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This article reports a first step toward developing some quantifiable dimensions of the industrial buying task group, called the buying center. Group composition and interaction processes were examined for purchases of capital equipment and industrial services in 31 firms. Data were analyzed to test the soundness of a communications network perspective on the buying center and the managerial implications of such a perspective. Equipment and service purchase measures differed reliably across several indices suggested by our theoretical orientation. Organizational structure and purchase situation attributes correlated in generally expected directions with the dimensions of the buying group.

# THE BUYING CENTER: STRUCTURE AND INTERACTION PATTERNS

## Introduction

THE concept of the buying center refers to all those members of an organization who become involved in the buying process for a particular product or service (Robinson et al. 1967). While the major buying roles (e.g., initiator, influencer) remain constant over all purchases, the participants can and do change over purchase types and categories. The buying center notion has been one of the most important conceptual contributions made in the study of industrial buying behavior. Yet progress in moving from the abstract buying center concept toward a research topic or management aid has been slow (Wind 1978b; Gronhaug and Bonoma 1980).

Wesley J. Johnston is Assistant Professor of the Faculty of Marketing, The Ohio State University. Thomas V. Bonoma is Associate Professor, Graduate School of Business Administration, Harvard University. It has been argued that the best way to incorporate and understand all the complex interactions taking place in industrial buying is via a systems approach (e.g., von Bartanlanffy 1968, Johnston 1979, Nicosia and Wind 1977). However, systems theory is currently considerably stronger on concept than on method and has offered little to the industrial marketing researcher or manager that is implementable. Nonetheless, the need to examine the group and other social aspects of the buying center remains a central one:

- To the extent that the buying center includes more than one member, any analysis . . . should include an explicit examination of the relevant characteristics of the group, i.e., the cohesiveness of the buying center, the leadership pattern, and the formal and informal network of communications among the center's members (Wind 1978a).
- The development of organizational (as distinct from individual) characteristics (such as

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group cohesiveness, autonomy, intimacy, polarization, stability, flexibility, etc.) is the least advanced area of organizational studies (Wind 1978c).

Useful knowledge has been gained from studying the purchasing manager as an individual (see Bonoma et al. 1977 for a review, and as he/she engages in selected (often simulated) interactions with salespeople, Tosi 1966 or Strauss 1962.) For the most part researchers have been unable to capture the real life complexity of the buying interactions that occur in a company, much less the influences coming from selling representatives and the environment (competitors, government). The stumbling block has been suitable interaction theory, and just as important, suitable methods.

This paper develops some structural and interaction-based system concepts to examine the functioning of corporate buying centers from a small group perspective, to develop compatible methods that can be used to measure these relational concepts, and to conduct an investigation of the buying center as a small social system in a number of organizations. The practical implications of this kind of approach to the buying center are numerous from an industrial marketer's perspective. They include understanding the involvement and interaction of organizational members in the buying decision process, information transmission and processing in the buying center, and the importance of purchasing management in the buying center.

#### **Previous Research on the Buying Center**

Although the term buying center was first used by Robinson et al. (1967), the first citation recognizing that a number of managers other than the purchasing staff were regularly involved in buying decisions was Cyert et al. (1956). Since then many articles examining the buying center have appeared. For example, Weigand (1968) showed that the industrial buying process is complex and involves many people at all levels in a firm. Later, Brand (1972) conducted a study based on 232 semi-structured interviews with managers involved in buying activities in 43 U.K. companies. He examined the participation of key interviews with these managers and the participation of key departments and managers in the different stages of the buying process. He found that general management and technical personnel were perceived as equal or more important than purchasing management in most of the buying stages, and in all of the companies.

The frequency of buying involvement of different functional areas in the firm like engineering, production, and purchasing has been investigated on a number of occasions (Buckner 1967, *Scientific American* 1969). These studies typically employed a large cross-sectional survey of industrial firms, from which aggregate frequencies of functional area involvement were computed on an industry or product basis. No attempt was made in any of these studies to group or systematically investigate characteristics of organizations or groups with similar buying involvement.

Other researchers tried to discover what aspects of an organization or the purchase situation draw different participants into the buying process. Gronhaug (1975) found that the number of buying participants was affected by the degree of routinization of the buying problem, the perceived product importance, and the resources available for handling buying problems. Patchen (1974) examined the effects of the locus and basis of participants' organizational influences on the buying process. He found that the importance of a person's stake in the decision had an effect on that person's participation in the process.

