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Thomas Brashear Alejandro, Christian Kowalkowski, João Gustavo da Silva Freire Ritter,
Renato Zancan Marchetti and Paulo Henrique Prado

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INFORMATION SEARCH IN COMPLEX INDUSTRIAL BUYING: EMPIRICAL EVIDENCE FROM BRAZIL

Thomas Brashear Alejandro*
Isenberg School of Management
University of Massachusetts Amherst
Amherst, MA 01003
E-mail: brashear@mktg.umass.edu

Christian Kowalkowski
Department of Management and Engineering
Linköping University
SE-581 83 Linköping, Sweden
E-mail: christian.kowalkowski@liu.se

João Gustavo da Silva Freire Ritter
Pontifícia Universidade Católica do Paraná – PUC/PR
Curitiba, Parana, Brazil

Renato Zancan Marchetti
Programa de Pos-Graduação em Administração – PPAD/PUCPR
Pontifícia Universidade Católica do Paraná – PUC/PR
Curitiba, Parana, Brazil

Paulo Henrique Prado
Centro de Pesquisa e Pós-Graduação em Administração
/Universidade Federal do Paraná - CEPPAD/UFPR
Curitiba, Parana, Brazil

ABSTRACT

This study develops and tests a model of information search in complex buying. We incorporate three categories of influences of organizational, personal and situational factors that affect information searching efforts. A sample of 96 of the largest Brazilian firms reported their use of the various influences in the decision to purchase integrated business management systems. Findings show that formalization of the organization is a key driver of information search efforts. Situational characteristics of importance, novelty and bargaining power increased the level of information search. Also, conformity of the purchasing agent and organizational centralization reduce information search efforts among the sampled Brazilian firms.

Keywords: Complex buying, Information search, Information sources, Brazil

INTRODUCTION

Regardless of industry, purchasing is generally perceived as a core activity of companies (van Weele, 2004). The development in information technologies has enabled buyers to source more broadly, for example by using software agents and bots to collect and display market data and facilitate buying decisions (Hertweck, Rakes, & Rees, 2009). In a study of global manufacturing, Deloitte (2003) noted a mounting complexity across industries, markets, and supply networks makes, the search and coordination of information more demanding. As the importance, complexity, uncertainty, and time pressure associated with an organizational purchase increase, the information search needs to be more active, with a wider variety of information sources to be used to facilitate the purchase decision. Because industrial buying behavior is generally “a multi-phase, multi-person, multi-departmental, and multi-objective process” (Johnston & Lewin, 1996, p. 1), the increasing complexity and dynamics of industrial buying puts even more requisites on active information searches throughout the purchasing process.

We highlight three key gaps that are the rationale for this research. First, most studies combine types of buying situations which may cloud the findings. The utilization and influence of information sources are likely to differ depending on the type of buying (e.g. basic or complex offerings) and the buyer’s characteristics (Johnston & Lewin, 1996). We focus on one type of complex buying situation to determine what drives the complex information search effort among four key categories of information sources: personal, commercial, media, and experiential (e.g. Brossard, 1998; Davig, 1980; Moriarty & Spekman, 1984). Secondly, the use of high technology and the Internet have changed the dynamics of information search. The vast majority of existing research was conducted prior to this rapid influx of technologies. We focus on the

wider range of information sources, how they use them, and how they evaluate them in this new technology enriched information environment. Third, Zheng et al. (2007) calls for more research in purchasing practices in emerging economies such as Brazil, China, and India. Recent empirical studies of purchasing practices are generally based on data from North America or Europe (e.g. Anderson et al., 2000; Bienstock & Reine, 2007; Paulraj et al., 2006; Juha & Pentti, 2008; Ogden et al., 2007; Snijders & Tazelaar, 2005; Garrido & Gutierrez 2004). These have been primarily stable economies with extensive experience of complex buying and access to established global information sources. Our use of Brazil, a big emerging market, provides more insight from a unique market environment highlighted by an increasing need for information in complex buying decisions.

We focus on an industrial purchase decision related to those growing demands, the acquisition of enterprise resource planning (ERP) systems. This type of system is intended to support all the needs for information for managerial decision-making for a business venture as a whole. Recently, there has been increasingly strong demand for these systems from Brazilian firms and some projections indicate that by 2012, the total value of the Brazilian IT market should pass US\$ 32 billion (Business Monitor International, 2009). Brazil's economy may overtake Italy by 2025, France by 2031, along with UK and Germany by 2036 according to the Goldman Sachs Financial Workbench (Goldman Sachs, 2003). The consequent growth of complex buying and selling situations obliges an increase of studies in this area. However, despite Ribeiro et al.'s (2009) call for more knowledge generation about the business markets within the Brazilian context, to the best of our knowledge, there are no studies of industrial complex buying behavior except for a dated study of buying behavior (Davig, 1980). Thus, a study of the Brazilian market contributes not only by extending existing knowledge on

information seeking in industrial buying, but also by being conducted in a compelling and under researched context.

The findings of this study show that the organizational formalization of the buying process and the buyer's bargaining power are positively related to the effort to search for information, whereas organizational centralization, personal attributes of conforming, and the importance and novelty attributed to the purchase were negatively related. We also show how different buying behavior characteristics relate to the use of different information sources and find evidence that some common assumptions about information seeking may not hold in complex buying contexts. Our findings also show that although personal information sources are considered the most trustworthy, commercial information sources were the most utilized source by industrial buyers.

The remainder of the paper is structured as follows. We begin with a review of the relevant literature on information sources in industrial buying processes. Drawing upon these foundations, a research model with eleven hypotheses is proposed. We present a description of the research methodology and data analysis in the next section, followed by the findings of this study. Finally, we conclude by discussing the study's theoretical and managerial implications, its limitations and suggestions for future research.

SOURCES OF INFORMATION IN COMPLEX INDUSTRIAL BUYING

A key matter for effective marketing activities by selling firms is the understanding of their existing and potential clients' buying behavior (McQuiston 1989; Johnston & Lewin, 1996). It includes the identification of information sources utilized by clients during their buying decision and the understanding of what factors influence their actual search effort. Therefore,

even if such an understanding can be difficult to achieve due to the complexity of communication networks, knowledge about clients' information seeking is of major concern of industrial marketing professionals.

