influence

The parameters proposed in this part of the model suggest a causal relationship between the constructs of novelty, complexity, and importance and the collective participation and influence of the members of the DMU.  $H_1$ , which proposes that participation is related positively to influence, is supported (standardized estimate .944, chi square difference at 1 d.f. = 156.05,  $p < .001$ ).  $H_2$  is supported by a significant and positive relationship between novelty and participation (standardized estimate = .160, chi square difference at 1 d.f. = 5.82,  $p < .05$ ). The nonrelation-

ship between novelty and influence is verified by a nonsignificant path between these two constructs (nonconvergent model).

The relationships between complexity and participation and between complexity and influence are different from what was anticipated.  $H_{3a}$ , which proposes a relationship between complexity and participation, is not supported because of a nonsignificant chi square difference (standardized estimate = .048, chi square difference at 1 d.f. = .45, n.s.) Also, the path hypothesizing a relationship between complexity and influence ( $H_{3b}$ ) is only marginally supported (standardized estimate = .043, chi square difference at 1 d.f. = 2.47,  $p \cong .10$ ). These findings are rather surprising and are discussed in the next section.

A significant and positive relationship is found between importance and participation ( $H_{4a}$ , standardized estimate = .128, chi square difference at 1 d.f. = 4.08,  $p < .05$ ). The relationship between importance and influence also is significant and positive ( $H_{4b}$ , standardized estimate = .059, chi square difference at 1 d.f. = 4.26,  $p < .05$ ).

## Discussion

An attempt was made to expand the typology used to classify industrial purchase situations by using causal modeling to examine whether the constructs novelty (the lack of buying experience within the organization), complexity (the amount of information needed to make an accurate evaluation), and importance (the perceived impact on the firm) causally affect the participation and influence of the members of the decision-making unit. When each structural relationship is considered individually, significant relationships are found in the paths between novelty and participation, importance and participation, and importance and influence. These findings show that the factors novelty and importance can serve as general predictors for the amount of communication that will be offered for consideration by members of the decision-making unit. Also, the perceived impact of the purchase on orga-

TABLE 5  
Results of Tests of Overidentifying Restrictions

Hypothesis	Path		Parameter	Standardized Estimate	$\chi^2$ Difference
	From	To			
$H_1$	Participation	→ influence	$\beta_{21}$	.944	156.05 <sup>a</sup>
$H_2$	Novelty	→ participation	$\gamma_{11}$	.160	5.82 <sup>b</sup>
$H_{3a}$	Complexity	→ participation	$\gamma_{12}$	.048	.45
$H_{3b}$	Complexity	→ influence	$\gamma_{22}$	.043	2.47 <sup>c</sup>
$H_{4a}$	Importance	→ participation	$\gamma_{13}$	.128	4.08 <sup>b</sup>
$H_{4b}$	Importance	→ influence	$\gamma_{23}$	.059	4.26 <sup>b</sup>

<sup>a</sup> $p < .01$ .

<sup>b</sup> $p < .05$ .

<sup>c</sup> $p \cong .10$ .

nizational profitability and productivity (importance) can serve as an indicator of how much the communication offered by the sender will influence the receiver's evaluation of the product.

The nonsignificant relationship between complexity and participation and the marginally significant relationship between complexity and influence are rather surprising given the preponderance of findings indicating that either product complexity or complexity of the purchase situation is related to participation and influence. These findings may have been due to a combination of factors. Several different definitions of the complexity construct have been studied. Some researchers have studied complexity of the product (e.g., Lilien and Wong 1984), others the degree of change caused by the purchase (e.g., Kirsch and Kutschker 1982), and still others the complexity of the entire purchase situation (e.g., Johnston and Bonoma 1981). Hence, "complexity" may be a second-order or theoretical construct (Bagozzi and Phillips 1982), which in turn causally affects the first-order constructs of product complexity or situation complexity. In hindsight, instead of trying to identify one construct of "complexity" and attempting to force several different indicators to measure that one construct, it may be more prudent to subdivide the construct into such factors as "product complexity" and "situation complexity." Separate measures then could be collected on each of these constructs and a new model with both constructs could be specified and tested.

### **Managerial Implications**

The findings indicate that as novelty and importance to the purchasing organization rise, more information is sought by members of the decision-making unit. Sellers, then, must first ask the appropriate questions to determine how novel or important the purchase situation is to the organization. Should the situation be very novel or important, salespeople should be prepared to assume an educational role, supplying accurate and timely information that shows how the product will fit the needs of each individual buyer. This information can be communicated through a conventional sales presentation, but computer software or instructional videos also could be used to enhance understanding and provide additional information to assist the buying group in their decision task.

The need for more information by DMU members increases the importance of having adequately trained salespeople. Managers cannot be content merely to train their representatives about the features of their own product. Representatives must also realize that the increased need for information by the DMU can lead to information being solicited from more competitors. Salespeople must have sufficient information about each

competitor's product to be able not only to make a feature-by-feature comparison, but also to show how the features of their product are better suited to the needs of each individual buyer.

The greater uncertainty typical of novel and important purchase situations results in a greater perceived risk on the part of the members of the decision-making unit. More and better information provided by salespeople can reduce this risk as well as help differentiate the product from that offered by a competitor. This greater differentiation can be of benefit in the short run by assuring uninformed buyers that the product can meet their needs, which in turn should reduce their desire to seek more information from other suppliers. Increased product differentiation could become a long-term advantage as well by creating an intangible switching cost to the buyer during future purchase considerations.