More recent research has turned to the perceived influence of various functional roles in the buying process (Fortin and Ritchie 1980, Grashof and Thomas 1976, McMillan 1973, Patchen 1974). The results of these studies show that there are significant differences in the perceived influence of major participants in the buying process, but that every participant or group reports that it is one of the most important and central. Little or no consensus on who is the most influential party has been obtained (Silk and Kalwani 1979). However, when the question is restricted to who participates in the buying center, high consensus is achieved (Gronhaug 1977, Kelly 1974, Patchen 1974). Apparently, it is quite easy to identify buying center participants in any given purchase situation, but quite difficult to understand their dynamics and power relationships.

Power, politics, and influence may be central social variables in the buying center. Strauss (1962) found the work behavior of purchasing agents to be strongly influenced by lateral negotiations, or formal and informal interactions with peers to influence the terms of purchases. In another study, Pettigrew (1975) examined the communications entering and exiting the buying firm. He found that certain individuals acted as gate-keepers to structure the outcome of the purchasing situation in the buying firms through control of information. Martilla (1971) found that word-of-mouth communication within firms is an important influence in the later stages of the adoption process. Opinion leaders were found

to be more central to the verbal communication network than were other buying influentials in the firm.

The results of the research conducted to date depicts the buying center as a complex, multiperson group within the buying organization. The characteristics of this group, its structure, operation, and dynamics, remain largely unknown.

#### The Buying Center from a Systems Perspective

While researchers have conceptually examined the buying center from a small group or systems perspective (Anyon 1963, Bonoma and Johnston 1978, Bonoma et al. 1977, Choffray and Lilien 1978, Cyert and MacCrimmon 1968, Cyert and March 1963), and others have called for work in the area (Nicosia and Wind 1977), only a very limited amount of empirical work has actually been done.

Only a few studies that actually take a system or small group perspective could be found in the industrial buying behavior area (Choffray 1977, Corey 1978, Hillier 1975, Wind 1978b, Spekman 1978, Spekman and Stern 1979). Choffray found that companies exhibited different vector involvement patterns in the purchase of industrial cooling systems. He had difficulty, however, in correlating this involvement measure with any other easily measurable variables. The vector involvement pattern is simply a list of departments within a firm with binary (yes or no) scoring for participation in the buying decision process.

Wind (1978b) examined purchases of scientific and technological information by 171 companies and found that 274 persons were involved in these purchases. He developed unidimensional scales that graphically presented the relative importance of various functional positions in each phase of the purchase decision. He concluded that "recognition of the complexity of the organizational buying center, and empirical identification of its boundaries, can help... the entire purchasing process." (p. 29)

Spekman (1978) used a macrosociological approach to examine the decision making potential of 52 industrial buying centers in 20 manufacturing firms. He examined the effect of perceived environmental uncertainty on four structural dimensions of the buying center: centralization, rules and procedures, participation in decision making, and division of labor. There was some support found to indicate than an increase in environmental uncertainty leads to a decrease in the buying center's degree of division of labor and to an increase in the level of participation in decision making.

Hillier (1975) developed a group model of the

purchasing process called the decision atom viewpoint. Seventeen widely different organizations studied over a three-year provided the basis for the model. In the center or nucleus was the project team; the first level of electrons orbiting the nucleus was the group of individuals exerting primary constraints, then a level of relevant others, and finally a level of others outside the firm. The complexity of the decision atom was hypothesized to be a function of the commercial complexity of the negotiations, behavioral complexity of the human interactions, and the characteristics of the product.

Corev (1978) recently published an important study into the dynamics of industrial procurement systems in five major companies. He found two major social/organizational factors affecting the purchasing manager: the influence of internal purchasing performance measurement systems, and the influence of other (nonpurchasing) functional areas in the firm. Corey identified a number of purchasing performance areas that were of high concern to upper management and impacted on purchasing behavior. Among them were how well sourcing and purchasing overhead resources were managed (dealing with the numbers), and how well the purchasing function, no matter how internally efficient, facilitated the mission of other firm functions (e.g., production) and executives.

In a single case study, Calder (1976) demonstrated that role theory can provide a conceptual framework for connecting individuals together into a collectivity. Using digraphs (directional graphs), he illustrated how the set of tasks, positions, and persons were interrelated in a structural role analysis. While presently not well developed, the structural role approach does offer the concept of conducting numerous case studies across a number of organizations to permit aggregation while still preserving an individual level perspective.

These studies, added to the research discussed in the previous section, help to identify a number of dimensions of the buying center as well as extend them. Table 1 summarizes the research on the buying center, illustrating which studies have examined the various characteristics of the phenomenon.