Research on industrial buying behavior has shown the importance of personal and commercial information sources and the considerable influence of the industrial sales representative during the buying decision process. Buyers are likely to utilize commercial sources of information to a greater extent during the earlier stages of the decision process, whereas personal sources of information may become more important as the decision process progresses (Johnston & Lewin, 1996). Furthermore, compared to buying situations with low complexity, buyers rely more heavily on personal sources of information in complex buying situations (Bienstock & Royne, 2007; Kennedy & Deeter-Schmelz, 2001).

Studies suggest that the information provided by a trusted party is used more and therefore provides more value to the buying firm (e.g. Moorman, Deshpande, & Zaltman, 1993). Buyers come to trust salespersons (sales calls or business presentations) mainly at the stage of need recognition and later in the stage of seeking alternative sellers (Moriarty & Spekman, 1984). In the industrial buying context, both trust of the salesperson and trust of the selling firm do increase the probability that buyers expect doing continued and future business with the selling firm (Doney & Cannon, 1997). Furthermore, industrial buyers place more trust in personal and commercial sources when the buying decision involves high levels of conflict. More specifically, industrial buyers seem to trust more in personal and commercial information sources when high levels of economic risk are involved in the purchase (Brossard, 1998).

However, despite the great deal of trust generally placed in information provided by sales representatives, Moriarty and Spekman (1984) note that buyers also consider the content of this

information as biased and may not fully trust (or even believe) parts of the sales presentation. Additionally, the authors show that as the buying decision process advances, there is also a considerable increased dependence on personal and non-commercial information sources on the part of buyers, such as consultants outside of the organization. More recent studies also point at the importance of establishing trust-building structural mechanisms in relatively new sources of information, such as online B2B marketplaces, in order to increase trust in the selling firm (e.g. Pavlou, 2002).

To sum up, industrial buyers generally use multiple information sources during a complex decision making process, which allows them to check the quality of their information and, consequently, lower their uncertainty in the decision-making process. This broad access to different sources allows buyer companies in search of credibility to compare the information obtained from one source with that of the other sources (Spekman & Stern, 1979). Suppliers who deal with these processes should not restrict their efforts to one or two communication tools but rather consider a mix of these instruments.

MODEL AND HYPOTHESES

In buying situations, a search for information can be conceived as the effort of the buyer to research internal and external environments in order to identify and monitor the information sources that are relevant to the buying decision (Bunn, 1993). In addition to seeking to identify the main sources of information that influenced the purchase of the integrated business management systems, this study sought to analyze the main variables that influenced the effort to seek information from industrial buyers. The variables included in the analysis were those which, based on previous studies, were expected to contribute to our ability to explain the drivers of

information search effort during complex buying and to synthesize and extend the broad research base. Although most previous studies have looked only at an explicative set of variables, an effort was made in this study to combine a series of different variables in order to obtain a more complete view of the factors that affect the search for information.

Our review of the literature provided the foundation for our research model presented in Figure 1. Our model focuses on three sets of variables: (1) organizational influences – where the focus was on organizational centralization and formalization; (2) personal influences – seeking to evaluate the influence of factors such as originality, conformity to rules and stakeholding of the participants on the result of the decision; and (3) situational influences – such as novelty, importance and uncertainty in the task of buying, the bargaining power of the buyer, the extent of choice and the existence of reciprocity between companies. In the following paragraphs, we develop the hypotheses for each set of variables in our model.

Centralization

Centralized organizations are characterized as hierarchical structures with the headquarters making most of the critical decisions (Ghoshal & Nohria, 1989). According to Kohli and Jaworski (1990), this centralized decision-making is evidenced by a lack of delegation of authority and a lack of multiple party participation in decisions or the processes leading to a course of action. In a highly centralized buying center, there is less member participation in decision making (Spekman & Stern, 1979) and the degree of search; evaluation and authority to buy are directed from the top (Lau, Goh & Phua, 1999).

Decentralized organizations provide more opportunities for member participation in the buying process and buying center members are more likely to interact and exchange information

with one another (Dawes, Lee, & Dowling, 1998). As complex buying decisions tend to be made by a group rather than an individual (Dhar, Menon & Maach, 2004), decentralizing the decision making process leads to enhanced interaction, information search and information exchange.

Thus, low levels of centralization facilitate the interpersonal communication and member participation in the buying decision process. Greater participation in the decision process implies more additional lateral communication networks, which facilitate the search effort and acquisition of more extensive purchasing-related information (Spekman & Stern, 1979).

Accordingly, we propose the following hypothesis:

H1: Organizational centralization is negatively related to the information search effort.

Formalization

Formalization, like centralization, is a focal construct in the analysis organizational structure and intra-organizational relationships (Ghoshal & Nohria, 1989). In a highly formalized organization, job descriptions are explicit, organizational rules are specified, and there are clearly defined procedures covering work processes (Klebba & Dwyer, 1981). In our context, we regard formalization as the extent to which the conventions, guidelines, and routines of the buying process are mandated (Johnston and Bonoma 1981; Lau, Goh & Phua, 1999). Complex buying decisions require extensive detailed stage-gate routines for analyzing new tasks and high-tech products (Grønhaug, 1977). Thus, a clear decision making procedure of complex buying is available in buying centers involving high formalization.

In complex purchasing tasks, the stage of seeking information, like the other stages of a buying process, tends to follow the patterns that have been explicitly established, and the

decision seems to be based on routinely used information sources (Lau, Goh & Phua, 1999). The purchasing agent or buyer, while playing a key role, is just one of a number of gatherers and users of information (Jennings & Plank, 1995). Thorough practice and execution of the formalized procedures ensures member participation, which leads to greater effort to information search effort. In addition, a formalized information search process implies search routines, which is simply stated as a tendency to rely upon certain sources of information (Webster, 1965). In this way, high levels of formalization of the buying center processes facilitates the coverage of all the important information sources and avoids the risk of missing, or not attending to some key information sources. Thus, we hypothesize the following:

H2: Organizational formalization is positively related to the information search effort.

