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A behavioral study of supply manager decision-making: Factors influencing make versus buy evaluation

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Abstract

This paper investigates behavioral factors influencing a supply manager's decision to insource or outsource the manufacture of a product component. To do so we posit a theoretical framework that integrates the heretofore distinct operational make–buy literature and the behavioral decision-making literature. Within the framework three factors influencing the make–buy decision are brought into account: the decision-maker's perception of supply risk or ''strategic vulnerability'', the degree of core competency represented by the product component under consideration and the formality of the information about supply alternatives. The results of a controlled experimental survey show that: strategic vulnerability and core competency do influence the make–buy decision, strategic vulnerability has greater influence than core competency and information formality moderates the make–buy decision when the strategic vulnerability and core competency conditions are mixed. The practical implications of these results include the notion that management can ensure a more rational make–buy decision if they understand the biases that influence the decision and point these biases out to the decision maker.

Keywords: Outsourcing; Supply chain; Behavioral decision making; Experiment; Purchasing; Supply risk

1. Introduction

Outsourcing in general, and the make–buy decision in particular, are important and recurring operational issues in contemporary supply chain management. Firms can use outsourcing to leverage the organization's internal and external resources, capabilities and competencies. In particular, the decision to insource or outsource an existing part or sub-assembly could allow a firm to free up needed resources to focus on more important, newer or higher return processes and opportunities. As such, make–buy decision-making takes on a critical importance (Stock and Tatikonda, 2000; McIvor, 2005; Leenders et al., 2006).

The study of the make–buy decision has typically assumed that the ''firm'' makes the decision using an economic utility model to best serve the long-term goals of the company. However, the employees that make the decisions (e.g., supply chain managers, purchasing agents or materials managers) are human, and human decision-making is ''bounded'' in its ability to acquire and process information. Humans tend to use simplifying heuristics to deal with complex problems (Simon, 1997). These heuristics are generally effective in decision-making. They help to filter and assimilate the data. Heuristics are especially likely to drive the decision outcome when the decision process enters a ''gray'' area where there is no clearly dominant best alternative.

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To address the issue of human involvement in the make–buy decision, we integrate two sets of literature: the *operational make–buy literature* and the *behavioral decision-making literature*. The operational make–buy literature prescribes whether insourcing or outsourcing is appropriate in a particular situation. This literature has evolved over several decades. The first work in this stream treats the make–buy decision as an economic one focusing on minimization of the one-time and total costs incurred in buying or producing the product. This approach is grounded in ''transaction cost economics'' (Williamson, 1981) and is well known for its bifurcation of decision alternatives into ''markets'' or ''hierarchies''. Markets (i.e., purchase from an external supplier, also known as ''buy'' or ''outsourcing'') are employed in low transaction cost situations, while hierarchies (i.e., internal vertical integration, also known as ''make'' or ''insourcing'') are employed in high transaction cost situations.

The literature then evolved to include consideration of the essential nature of the item under make–buy evaluation. Here, whether the item is central to the capabilities of the firm drives the make–buy decision from a more strategic perspective (Prahalad and Hamel, 1990). This approach is grounded in the ''resource-based view'' of the firm. Companies could more effectively allocate scarce resources by outsourcing non-core activities, and by focusing their operational efforts and capacity on core competencies: skills, knowledge and technologies that a company must own in order to differentiate itself and compete effectively (Barney, 1991; Peteraf, 1993; Nellore and Soderquist, 2000). This is fundamentally a management decision relating to protection and development of intellectual property, capital and ''know how'' (Bohn, 1994).

A more recent branch of the operational make–buy literature incorporates the realities of contemporary supply chains by considering myriad uncertainties in the supply marketplace. This stream is more multivariate in nature and adds degrees of subtlety by addressing more factors. The collection of these factors amalgamates into supply risk or the ''strategic vulnerability'' posed to the buyer (Quinn and Hilmer, 1994; Tayles and Drury, 2001; McIvor, 2005).

In all, the *operational make–buy literature* has seen several generations, initiating with a primarily economic perspective focusing on minimization of costs, evolving to add an intellectual capital perspective that accounts for distinctive competence implications, and further growing to consider supply risks. The *behavioral decision-making literature* also covers a great deal of territory. The main factors addressed in the behavioral decision-making literature are task-related characteristics of the decision and decision process, personal characteristics of the decision maker and contextual characteristics of the particular decision. We describe this literature in detail in Section 2.