Using this foundation, and adding to it from the area of psychological and general management work in communications theory, Johnston (1979) identified a set of buying center dimensions that could be used to describe industrial purchases. These dimensions, their associated measurements, and the underlying theoretical notions are outlined below. To check on the validity of the notions, and to develop some data on how purchases of capital equipment differ from those of industrial

## TABLE 1Research Studies on the Buying Center

	i the buying o									
Study	Buying Characteristic Examined	Size—Number of People Involved	Responsibilities— Tasks of Various Functions	Participation in Various Stages	Perceived Influence of Various Functions and Individuals	Frequency of Involvement of Different Functions	Correlates of Involvement	Vertical / Lateral Influence Dimensions	Communication Process	Group Characteristics (Systems Perspective)
Cyert et al.	1956	Х	X	Х						
Strauss	1962		Х	Х	х			х	х	
Buckner	1967					х				
Weigand	1968		Х		х					
Scientific American	1969					Х				
Martilla	1971				Х		Х		Х	Х
Brand	1972			Х	Х					
McMillan	1973		Х		Х					
Kelly	1974		Х	Х						
Patchen	1974	Х	Х	Х	х		Х			
Gronhaug	1975	Х					х			
Hillier	1975	Х	Х				Х	Х		Х
Pettigrew	1975	Х	Х	Х				Х	Х	
Calder	1976	Х	Х	Х				Х	Х	Х
Grashof and Thomas	1976	Х	Х		Х					
Choffray	1977		Х	Х		Х	Х	Х		Х
Gronhaug	1977		Х	Х						
Corey	1978		Х	Х			Х			
Spekman	1978	Х	Х	Х			Х	Х		Х
Silk and Kalwani	1979				Х					
Fortin and Ritchie	1980		Х	Х	Х		Х			

services, extensive interviews with buying center members were conducted in 62 purchases across 31 corporations. First the theory and method will be developed, and then the data will be presented.

## **Structural and Interactive Dimensions** of the Buying Center

No two buying decisions in any given company are likely to be exactly alike, nor will any two companies follow exactly the same procedures in even highly similar purchase situations. However, there may be some general patterns of interaction and social behavior which will be the same, even across moderately dissimilar purchase situations.

Industrial buying behavior has been viewed as a system composed of many dyadic (two-person) interactions within the context of a formal organization (Bonoma, Bagozzi, and Zaltman 1978; Bonoma, Zaltman, and Johnston 1977). By mapping the social interrelationships that take place during a purchase, as expressed by communications between various buying group dyads, the social dynamics of the buying center for that purchase should become clear. In this view, the buying center exists as a communication network that does not necessarily derive its configuration nor operation from the formal organization, but rather from the regularized patterns of communication that reflect the individuals involved and their relationships. We set out to develop some aspects of this communication structure to serve as measures of the social operations of a buying group.

From our theoretical perspective, the work on the buying center reviewed above, and especially the social psychological literature on communications and small groups (see Shaw 1976 for a good review), we hypothesized that five dimensions of the buying center could be specified and measured. These dimensions are:

• vertical involvement in the buying center's communications. This dimension is characterized by the number of levels of the organization's authority hierarchy exerting influence and communicating within the buying center. Six levels of authority were defined for the purpose of this study: ownership (board of directors), top management (CEO,

president, executive vice president), policy level management (functional vice presidents, general managers), upper level operating management (e.g., directors, managers), lower level operating management (e.g., supervisors, product managers), and production work/clerical employees.

- *lateral involvement* of different departments and divisions in the buying communications. This dimension can be operationalized as the number of separate departments, divisions, or firm functional areas involved in the purchase decision (see Strauss 1962 on the relevance of lateral involvement).
- extensivity, or the total number of individuals involved in the buying communication network. Communication and information processing systems can be described in terms of the number of parts (e.g., people, departments) at work in a system. Schroder et al. (1966) referred to this property as "differentiation." We operationalized buying center

extensivity as the total number of individuals involved in the buying process; this measure has been previously shown to correlate positively with decision quality by Schroder.

- connectedness of those involved in the buying communication network. This concept and its associated measure indicates the degree to which the members of the buying center are linked with each other by directed communications concerning the purchase. The degree of connectedness can be empirically expressed as a percentage of the total possible connectedness in a particular buying center. Only communications about the purchase under consideration were included in this percentage. Others were disregarded.
- centrality of the purchasing manager in the buying communication network. The centrality of the purchasing manager was expressed as the sum of his/her purchase communications, both sent and received, weighted by the total number of individuals in the buying



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center. Previous studies in psychology found centrality correlated highly with perceived leadership, status, and influence (Shaw 1976).