Stakeholding

Stakeholding refers to the motivation of participants to increase their influence on large scale organizational buying decisions (Dawes, Lee & Dowling, 1998). This implies that the decision, albeit proposed to be rational, may also tend to depend on personal characteristics and needs of decision makers. Stakeholding explains how people are motivated to increase their influence in large-scale organizational purchasing decisions (Patchen 1974) and buying center members with greater stakeholding are motivated to increase their participation in the decision making process (McQuiston & Dickson, 1991). Those that perceive themselves as lesser stakeholders, have less motivation to spend time communicating with other members in the buying center. High stakeholder beliefs can lead to greater access to resources such as information (Dawes, Lee, & Dowling, 1998).

In a complex industrial buying situation, experts, specialists, and other professionals with technical expertise and knowledge may be needed to evaluate the available alternatives (Lau, Goh, & Phua, 1999). Although it is traditionally thought that the active information search effort is often relegated to the purchasing agents because it is presumed to be their job responsibility (Sheth, 1973), if the other team members perceive more stakeholding, their personal stake in the decision is increased and they will participate in the information search more actively (Dawes, Lee & Dowling, 1998). Thus the degree to which a person believes they are accountable, or stakeholding, affects the information search effort. Based on this, the following hypothesis is proposed:

H3: Stakeholding is positively related to the information search effort.

Innovative Orientation

Originality and rule conformity are two principle dimensions of innovative orientation (Kirton 1976). In the buying process or purchase decision, originality is expressed through an unorthodox approach to problem solving, idea generation and lack of boundaries. Less innovative individuals, in contrast, restrict their behavior to the socially acceptable and tend to be disciplined, risk avoiders, and conform to rules and authority (Bagozzi & Foxall, 1996; Dawes, Lee & Dowling, 1998).

The originality and conformity of the key players in a buying center will affect the search, awareness and flow of information among the key decision makers. Purchasing agents with a high innovative orientation should be more sensitive to and aware of a number of different information sources (Moriarty & Spekman 1984). They are the primary contact point for most

information and in particular with sales representatives, considered the most important source of information in the context of complex industrial buying (Abratt, 1986). Further, as a key node in the communications network (Keller 1986); the purchasing agents are often both buyers and gatekeepers who control the flow of information into the buying center (Webster & Wind, 1972). Thus, more innovative purchasing agents provide greater access to the information flow (Dawes, Lee & Dowling 1998), which means that the buying center spends more effort on information search. Originality and lack of rule conformity trigger both the search by the key players but also an unorthodox pattern to look for unconventional and non-role specific information.

Accordingly, we hypothesize that:

H4: Originality is positively related to the information search effort.

H5: Rule conformity is negatively related to the information search effort.

Novelty of Buying Situation

Individuals participating in buying decisions have varying degrees of experience with the product, service or specific buying situation. McQuiston (1989) refers to the lack of experience with similar situations as novelty. Greater novelty suggests a higher likelihood of a more broad, more timely and extended information gathering process (Robinson, Faris, & Wind, 1968). Thus, the novelty of the purchase can affect industrial buying behavior (Hanssens & Weitz, 1980 Garrido & Gutierrez 2004). These studies show that when the buying situation is more novel, there is greater insecurity and more departments and divisions may be required to participate in

the buying process as a way of seeking relevant experience and knowledge (McQuiston, 1989; Garrido & Gutierrez 2004).

Novelty increases the number of players in the decision making process and the increased participation requires more communication and information search in the buying process (Johnston & Bonoma, 1981). That is, purchasing agents need more information. This activates the buying centers' various roles and the aforementioned prescribed information gathering mechanisms of each role (Lau, Goh, & Phua, 1999), resulting in a more extensive information search. Therefore the degree of novelty of the purchase increases information search. Thus, we propose the following hypothesis:

H6: The degree of novelty of buying is positively related to the information search effort.

Importance

Complex buying implies a higher level of risk and importance in the buying decision. The level of importance of the purchase is determined by the purchaser or buying center member's belief that the decision is highly instrumental to the functioning, effectiveness and performance of the organization (Bunn, 1993). The level of importance drives the number and level of participants (Johnston & Bonoma, 1981; Reve & Johansen, 1982; Garrido & Gutierrez 2004). The amount of communication offered for consideration also increases when there is greater perceived importance (McQuiston, 1989) and the need for more detailed data increases with importance of the purchase (Kraljic, 1983). Thus, buying center members will make greater effort to information search effort when they perceive greater importance of purchase. Based on this, we hypothesize that:

H7: Importance of buying is positively related to the information search effort.

Uncertainty

Industrial buyers make an effort to optimize their information search when the situation involves a higher degree of risk and/or uncertainty when it comes to making decisions (Spekman & Ford, 1977). Uncertainty is the likelihood that a purchase will lead to undesirable consequences; or, the difference perceived between what would have been the best possible buying decision and the decision actually made (Lau, Goh & Phua, 1999). In an uncertain buying situation, more people and more specialized personnel may be involved to tap more sources of information to reduce uncertainty (Kohli, 1989; Lau, Goh, & Phua, 1999). When confronted with higher environmental uncertainty, buying groups will have stronger information needs and adopt a continuous gathering and processing of information regarding the environment (Spekman & Stern, 1979). Garrido & Gutierrez (2004) found that perceived risk was significantly related to participation in a complex buying situation. Thus, we expect there is greater information search effort when coping with uncertainty and hypothesize that:

H8: Uncertainty is positively related to the information search effort.

Bargaining Power

Relative bargaining power of buyers is a key competitive force (Porter, 1981). The power of the buyer may be defined as the perception by the buyer of the negotiating power of the company in a particular buying decision (Bunn, 1993). The purchasing agent as a boundary spanner for the buying firm represents the bargaining power of the whole firm and not just the

individual. For example, purchasing agents with access to such information as alternative products and suppliers can influence the buying process by withholding the information or controlling the timing and manner of its dissemination (Kohli, 1989). Thus, we expect the purchasing agents to have strong motivation to search more information to attain such competitive advantage in negotiation with their counterparts in the selling firm. Besides, comparing the six industrial buying decision approaches observed by Bunn (1993), we find that the information search effort has a tendency to increase as the buyer power increases. When the industrial buyer's bargaining power is high, there is a tendency to intensify the information search effort in order to obtain the maximum amount of information possible (prices practiced by alternative suppliers, factors related to the supplier's costs, demand for the type of product being purchased, etc.) which may prove to be useful during negotiations. Based on this, we hypothesize that:

H9: Bargaining power is positively related to the information search effort.