Finally, sellers must remember that if more information is collected by the DMU, it will take longer to digest, extending the length of the purchase process. Salespeople must not try to pressure the members of the DMU into a decision, but should instead check with its members frequently and be ready to provide additional information if needed. Salespeople must be particularly attuned to information exchanged at the alternative-evaluation and choice stages. Sellers cannot assume that information presented earlier in the process will suffice; buyers may have forgotten it or it may have been undermined by subsequent information provided by a competitor. Salespeople must continually emphasize how the differential advantage of their product will better suit the needs of each buyer.

Related to the issue of whether the attributes of the purchase situation can be causal determinants of participation and influence is the question of whether or not these constructs vary by the stage of the process—do one or more functional groups participate or have more influence at any particular stage? To examine this question, a series of t-tests was conducted comparing the mean participation and influence scores of the four groups at each of the three stages in the process. The results are reported in Table 6.

For the purchase of the technically sophisticated piece of capital equipment, the plant management and engineering groups participated more and were more influential than the purchasing and operations groups throughout the process. Plant managers offered more communication for consideration than did operations personnel at the alternative-evaluation stage, more than the other three groups at the choice stage, and more than both the purchasing and operations groups globally throughout the process. Their perceived influence was greater than that of purchasing personnel at the choice stage and more than that of the purchasing and operations groups globally throughout the process.

**TABLE 6**  
**Comparison of Functional Group Mean Participation and Influence Scores Across the Stages of the Decision Process<sup>a</sup>**

	Purchasing	Management	Engineering	Operations
<b>Participation</b>				
Alternative evaluation	2.83	3.08	3.13	2.56
Choice	2.94	3.37 <sup>b,d,f</sup>	2.98	2.76
Global	2.80	3.30 <sup>c,f</sup>	3.16 <sup>b</sup>	2.86
<b>Influence</b>				
Alternative evaluation	2.92	3.20	3.06	3.02
Choice	2.73	3.34 <sup>c</sup>	3.05	3.00
Global	2.72	3.22 <sup>c,f</sup>	3.08 <sup>b,e</sup>	2.71

<sup>a</sup>Participation and influence ratings were given on the following scale: 1 = little or none, 2 = some, 3 = quite a bit, 4 = a great deal, 5 = a very great deal.

<sup>b</sup>Significantly different from purchasing at  $p < .05$ .

<sup>c</sup>Significantly different from purchasing at  $p < .01$ .

<sup>d</sup>Significantly different from engineering at  $p < .05$ .

<sup>e</sup>Significantly different from operations at  $p < .05$ .

<sup>f</sup>Significantly different from operations at  $p < .01$ .

Engineering personnel offered more communication for consideration than the operations group during the evaluation of alternatives and more than the purchasing group globally throughout the process. This increased participation led to their having greater perceived influence than both the purchasing and operations groups globally throughout the process.

These findings reemphasize the importance to the salesperson of discovering and contacting the members of the DMU beyond the purchasing group. For products that are highly technical and represent a novel and important situation for the buyers, salespeople must create a differential advantage for their product for both the plant management and engineering groups as those individuals tend to participate most and to have greatest influence throughout the process.

### **Directions for Future Research**

Given that the study is the initial attempt to apply causal modeling to examine participation and influence in industrial purchasing, the results are encouraging. The findings show that the constructs novelty and importance can serve as general predictors for determining who participates in an industrial purchase decision and what their influence is. However, these findings do not mean that these constructs are the definitive typology. Though the fit of the overall model is significant, the nonsignificance of the relationship between complexity and participation and the marginally significant relationship between complexity and influence are perplexing and should be examined in more detail. Also, we know that these three constructs capture some of the variance in the industrial purchase situation, but we have no idea how much or what other constructs may be involved. Previous research has shown that such constructs as time pressure (Isenberg

1981), organizational variables (Pugh, Hickson, and Turner 1968), perceived risk (Sweeney, Mathews, and Wilson 1973), and personal stake (Patchen 1974) affect participation and influence. With the constructs novelty, complexity, and importance as a basis, future models of organizational buying behavior can include any or all of these constructs in an attempt to examine further their relationship to participation and influence.

The purpose of the research is to expand the Robinson, Faris, and Wind (1967) theory of buy-classes to include the constructs novelty, complexity, and importance. It is important to stress that the work reported here must be thought of as exploratory in terms of theory, measures, and sample. As in most industrial marketing research, compromises became necessary. Because of budgetary constraints and the well-recognized difficulty of collecting data in the industrial sector (e.g., Moriarty 1983), the research was limited to surveying purchasers of one vendor. Though the sponsoring organization was cooperative, it could provide information only on successful sales attempts. Also, only the quantity of communication offered for consideration was examined; future work could study the quality of information as well. As the purpose of the research was to model the effects of the purchase situation attributes on participation and influence, a single product line was chosen to reduce variation due to product differences. However, using a single product line may in turn limit the variance in the purchase situation attributes of novelty, complexity, and importance. As the preliminary results are encouraging, researchers should attempt to verify the relationships found here by examining a variety of different products and using unsuccessful as well as successful sales attempts. The results of these future studies, coupled

with previous findings and those reported here, can broaden our understanding of organizational buying behavior by providing further insight into who partic-

ipates in an industrial purchase decision and what the interpersonal influence is among the members of the decision-making unit.

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