These five communication concepts can be shown diagramatically. Figure 1 presents a conceptual picture of an organization buying center for a specific hypothetical purchase. The communication links between those persons both within the firm and external to it are shown. In addition, the five interactive dimensions we have proposed can be measured. Five levels of vertical hierarchy are involved (vertical involvement), 11 different divisions or departments are implicated in communications (lateral involvement), a total of 25 different people within the firm are involved (extensivity), the degree of connectedness is slightly less than 10%, with 56 communication links existing out of a possible 600, and the purchasing manager's centrality is 17%, with eight communication links versus 48 possible (centrality). This graphic summary of the buying center offers some interesting possibilities to purchasing management or sales management in addition to its research uses. These are discussed in the section on implications.

The theoretical/methodological dimensions developed here create a first step toward a measurable systems view of the buying process that mirrors its dynamic nature. A major purpose of this study was to determine if this communications network view of the buying center sensibly captured the dynamics and variations over different buying centers and purchase situations. For a more qualitative treatment, see our companion article (Johnston and Bonoma 1981).

## **Expected Correlates of the Buying Center's Dimensions**

In order to gain a view of how the communications model and measures would perform, we measured certain more traditional structural characteristics of firms and purchase situation attributes shown to have an influence on buying center participation in preview studies (e.g., Johnston 1979). Using these structural and situational variables, we could observe how the communications measures behaved under different firm conditions and buying situations.

## Structural Variables of the Firm

Research on organizational structure has concentrated on five aspects of the firm as often important in firm and buying center performance (Spekman 1978; Zaltman, Duncan, and Holbeck 1973):

- *centralization*—the degree to which authority, responsibility, and power are concentrated within an organization or buying unit.
- *formalization*—the extent to which activity in an organization or buying group is formally prescribed by rules, policies, and procedures.
- *complexity*—the degree to which the organization is compartmentalized and pursues functional specialization.
- *size*—organizational revenues, employees, or some other measure.
- *participation*—the extent to which various organizational members are involved in decision making.

Since the communication dimensions specified above measure several aspects of participation, this variable was not included as an independent measure. The other structural variables were employed.

## **Purchase Situation Attributes**

In addition to the structural variables, we looked at purchase communications concerning two kinds of buying situations: capital equipment and services. We used such a gross buying situation categorization because it has been relatively difficult to identify primary purchase situation attributes that are independent of the organization that buys (see, e.g., Downs and Mohr 1972). In fact, research has demonstrated clearly (Gronhaug 1975, Robinson et al. 1967) that what is bought influences how it is bought. Therefore, in addition to collecting data on capital goods and service purchases, we collected data on managers' impressions of the purchase's importance, novelty, and complexity. Table 2 lists the independent variables measuring the buying organizations' structure and the purchase situations' attributes and their operationalization.

## **Research Propositions**

Since buying center communications have not been measured before in the way we advocate, we did not attempt to advance a series of complex hypotheses for this study. However, a general examination of the available literature would suggest:

(1) Higher purchase importance, complexity, and novelty ought to lead to more involved vertical and horizontal decision making communication nets that are more connected and extensive in their composition (Robinson et al. 1967).

(2) Local variables, such as those having to do with the purchase situation, ought to have more influence on buying center communications than structural aspects of firms (Spekman 1978).

(3) Product and service purchases should differ

Organizational Structure	Measure	Label	
Size	Annual sales in dollars	SALES	
Complexity	Number of divisions/subsidiaries	DIVSUB	
Formalization	Percentage of the buying process communication that was written	WRITTEN	
Centralization	Organization and operation of the purchasing function in the firm (Centralized/Decentralized/Combination)	ORGPRCH	
Purchase Situation Attribute	Measure	Label	
Importance	Average of entire buying center's perceived importance (1-10 scale)	IMPORT	
Complexity	Time required to complete the buying process	TIME	
Novelty	Buy grid categorization (New task, modified rebuy, straight rebuy)	NEWNESS	
Purchase Class	Type of purchase (capital equipment or industrial service)	PURCLS	

reliably on a number of the structural and interactive dimensions, but services should probably not present any radically different buying center dynamics from those of equipment purchases (Johnston and Bonoma 1981).

In order to assess these exploratory propositions, and more importantly, the communications perspective offered above, data were collected on 62 purchases.

## Method

The sample consisted of interviews examining the purchase of capital equipment and industrial services in different organizations. Each organization from which data was collected was a for-profit firm in the private sector of the economy.