Extent of Choice

Each buying decision involves the evaluation of potential options or alternatives. The variety and availability of alternatives is considered the extent of choice (Bunn 1993). The choices include the possible products or services that fulfill the buyers' needs but also the extent of potential partners or suppliers (Cannon and Perreault 1999). In complex purchases, the uniqueness of the specifications potentially narrows the available options with regard to products or suppliers who can fulfill the requirements. However, Bunn (1993) found that the extensiveness of choice set and effort to search are greater for complex modified rebuys than for

simple rebuys. Moon and Tikoo (2002) extend that finding and show that extensiveness of choice is a distinguishing characteristic of more complex buying situations for both buyers (hospitals) and users (doctors). Webster (1965) notes that purchasing agents must continue and expand their information search efforts until they identify a sufficiently large number of alternatives. Referring back to the procedures or formalization, these extended searches are typically based on the search rules that require a set number of alternatives before a decision or selection process proceeds. The information search effort when the number of available suppliers or products is high also intensifies to provide sufficient information to make diligent comparisons. Thus, if purchasing agents perceive a greater extensiveness of choice set (product or supplier), the elimination of alternatives requires greater information search to make the comparisons. Based on this, we propose the following hypothesis:

H10: Extensiveness of choice is positively related to the information search.

Reciprocity

Reciprocity is a social norm of behavior wherein those that receive something are in turn obliged to “reciprocate” or return the favor (Gouldner, 1960). Reciprocity in industrial markets has evolved as partners in exchange begin to substitute the traditional transactional exchange for a more relational approach with attitudes and perspectives toward the long term (e.g. Grönroos, 2004). In such relationships within firms, with clients, distributors, and suppliers, companies are closer and more collaborative (Stump & Sriram, 1997). Bagozzi (1995) considers reciprocity as the core of marketing relationships. In the marketing network, it is an important component in

relational tie strength (Rindfleisch & Moorman, 2001) and a significant predictor of certain relationship types (Cannon & Perreault, 1999).

The varying parties in a buying center or complex buying decision, when the norm of reciprocity is in effect, gain an understanding of mutual benefit, shared benefit and burden, along with suggesting a repayment in kind of the efforts of the partner to maintain the relationship (Macneil 1980). Greater reciprocity is more likely associated with a sharing relationship (Tong et al., 2008) wherein firms both contribute to and procure from a collective pool of resources on an as needed basis (Fiske, 1992). Reciprocity affects information sharing internally and externally. Johnston and Lewin (1996) consider it a key link between the buying and selling firms and it is considered a key element in building long term relationships (Dwyer, Schurr & Oh, 1987). In relationships with high reciprocity, firms share information at multiple levels openly and informally, rather than worrying about information being used against them in future renegotiations or leaking out to their competitors (Brady, Davies & Gann, 2005). Higher levels of reciprocity will lead to greater active information sharing between buying centers and suppliers. Thus, buyers search more for information from their partners and use the network connections that each buyer center member has with the other organization. Likewise, these connections free up resources which allow for a broader search of information needed in the complex buying decision. Accordingly, we hypothesize that:

H11: Reciprocity is positively related to the information search effort.

METHOD

Data Collection

The sampling frame included 1,000 of Brazil's largest companies chosen from the annual classification by the *Gazeta Mercantil*, a leading business periodical in Brazil. Questionnaires were sent to the head offices of these companies and addressed to the chief executive of each company. In the introductory letter, the executives were requested to select the most suitable professional (Kumar, Stern & Anderson 1993) to complete the questionnaire in order to ensure that the respondent would indeed be participating effectively in the decision making process for the purchase of the integrated management systems. Two different and complementary strategies were used to collect data: (1) a structured printed questionnaire that could be returned postage paid; and (2) a structured questionnaire available online. To capture a range of industries and decision making processes in the Brazilian market, companies from 22 states were sent initial contact letters. Approximately 85 percent of the companies were in the top 9 industrialized states of São Paulo, Rio de Janeiro, Minas Gerais, Rio Grande do Sul, Paraná, Bahia, Distrito Federal, Santa Catarina, and Espírito Santo.

A review found that 938 packets were correctly delivered to the companies and 195 were returned completed. The return rate of the questionnaires was approximately 21%. Because the main aim of the study was to analyze the information search effort by companies who were acquiring an integrated management system, only 96 of the 195 returned questionnaires (49.23%) were considered valid for the data treatment. The other questionnaires were excluded as they had not acquired an integrated management system in the last five years.

Measures and Analysis

The measures used in the study were adopted and revised from previous studies and were assessed with multiple items except for formalization and extent of choice. A list of the measurement items and their sources are shown in Table 1. In the development of the survey and assessment of measures, we adhered to recommended procedures to assure validity (e.g., Netemeyer, Brashear, & Boles 2004). The “conceptual equivalence” (Singh 1995) was assessed prior to the survey development by the team of researchers by determining that the concepts were commonly used and operational in the Brazilian business context. Additionally, to assure “translational equivalence” of the questionnaire, we conformed to proposed procedures for back translation and checks for consistency (Kumar 2000; Van de Vijver & Leung, 1997). Finally, in the measurement evaluation, we found “factorial invariance” in all items loaded on their respective factors (Singh 1995). These procedures provide confidence that the measures have high degrees of validity. The reliabilities and average variance extracted are shown in Table 1. The data were analyzed using Partial Least Squares (PLS) based on the considerations of sample size and distribution characteristics (Falk & Miller, 1992; Wold, 1982).

Insert Table 1 around here

Composite reliability and average variance extracted were assessed as recommended evaluations for construct reliability and validity (Fornell and Larcker 1981). The constructs all met or exceeded the value recommended for composite reliability of .70 as seen in Table 1. Except for Originality, all average variance extracted measures exceeded .50 or above, which is sufficient according to Bollen (1989). Discriminant validity was assessed by comparing the average variance extracted and the square of correlation between the constructs (Fornell &

Larcker 1981). Correlations are seen in Table 2 and by comparison, the average variance extracted exceeded the squared correlations which indicate discriminate validity of the latent variables. We therefore conclude there are no serious limitations with regard to the measurement.