We initially identified one individual in each firm who was involved in some way in the communication network generated by a purchase situation. This individual was usually from the purchasing or materials management department. Semistructured interviews were conducted to identify all those individuals with whom the initial contact person communicated as well as the perceived content of these communications. The individual's role and tasks in the purchasing process were also recorded. Protocol analysis was used as part of the interview process.

After identifying and structuring the entire part this individual played in the purchasing process, the other individuals identified as having had contact with this initial person were interviewed to determine their part in the buying process. This interview technique has been referred to as snowball interviewing, and for this type of multiperson research is superior to alternative methods, such as Bale's (1950) Interaction Process Analysis, which require visual observation of all group members throughout the entire problem-solving period (something seemingly impossible in the industrial buying process). Interviews with one individual involved in the purchasing process led to interviews with other individuals involved in the process, which led to the identification and subsequent interviews with still others. This expanding interview process eventually exhausted itself when all the individuals within a firm who had a part in the purchasing process were identified and interviewed.

Thus, membership in the buying center required participation in the communication network concerning the specific purchase being investigated. This definition of the buying center is more quantifiable than previous attempts because it readily adapts to digraph analysis developed in the communications and sociology disciplines. A limitation of this approach, however, exists in that it is plausible for individuals to have an effect on the purchase decision without having been involved in the communication network. An example might be the CEO who has instilled his / her values throughout the organization, with the effect that those involved in the purchase decision act based on their perceptions of what the CEO wants-without any participation by the CEO in the buying decision process. This type of influence, however, should be captured

## TABLE 3 The Most Central Individual(s) in Each Buying Center

Company	Capital Equi	pment	Industrial Services				
Chemical Heat exchanger manufacturer		Purchasing manager	Construction contract labor	Purchasing manager			
Industrial safety products manufacturer	Automatic drilling machine	Engineer VP of manufacturing	Plant janitorial service	Purchasing manager			
Steel mill furnace manufacturer	Standby oil heating system	Purchasing manager	Temporary drafting service	Engineer			
Steel manufacturer	Coke oven	Purchasing manager	Maintenance repair contract	Buyer			
Water transportation & construction co.	Locomotive crane	Purchasing manager	Contract cement work	Purchasing manager			
Heating equipment manufacturer	Large industrial press	Engineer	Refuse removal	Purchasing manager			
Industrial products distributor	Plasma cutting equipment	VP of operations	Installation of fire prevention system	VP of operations			
Specialty steel manufacturer	Hot piercer mill	Purchasing manager	General contracter for asphalt work	Engineer			
Machine tooling co.	Vertical boring mill	VP of operations	Fabricating work	Purchasing manager			
Specialty steel manufacturer	Steel plate leveler	Manufacturing engineer	Calibration of lab instruments	Purchasing manager			
Industrial products distributor	Storage shelving	Director of materials	Refuse removal	Director of materials			
Metal and wire manufacturer	Wrapping machine	Division manager	Machinery rigging for shipping	Traffic manager			
Aerospace & automotive products manufacturer	Metal working machine tool	Divisional purchasing manager	Technical consultant	Director of purchasing			
Paper products manufacturer	Banding system	General manager	Vending machine service	Personnel manager			
Steel mill builder	Processing pump	Project manager	Pump installation & start up	Project manager			
Refractory	Fork-lift trucks	Plant purchasing manager	Plant security protection	Buyer purchasing manager			
Pipe fabricator	Presses	Safety engineer maintenance supervisor	Janitorial service	Buyer purchasing manager			
Petroleum products manufacturer	Gasoline storage tank	Buyer	Printing of advertising materials	VP of marketing			
Power plant builder	Nuclear load cell	Job-shop order department manager	External building maintenance	Manager of facilities			
Steel manufacturer	River tow barge	VP of production	Employee food service	Plant labor relations manager			
Mining equipment manufacturer	Executive office desk	Purchasing agent	Training for 1st line supervisors	General manager			
Chemical & scientific instrument distributor	Medical instruments	District VP of sales	Management consultant	Senior VP of sales			

TABLE 3 (continued)								
Company	Capital Equ	uipment	Industrial Services					
Electrical parts distributor	Recessed lighting fixtures	Company VP	Architectural services	Executive VP				
Cement manufacturer	Fork-lift truck	General manager (VP)	Plant security protection	Assistant plant superintendent				
Steel fabricator	Bar stock steel	Materials manager purchasing agent	Typewriter maintenance	Engineer				
Construction company	Steel tonnage	Manager of sales	Site survey	Project manager engineer				
Steel manufacturer	Galvanized steel processor	Engineer	Slap processing & metal recovery	Divisional VP				
Engineering and construction company	Cooling vessel	Job site foreman	Tar sludge removal	Buyer Purchasing manager Divisional VP				
Home products manufacturer	Mixing machines	Buyer engineer	Drapery cleaning	Service manager				
Electrical parts manufacturer	Resistor	General manager Purchasing manager	Refuse removal	Purchasing manager				
Building materials manufacturer	Pump	Engineer	Engineering services	Executive VP				

in the independent measures of formalization and centralization.

A total of 241 interviews were conducted. It was not always possible to interview everyone that had been involved in each purchase. It did prove possible to interview enough organizational members connected with each purchase decision to get a highly detailed description of how each decision evolved. A minimum of two individuals were interviewed in each purchase decision, a procedure suggested by Wind (1978a). In addition, the protocols of various organizational members showed a high degree of consistency, indicating some validity for the observations. In a few cases, an individual identified as having been involved could not recall his or her involvement. This was resolved in each case by carefully reconstructing the purchasing process and describing the role and communication that individual had been reported to have had. The individual in each case then remembered his/her involvement and was able to discuss his/her role and communication concerning the purchase.

One capital equipment and one industrial service purchase were investigated from each firm. In no way were the selections of the particular purchase items random, but rather, they were unsystematic in the sense that the primary contact person was asked to choose a recent equipment or service (or both, in the rare case the individual was involved in both) decision for our analysis. Table 3 lists the companies involved in the study by their main business and illustrates the wide range of capital equipment and service purchases investigated, including straight rebuys (typewriter maintenance), modified rebuys (gas storage tanks), and new purchases (boring mill). All of these purchases had been completed within the past six months and the majority within the past two months. Some purchases of capital equipment and services had been made within the past week. The time that it took to complete the entire buying process from first recognized need to the final purchase conclusion varied to a considerable extent. The shortest time to complete a capital equipment purchase was one week. The longest was two years. Service purchase time periods ranged from two weeks to over several years (a special situation). The mean time periods were 27 weeks for capital equipment and 20 weeks for services.

## Results

Table 4 shows the results of regression analyses run with the buying center dimensions as criterion variables and the organizational structure measures and purchase situation attributes as predictor variables. Dummy variables were used for organizational centralization, purchase situation novelty, and pur-

(	Purchase Situation Attributes											
Buying Center Dimension	Size (SALES) beta weight (t)	Com Forma (DIVSUB) beta weight (t)	plexity Ilization (WRITTEN) beta weight (t)	Centrali (ORGP (Combi- nation) beta weight (t)	ization PRCH) (Central- ized) beta weight (t)	Importa Comple (IMPORT) beta weight (t)	nce exity (TIME) beta weight (t)	Nove (NEWN (Straight Rebuy) beta weight (t)	lty ESS) (Modi- fied) beta weight (t)	Purchase Class (PURCLS) (Service) beta weight (t)	R²	F (10,49)
Extensivity	.17 (1.24)	05 (0.11)	.20 (3.22)*	07 (0.36)	14 (1.21)	.36 (8.69)*	.26 (4.77)*	18 (1.10)	08 (0.27)	–.16 (2.09)⁵	.41	5.14°
Lateral involve- ment	.09 (0.28)	03 (0.04)	.33 (7.99)*	14 (1.09)	19 (1.91)	.25 (3.55)°	.17 (1.68)	43 (4.99)*	–.29 (2.49) <sup>⊳</sup>	03 (0.05)	.31	3.62*
Vertical Involve- ment	09 (0.31)	.25 (2.77)*	.05 (0.17)	.16 (1.57)	.18 (1.97)	.32 (6.43)°	.33 (7.29)*	.02 (0.02)	01 (0.00)	25 (4.47)ᢪ	.38	4.55°
Connect- edness	20 (1.22)	.18 (1.15)	44 (12.04)*	.13 (0.82)	.27 (3.41)*	11 (0.58)	15 (1.26)	.16 (0.58)	.21 (1.23)	.07 (0.31)	.22	2.70 <sup>ь</sup>
Purchasing Managers Centrality	24 (1.35)	.23 (1.39)	.17 (1.45)	11 (0.41)	16 (0.92)	07 (0.24)	12 (0.63)	27 (1.37)	03 (0.03)	.01 (0.00)	04	.76

chase class (equipment or service). Three levels of organizational centralization were analyzed via the regression analyses. Dummy variables were used to indicate companies whose purchasing function was either totally or partially centralized. The null state represented companies with completely decentralized purchasing. Dummy variables were also used to analyze the effects of the purchase situation's novelty on buying center dimensions. The Robinson et al. (1967) typology of new task, modified rebuy, and straight rebuy was used to indicate the novelty of the purchase situation. New task situations represented the null state with modified and straight rebuy situations receiving dummy variable weights. The purchase class (equipment or service) also received dummy variable regression treatment. Purchases of capital equipment represented the null state and service purchases received dummy weights. One company was dropped from the regression analysis because it would not release its annual sales data. Thus the regression is based on 60 purchase situations.