Insert Table 2 around here

RESULTS

Testing the Hypotheses

The test of the proposed model was conducted using the PLS technique with latent variables (Falk & Miller, 1992). The results of this analysis are given in Figure 1. For the proposed model, the relationships among the independent variables of Stakeholding, Originality, Uncertainty, Extent of Choice, Reciprocity and the dependent variable cannot be considered significant.

Insert Figure 1 around here

Organizational Influences on the Information Search Effort

The first hypothesis was supported, as the greater the centralization of the choice process, the less intense the information search effort, corroborating the findings of Lau, Goh and Phua (1999). Accordingly, as more people take control over one or more stages of the decision process, the decision making becomes more decentralized, leaving the responsibility for improving the result of the decision to the involvement and dedication of employees, which leads to an effort to intensify the information search effort. In ERP (Enterprise Resource Planning)

buying processes, these different levels of centralization may occur because of the complexity of the system and the extent of different areas involved in specifying and deciding the ERP components.

The second hypothesis, which posited a positive relationship between formalization and the information search effort, was also supported. This result indicates that the increased information search effort can be attributed to the fact that formalization implies that all steps in the formal decision-making process are completed. Thus, there is a thorough information search effort taking place within the organization whereas in less formalized organizations and processes with lower degrees of routinization, a lot of the available or existing expected information search may be left out.

Personal Influences on the Information Search Effort

Hypotheses H3 and H4, concerning the influence of the stakeholding and originality of the respondent, were not corroborated because their parameter coefficients are not significant at a $p < .05$ level. Usually the ERP buying process involves different departments of an enterprise (production, finance, marketing, human resources, etc), which suggests that the decision responsibility and its consequences were shared among different organizational buying center members. The results suggest that the search effort for decision relevant information does not have a direct relationship with the decision maker perception about the eventual personal consequences if some problems occur.

However, H5, suggesting that the higher the level of conformity to rules reduced information search effort, was corroborated. Conformity to work standards implies that the decision-making process is followed and, thus, that information is thoroughly searched for in the

buying process. This is in agreement with the proposal of Kirton (1980) and suggests that more innovative managers (who conform less to the organizational rules) with better professional qualifications and less averse to risk, tend to be more open. These managers will normally look for information generated outside of the organization and are less likely to conform to the status quo of looking at already approved criteria and lists of sellers (cf. Moriarty & Spekman, 1984).

Situational Influences on the Information Search Effort

The result for the sixth hypothesis was significant, but the direction of the relationship was opposite of what was proposed in the model, i.e., the greater the novelty of the purchase, the less intense the information search effort. This may indicate a certain amount of difficulty in obtaining information related to management systems, since it is such a complex subject. Additionally, the lack of familiarity of managers with these systems, as shown in the research results could also have a bearing on these opposite results (see averages and standard deviations in Table 3).

Likewise, the result of H7 was also opposite the prediction. This means that we found a negative relationship between importance and information search effort. This contradicts previous results (McQuiston, 1989; Brossard, 1998), which showed that the greater complexity and importance of the decision making process for the purchase seemed to lead buyers to place more emphasis on different personal and independent information sources. An ERP buying process is normally executed in a buying center with a relatively high number of participants from different departments and with different backgrounds and goals. As the importance grows, each participant probably focuses the information seeking task on his personal expertise, but not necessarily search for more sources. The result is a large amount of specific information to solve

each departmental problem related to the ERP, with the added focus in some sources (as will be discussed in next session) from the collective input of personal expertise.

However, the ninth hypothesis was supported. We predicted that the bargaining power of the company would result in a greater information search effort. It would appear that when the bargaining power of buyers is considered high they tend to intensify their information search effort to find arguments that could prove useful during negotiations with the chosen supplier (prices of alternative suppliers, factors pertaining to the costs of the supplier, demand for the type of product being purchased, etc.). In addition, an unbalanced power relationship between buyer and supplier makes firms less inclined to share information with each other (Lusch & Brown, 1996). Thus, compared with buyers in balanced power relationships, buyers with high buying power would in fact need to intensify their information search in order to find the required information.

Finally, hypotheses H8, H10 and H11 were rejected. The relationship between uncertainty, extent of choice and reciprocity with the information seeking effort were not supported. These results could be partly explained due to a one-sided relationship view. The reciprocity measurement items captured just the dependence on supplier and the supplier's concern about the client. Further research is needed to expand the knowledge about this relationship.

Additional Analysis

In order to enrich the findings, two additional analyses were performed. First, a comparison of utilization levels (frequency of consultation) and the trust of the buyers in these sources were performed. The results show that the commercial sources, which are often

connected to the manufacturer of the integrated management systems, were certainly the most used, followed by personal, experiential and media sources. As for trust on the part of the respondents, Figure 2 shows that personal sources were considered the most reliable, followed by experiential, commercial and media sources.

Insert Figure 2 around here

It can be seen that the most utilized sources were not the most reliable from the viewpoint of the buyer (commercial sources). This conclusion corroborates previous studies (Bonoma, 1983; Brossard, 1998; Dawes, Lee & Dowling, 1998) in that, despite being consulted frequently, the information sources connected to suppliers could benefit from the decision being made and, therefore, are seen as moderately reliable. This high rate of consulting can perhaps be explained by the highly complex integrated management system, which means that many features and technical specifications of the products are analyzed in detail. Furthermore, the lack of knowledge and experience of ERP buying processes may explain the lower usage frequency of the more trusted personal and experiential sources.

In order to enrich the analysis, the dependent variable information search effort is considered multidimensional, with four different theoretical dimensions: (1) commercial sources; (2) personal sources; (3) media sources; and (4) experiential sources. In this sense, in addition to the analysis presented here, a PLS analysis was also conducted in which the dependent variable was divided into the four information source dimensions. The results are shown in Table 3.

Insert Table 3 around here

Organizational Influences on the Use of Information Sources

The degree of centralization of the buying process negatively influences the use of personal, commercial and media information sources. These findings correspond to the negative relationship seen in Figure 1. It was not possible to verify the influence of this relationship on the use of experiential sources. Furthermore, the greater the formalization of the process, the greater the use of commercial, media and experiential information sources, which implies an increased effort to seek. However, this variable has an opposite effect when it comes to using personal sources. This fact can be accounted for by the nature of the purchase, which is complex and related to formal processes of the organization.

Personal Influences on the Use of Information Sources

When treated independently, stakeholding positively influences the information search effort from experiential and media sources, but has a negative influence on the use of commercial sources. Furthermore, the originality of the buyer has a positive influence on the search for commercial information, but has a negative influence on the use of experiential sources. Additionally, conformity to procedures increases the effort to seek information from commercial sources, but reduces the intensity of the use of personal sources. It would appear that many large firms with professional purchasing organizations actively try to thwart too long-term and personal relationships between purchasing agents and sales representatives, for example, by rotating buyers responsible for specific suppliers. This is because representatives from the buyer and supplier firm who spend more time together are more likely to form strong interpersonal relationships (Tuli, Kohli & Bharadwaj, 2007). Therefore, these firms prefer to search for what

they perceive as 'objective' and third-party information (such as information from external consultants) than for personal supplier sources.

Situational Influences on the Use of Information Sources

In this group of variables, the novelty of the purchase for the company means less use of media and experiential sources. This fact may be accounted for by the fact that there tends to be limited information written on novel offerings and that few people have experience with them. The importance of the purchase leads the company to use personal and experiential sources, which are considered to be the two most trustworthy sources. However, uncertainty of results of the process leads the company to increase its use of commercial and media sources and to reduce its use of experiential sources.

In the case of bargaining power of the buyer, the greater the power, the more the buyer will use the different sources of information available (personal, commercial, media and experiential). The extent of buying options leads to intensified use of commercial information, but less use of personal sources. Finally, the possibility of reciprocity among parties leads them to increase their use of personal and media information sources.

CONCLUSION

In this paper we have investigated complex industrial buying behavior in large Brazilian firms. The results show that organizational formalization influenced the information search effort positively ($B = .27$) whereas organizational centrality influenced it negatively ($B = -.19$). As for personal influences on the effort to seek information, the main influence results from the conformity of members of the purchase center to organizational rules and norms ($B = -.12$).

Finally, among the situational factors, those with greatest influence on the information search effort were found to be the importance and novelty of the purchase ($B = -.21$ and $B = -.15$ respectively) and the bargaining power of the buyer ($B = .21$).

Relevant consideration by both industrial marketing professionals and academic researchers should be given to the fact that the vast majority of the 938 returned questionnaires were completed by professionals connected to the field of computing and information technology, and not to the chief executives who initially received them. Certainly, marketing managers of ERP system suppliers should pay special attention to directing their communicational efforts to these members of the organizational purchase center, i.e. to the person with the most technical and specialized knowledge of the subject.

Theoretical Implications

This study contributes to industrial buying behavior theory in several ways. First, this research has synthesized a broad research base on the search for and information seeking efforts in complex industrial buying decision making. It has enabled us to better understand and explain the process of searching for information during the industrial buying process. For example, despite its central role for information search effort, commercial information sources linked to suppliers have previously received limited attention in comparison to personal and supplier specific information. This is particularly interesting in the light of the rapid growth of various forms of electronic information channels, such as online B2B marketplaces, because new technology influences purchasing practices and enables better information access, something that was not 'available' on a wide scale when many prior studies were conducted (e.g. Brossard,

1998; Davig, 1980; Moriarty & Spekman, 1984). As such, these sources and their usage may still be emerging.

Second, in addition to corroborating and extending previous research, this study has also illustrated how different buying behavior characteristics relate to the use of different information sources. Our analysis has shown that specific buying behavior characteristics either increased or reduced information search effort. At a more detailed level, we also found that different buying behavior characteristics lead to the use of different mixes of information sources. The utilization of different information sources across characteristics suggests possible strategies to match the information sources with the buying decision characteristics. Bargaining power however was the only characteristic that unanimously correlates positively with an increased effort to information search effort from all types of sources. Thus, high levels of bargaining power by buyers drive a broad range of information search sources.

Furthermore, the study also finds evidence that some common assumptions about information seeking may not hold in complex buying contexts. In fact, a high degree of novelty and importance of the purchase may actually reduce the buyer's efforts to search information, a finding that contradicts previous results on organizational buying (e.g., Brossard, 1998; McQuiston, 1989; Robinson, Paris & Wind, 1967). One may suggest that it is a lack of search but in contrast it may be only a limited use of the traditional sources. This would suggest a limitation in the measurement of the information search sources. Do innovative individuals go outside of the traditional information channels? By the definition of novelty and conformity to rules, this seems plausible. Finding new ways of doing things and nonconformity, would suggest alternative information sources. Of interest here is how those with high innovative orientations go about searching.

Third, this research is one of a very few empirical studies on buying behavior in non-English speaking countries, and as a study in one of the major emerging economies, Brazil, it is particularly timely (cf. Zheng et al., 2007; Ribeiro et al. 2009). As Guenzi, Georges, and Pardo (2009) point out, such a research contribution is valued since it may enable a cross-validation of constructs widely used in previous research and not previously tested in a broader context. Our results show that the scales do work well in the Brazilian context, contributing to the literature and laying a foundation for future work in this area in such a dynamic market.

Managerial Implications

For managers in the *buying firm*, our study shows that formalization has a positive effect on the effort to search information whereas centralization has a negative one. As purchasing is increasingly centralized in many national as well as multinational firms, there is a possible risk that the decision basis for the complex buying will worsen since the use of personal, commercial, and media information sources goes down and the overall information search effort decreases. On an individual level, rule conformity seems to have the same negative effect on the effort to search information. On the other hand, increased organizational formalization contributes positively to the information search as the quantity of information increases. It does not however show the quality and relevance of the information obtained. For example, personal sources are regarded the most reliable by industrial buyers and this is the only information source whose use decreased as the degree of formalization increases. Managers can now have available the opposite effects of these constructs/influences on their current buying processes or procedures. The distinction may also be that formalization provides a structure and roles prescriptions that do

not limit behavior. It allows for better information search efforts as it provides the framework and organizational knowledge, but without confinement.