Of the five regression equations, four were statistically significant at the  $p \le .05$  level or better. The regression equation concerned with the centrality of the purchasing manager in the buying center communication network indicated that neither organizational structural variables nor purchase situa-

tion attributes had a significant effect on the purchasing managers' involvement. The purchasing managers' centrality did, however, vary to a great extent across the situations sampled. In purchases of both capital equipment and industrial services, the degree of centrality of the purchasing manager varied from zero (not even involved) to 100% (communicating to and and receiving communications from all other individuals involved). Table 3 shows the most central person(s) in each of the 31 purchase situations.

#### Extensivity

The number of participants in the buying center communication network was significantly affected by both organizational structural variables and purchase situation attributes. The degree of organizational formalization had a positive effect on this dimension of the buying center. The more formalized the organization, the greater the extensivity of the buying center. The purchase class, importance, and complexity of the purchase situation also affected the buying center's extensivity. Services had less people involved in the buying center than did capital equipment purchases. The importance and complexity of a purchase both had a positive effect on the total number of individuals involved in the buying process. These two purchase situation

attributes had the largest effect of all the independent variables examined in this study.

#### Lateral Involvement

The lateral involvement dimension of the buying center was also affected by organizational structural variables and purchase situation attributes. The formalization of the organization increased the lateral involvement of the buying center. The importance and novelty of the purchase situation also affected the lateral involvement of the buying center. The more important a purchase was perceived to be, the greater the number of departments and divisions involved in the buying process. The more novel a purchase situation, the greater the lateral involvement in the buying center. This was indicated by the negative beta weights for the dummy variables, indicating straight and modified rebuy situations. Both had lower involvement laterally than the new task situation, which was the base line in the regression.

#### **Vertical Involvement**

The vertical involvement dimension is most heavily influenced by purchase situation attributes. However, the complexity of the organization had a statistically significant positive effect on this aspect of the buying center as well. Purchase situation attributes that affect the vertical involvement in the buying center are the purchase class, importance, and complexity of the situation. The vertical involvement for service purchases was lower than for capital equipment. Both important and complex purchase situation increased the degree of vertical involvement in the buying center, as expected. The complexity of the situation had the greatest effect on vertical involvement.

#### Connectedness

Purchase situation attributes did not seem to affect the connectedness of the buying center communication network. The degree of organizational formalization had a very strong effect on the buying center's connectedness. The greater the amount of written communication concerning the purchase, the less the connectedness of the buying center. This relationship was further investigated by examining each purchase situation closely. It was discovered that in companies where the amount of written communication was a high percentage of the total communications, a purchase requisition procedure was used. This procedure usually resulted in the written communications flowing from one member to another with little verbal contact between members, thus reducing the amount of contact between all members. The amount of connectedness was also affected by the organization's centralization. The more centralized an organization, the greater the connectedness of the buying center.

#### **Other Aspects**

The size of the company did not affect any of the dimension of the buying center. Every other organizational structural variable or purchase situation attribute affected at least one dimension of the buying center. The two variables that, overall, most seemed to shape buying center were the degree of organizational formalization and the importance of the purchase situation. Each of these variables was significantly related to three of the five buying center dimensions.

With the new task, modified rebuy, straight rebuy purchase typology was found to affect the lateral involvement in the buying center, but not the extensivity. It appears that in new task situations higher levels of departmental and divisional representation occur, but this does not necessarily lead to greater numbers of people involved in the buying process.

There were some differences between the two purchase classes of capital equipment and industrial services. Services tended to have less extensive buying centers with lower vertical involvement as predicted.

The lack of any significant relationships between the purchasing manager's centrality and the other variables is discouraging. Understanding this aspect of the buying center could make an important contribution to industrial marketing.

## **Conclusions and Implications**

This research defined and operationalized five interactive dimensions of the buying center. These dimensions were vertical and lateral involvement, extensivity, connectedness, and purchasing manager centrality. The buying center communication network was examined in 31 companies that had made purchases of capital equipment and industrial services. Some traditional organizational structure and purchase situation variables were included as independent measures as well.