In the buyer-supplier relationship, the greater the bargaining powers of the buyer, the greater the buyers' effort to seek information. Alternatively, powerful buyers can be in a better position to find relevant information and therefore use this position deliberately to find information that would give them an upper hand in negotiations with suppliers. This indicates that although high buying power is desirable for most firms, there may be a negative side effect - suppliers are less inclined to share information in high asymmetrical dependence situations or when they feel that they are being coerced. As a consequence, the buyer would need to intensify the search effort to overcome such limitations.

The findings with regard to novelty were contrary to our prediction and suggest that highly novel positions may reduce the scope of information search efforts. Novelty and a lower level of information search effort may reflect the limited availability of information sources. In the context of our study, the Brazilian marketplace has been growing but the market mechanisms that did not exist prior to the opening of the market may still be affecting the availability of information sources for certain complex buying decisions. In addition, the additional analysis shows that high levels of novelty were only slightly correlated with media and experiential sources and not correlated to commercial or personal sources. This suggests that in the case of ERP systems, commercial or personal sources, albeit the most often used and the most trusted, may not be available in highly novel complex buys at this point.

These findings can be used as a managerial guide to (a) Evaluate a firm's existing information practices and strategies in order to determine the 'optimal' effort for information searching and (b) Allocate the right resources and individuals to the right search efforts.

Obviously, too little effort to search information in complex industrial buying will have negative consequences. Managerial oversight of the search process is crucial and necessary since efforts to search information can be both costly and time consuming.

For managers in the *supplying firm*, it is important to understand the buyers' information-seeking strategies and information sources utilized, and how these are subject to change due to organizational, personal, and situational influences. Managing 'people aspects' in customer firms, i.e., providing customer personnel with appropriate information, is central to suppliers of complex products and solutions (Tuli, Kohli & Bharadwaj, 2007). Findings of our study also show that when there is an availability of options in suppliers or products (high extent of choice), buyers utilize commercial sources more frequently, and they are less inclined to use personal sources. Thus, the information sources that supplying firms should focus on in their marketing activities depend on such issues as how many suppliers are considered by the buying firm in order to make a final choice.

Another relevant finding is that, despite not being considered the most reliable, commercial information sources linked to suppliers of ERP systems were the most utilized source by industrial buyers. Given the complexity of these types of buying processes, there is a potential to achieve higher success by improving the trustworthiness of information sources connected to suppliers. Since suppliers' market communication often is inefficient and unconsidered (cf. Jensen & Jepsen, 2007), suppliers may also achieve higher success if they manage to improve their communication activities.

Finally, personal sources play a larger role if the purchase is important and the buying power strong. In such contexts, the quality and trustworthiness of sales representatives and other customer contacts becomes particularly important. Consequently, more customer-centric, rather

than product-centric sales cultures (Trailer & Dickie, 2006) are needed, as sellers with good relationships with buyers have more opportunities to affect the buyer's information search effort by influencing the value attached to certain information (Burger & Cann, 1995, p. 93).

Limitations and Future Research

A suggestion for future studies would be to test the model presented here in other situations involving complex decisions, such as the complex purchase of capital goods, the outsourcing of service operations, a decision on the location of an industrial plant, or the negotiation and forming of a strategic alliance. Furthermore, since we have analyzed buying behavior in large firms, it would be interesting to study middle-sized complex industrial buying centers and check whether the conclusions arrived at here can be replicated in these firms.

This study encourages further research into smaller, industrial buying centers such as those popular in Taiwan and to some degree, in South Africa. Compared to large buying centers, smaller ones differ in several ways, such as a lower degree of centralization and less bargaining power, characteristics that may influence the firms' information search effort.

Our results and conclusions must be considered in the light of certain limitations that need to be addressed in further empirical research. For example, although a study of buying behavior in Brazil is timely, the sole focus on Brazilian firms may also be regarded as a limitation.

Therefore, a wider sample of firms from different countries would better enable a cross-cultural validation of constructs. Such research could also incorporate other contextual factors such as culture, which we did not investigate in this study. Other limitations of the study derive from the fact that we analyzed complex industrial buying concerning one type of offerings only (i.e., ERP systems) and that we used a single informant per firm.

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Table 1. Measurements of the constructs

Constructs	Scale	Items of the Scales	Composite Reliability	AVE
Information search effort in industrial buying	(1) “source never used” to (5) “source greatly used”	(1) personal sources; (2) commercial sources; (3) media sources; (4) experiential sources.	.78	.50
Organizational Centralization (Dawes et al., 1999; Lau, Goh & Phua, 1999)	(1) “I totally disagree” to (5) “I fully agree”	(a) front line managers have no power to determine the purchase of equipment and supplies; and (b) the front line managers have a great deal of power about the establishment of a new project or program.	.83	.71
Organizational Formalization (Dawes et al., 1999; Lau, Goh & Phua, 1999)	(1) “I totally disagree” to (5) “I fully agree”	(a) in our organization, in places where there are standards and patterns about how work should be done, there is heavy supervision of employees to ensure conformity to these standards.	N/A	N/A
Stakeholding (Dawes et al., 1999)	(1) “few consequences for me” to (5) “many consequences for me”	The respondents were requested to indicate what the personal consequences would be for them if the integrated management systems had the following characteristics: (a) difficult to expand; (b) less reliable than expected; (c) more difficult to operate than expected (less user friendly); and (d) requires more technical back up and servicing than expected.	.84	.58
Originality (Dawes et al., 1999)	(1) “never”, to (5) “always”	(a) I have new perspectives about analyzing old problems; (b) I think of something different when I’m in difficulty; (c) I spread ideas; (d) I have original ideas; (e) I take risks trying to do things differently.	.74	.42
Conformity to the rules (Dawes et al., 1999)	(1) “never” to (5) “always”.	(a) I conform to the company rules; (b) I adapt to the system quickly;	.74	.59
Novelty of purchase (Lau, Goh & Phua, 1999; McQuiston, 1989)	(1) “I totally disagree” to (5) “I fully agree”:	(a) Our company had previous experience in making decisions about buying this type of integrated management system; (b) the purchase was a new or unique situation for our organization; and (c) the purchase of this integrated management system was something very familiar for our organization.	.82	.61
Importance of purchase (Lau, Goh & Phua, 1999; Bunn, 1993).	(1) “I totally disagree” to (5) “I fully agree”:	(a) The integrated management system has a significant effect on the profitability of our company; (b) if the system fails; this will mean high total costs (including non-monetary costs) for our organization.	.78	.65
Uncertainty of the task (Lau, Goh & Phua, 1999)	(1) “I totally disagree” to (5) “I fully agree”:	(a) I was sure about the performance of the integrated management system even before it was bought; (b) the probability of making a wrong decision is high for this type of integrated management system.	.71	.56