The interactive, communications perspective created seems to be a useful one for examining the dynamics, as opposed to the structure or roles, of the buying group. As we tentatively predicted, the purchase of industrial services seemed to involve fewer vertical layers of organizational authority and fewer managers overall. Secondly, looking at Table 4, the local variables of purchase situation attributes were stronger predictors of buying center communications than were organizational structure variables, as previous research (see Johnston 1979) has reported. Finally, it was the subjective variables of impressions of purchase novelty, complexity, and especially importance which were the most powerful determinants of vertical and lateral involvement, extensivity, and connectedness.

None of these findings should be very surprising. for they are not new. More useful are the unexpected insights into the buying center that a communication perspective permits. For example, why did our measures fail to pick up the (real) variance in the influence of the purchasing manager, differences in firms, and purchase situations have no effect on his/her involvement in the buying process. Regarding the extensivity measure, it is perhaps counter-intuitive that the more formalized the organization, the more people get involved in purchases. Is this because of a Parkinson's Law of bureaucracy breeding involvement, or increased professionalism and care in the buying deliberations? Regarding lateral and vertical involvement, it is hardly surprising that the more important, novel, and complex the purchase, the more horizontal and vertical corporate layers become involved (see Robinson et al. 1967). But, referring to the connectedness results, it is fascinating that there may be a hydraulic model of formal versus informal (e.g., conversations) communications operating. This is expressed in the results on organization formalization—basically, the more that is written down, the less there appears to be to talk about. Perhaps not surprisingly, the more centralized the company's functions, the greater the connectedness of the buying groups. As sign-off power for purchases concentrates at corporate headquarters, much more time is spent in operating units making sure all is in order before pushing the decision up.

Finally, one of the most useful outcomes of this research, we believe, is contained in the sort of diagram outlined in Figure 1. This systems picture of a buying center seems to present sales managers, purchasing agents, and would-be purchase champions alike with numerous opportunities to increase their understanding of, and hence influence on, buying deliberations. This type of diagram can be constructed by sales or marketing managers for any specific purchase decision in a customer firm. By starting with the question of who first identified the need for the product or service, and then continuing to ask a series of questions, the entire buying decision communication network can be developed. Each dimension has implications for marketing and/or purchasing management. The

degree of lateral involvement in a purchase is an important consideration for both the industrial marketer and the purchasing manager. It indicates to the industrial marketer the potential for diversity of opinion and the possibility for influencing the decision through a number of functional areas within the firm. The purchasing manager on the other hand must decide what is the optimal level of lateral involvement by the various departments and divisions within his / her firm. Too narrow involvement prevents necessary information from surfacing during the purchasing process. Too broad an involvement creates the potential for too much input into the process with bickering over vested interests and a confusing information processing situation. The degree of vertical involvement in purchasing decisions is also important. From the industrial marketer's perspective, he/she must know how many levels of management hierarchy are involved to plan a successful communications strategy. Not going high enough in the buying organization to influence the decision could see many hours of marketing effort overruled. The vertical dimension of the buying center also has implications for the purchasing manager. Knowing when the higher levels of management want to or should be involved in a purchase decision is important for successful purchasing management. Involving the company's president in a purchase decision that could or should be handled at a lower level wastes valuable executive time. Not involving the president when the situation calls for it may result in a poor decision and perhaps cost the purchasing manager his / her position. When considered together, the lateral and vertical dimensions of involvement give the buying center a flexible measure of social influence. This flexible network of influence can also be evaluated from information processing perspectives. Extensivity and connectedness indicate the ability of the buying center to process information quickly and accurately (Schroder et al. 1966). Finally, the importance of the centrality of the purchasing manager should be clear. For purchasing managers desiring to increase their influence, positioning themselves at the center of the communications network seems a viable strategy. For the industrial marketer the purchasing manager is often the most easily reached member of the buying center. When the purchasing manager's centrality is likely to be high, it may be sufficient only to persuade him/her on one's product. When the purchasing manager's centrality is likely to be low, contacting other members of the buying center seems advisable. An understanding of the five dimensions of the buying center and their correlates is important for industrial marketers,

especially for key account strategies, and purchasing managers who desire to truly manage the industrial buying process. By determining the actual decision processes within the organization, purchasing management is likely to discover methods to increase communication efficiency and reduce the time required to complete the strategy.

It is important to stress that the work reported here must be thought of as exploratory, in the sense that the number of companies sampled is small, the measures rough, and the fledgling systems

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perspective element somewhat inelegant. However, the research does represent a first step toward modeling and measuring a dynamic system with relational variables. Furure research, using this approach, could do well to consider how personal and organizational factors affect interaction patterns in the buying center. Do certain organizational designs result in different interaction patterns than others? Do certain kinds of personalities engage in different interaction patterns? These are issues for future examination.

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