Table 1. Measurements of the constructs involved in the proposed model (continued)

Constructs	Scale	Items of Scales	Composite Reliability	Average Variance Extracted
Bargaining power of the buyer (Bunn, 1993)	(1) "I totally disagree" to (5) "I fully agree":	(a) the integrated management system bought by our organization is standardized or non-customized; and (b) the eventual costs resulting from a change of supplier are considered low for our company.	0.66	0.50
Extent of choice (Bunn, 1993)	: (a) 1 – 2 suppliers; (b) 3 – 4 suppliers; (c) 5 – 6 suppliers; (d) 7 – 8 suppliers; and (e) over 8 suppliers	Indication of how many suppliers were considered in order to make the final choice.	N/A	N/A
Reciprocity (Stump & Sriram, 1997)	(1) "I totally disagree" to (5) "I fully agree":	(a) We feel dependent on the supplier of this integrated business management system; and (b) the supplier of the integrated management system is concerned with our interests.	0.77	0.62

Table 2. Mean, standard deviation and correlation matrix

	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12
1. Centralization	2.32	.80	1											
2. Formalization	3.50	.77	-.18	1										
3. Stakeholding	3.88	.69	-.15	.13	1									
4. Originality	3.92	.47	-.09	.12	.16	1								
5. Conformity	3.08	.54	.14	-.01	-.16	-.19	1							
6. Novelty	3.55	.83	.20	-.18	.11	.00	-.13	1						
7. Importance	3.91	.64	.03	.26	-.10	.13	.17	-.10	1					
8. Uncertainty	2.83	.79	-.06	.00	.01	.09	-.05	.06	.05	1				
9. Bargain	2.23	.84	-.12	.10	-.00	.23	-.09	.03	.02	.25	1			
10. Extent of Choice	1.93	.90	.22	-.14	.06	.05	-.04	.28	.01	.01	.06	1		
11. Reciprocity	3.37	.52	-.16	-.19	-.04	-.13	-.12	.08	-.27	.16	.10	-.04	1	
12. Information Search	2.97	.55	-.34	.29	.16	.14	-.21	-.17	-.16	.10	.28	-.08	.12	1

Table 3. Independent variables related to the use of different information sources

	Centralization	Formalization	Stakeholding	Originality	Conformity	Novelty	Importance	Uncertainty	Bargaining Power	Extent of Choice	Reciprocity
Personal Sources	-.28*	-.21*	.07 ^{ns}	.06 ^{ns}	-.16*	-.01 ^{ns}	.31*	-.03 ^{ns}	.26*	-.16*	.25*
Commercial Sources	-.32*	.20*	-.11*	.22*	.32*	.06 ^{ns}	-.06 ^{ns}	.27*	.10*	.20*	-.01 ^{ns}
Media Sources	-.17*	.17*	.11*	-.02 ^{ns}	-.02 ^{ns}	-.12*	-.07 ^{ns}	.12 ^{ns}	.17*	-.07 ^{ns}	.16*
Experiential sources	.06 ^{ns}	.10*	.18*	-.12 ^{ns}	-.04 ^{ns}	-.17*	.17*	-.13*	.28*	-.03 ^{ns}	-.07 ^{ns}

* Relationships are considered significant at $p < .05$ indicated by Falk & Miller (1992)

^{ns} Relationships are considered non-significant

Figure 2. Usage of and trust in information sources

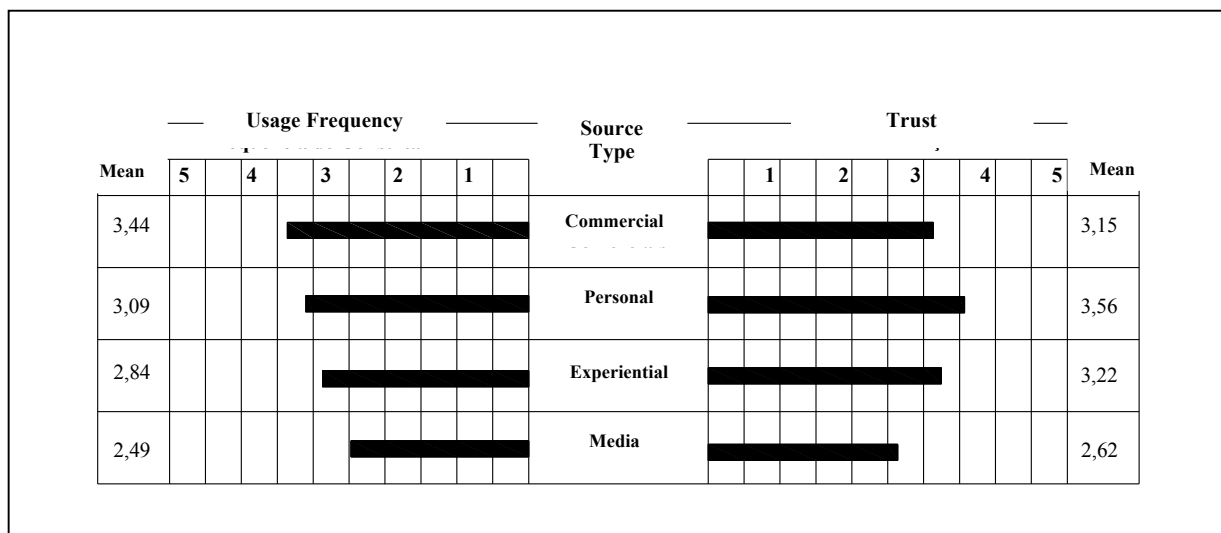


Figure 1– Model and Results