The integration and linkage of these two broad sets of operational and behavioral theory literature arises where they overlap. The operational make–buy literature rather exclusively assumes a rational decision-making approach by the firm, where a programmed, rules-based and optimal decision is made given the known factors and the known uncertainty dimensions. There are two limitations here. First, typically it is not a firm that makes a decision; rather, in most cases it is a human being who makes the decision. There is a strong human component to this form of corporate decision-making. Second, the human being is likely to augment any rules-based decision analysis approach with other information, sensitivities and biases. As such, the operational make–buy literature to date has not adequately addressed the human level aspect of this important decision. In contrast, the behavioral decision-making literature by definition addresses individual human level aspects (Payne et al., 1993). This literature and its central theories have been developed and applied in a wide variety of business contexts to understand, for example, consumer behavior, negotiation techniques and management decision-making. But, to the best of our knowledge, this literature and its concomitant theories have not been applied to explore or investigate the behavior of managers involved in a supply chain make–buy decision.

The integration of these two broad literatures presents an opportunity to close a significant research gap in the understanding of the make–buy decision. This paper aims to contribute in two ways. First, we aim to start to fill the gap by applying behavioral decision-making concepts to the operational make–buy context. Our conceptual framework (in Section 3) posits personal and task characteristics that influence a supply manager's make–buy decisions. In all, we posit that economic/cost, intellectual capital and supply risk factors will influence a supply manager's decision, and that these factors interact and are themselves further influenced by the format of the information available to the decision maker. Understanding the relative influence and interactions of these factors contributes to theory and aids in practical prescription to both OEMs and vendors in the make–buy situation. Second, we aim to contribute by illustrating and applying a novel research methodology uniquely suited for study of behavioral decision-making in the operational make–

buy context. This empirical method is the controlled behavioral experiment implemented via a questionnaire-style instrument to real supply managers. To the best of our knowledge, this approach has not been presented in the extant operations management literature. It is an especially valuable investigative technique because of its ability to control factors, test many combinations of hypothesized causal relationships, and isolate behavioral issues. All of these would otherwise be infeasible in many sampling contexts (see Section 4.1).

In all, it is our hope that this paper presents an important first step in framing this topic conceptually and providing substantive empirical results, and in presenting an especially appropriate methodological approach to conduct research on this topic. This paper is organized into seven sections. Section 2 presents selected literature from the behavioral decision-making research streams. Section 3 presents our conceptual framework with five hypotheses positing factors influencing a supply manager's decision to outsource or not. Section 4 describes the experimental method in detail and Section 5 presents the statistical analysis results. These results and their implications are considered in Section 6. Section 7 concludes this paper.

2. Behavioral decision-making by managers for make versus buy

Behavioral decision models are descriptive models that account for seemingly paradoxical outcomes not accounted for under economic models of expected utility (Tamura, 2005). A person's decisions are influenced by even subtle changes in the task, the environment or their own personal perspective. These influences on human behavior and the resulting decisions have been termed behavioral decision-making and have been studied in psychology, economics, consumer behavior and many other fields in the past 30 years (Payne et al., 1993; Simon, 1997). This robust collection of studies converges to classify the influences on behavioral decision-making into three major classes of effects: task, context and personal characteristics of the decision maker.

Task effects relate to any change in the complexity as perceived by the individual, or the presentation of the task to the human decision maker. These include the number of alternatives considered, time pressure, information formality and presentation, or the type of response needed (i.e., choice versus bid). Context effects relate to the way in which the task relates to itself or to the environment. For example, when alternatives are perceived to be very similar, the decision process employed is different than when the alternatives appear to be very different. Similarly, a change in a reference point suggested by the environment can cause a reversal in preference for the decision maker. Personal characteristics of the decision maker such as motivation, personal relevance, mood and expertise can influence the decision-making process in interesting ways (Payne et al., 1993). This study focuses on task effects and personal characteristic effects because the human (personal) decision maker is integral to the decision process, and because task factors are generally far more controllable by the organization than context effects. Context effects are important as well, but are beyond the scope of this study (and constitute a logical next step for future research).

2.1. Task related characteristics

Task related characteristics influence the decision by emphasizing or de-emphasizing various pieces of information available for making the decision. Tversky and Kahneman (1973) first began to quantify the elements of the task that systematically bias judgments. They suggest that in order to make complex decisions manageable, the decision maker will utilize simplifying heuristics that focus on a subset of available information in order to make an acceptable decision rather than an optimal decision. Decision makers of all types have a ''bounded rationality''. While they would like to be rational, they often lack important information or cognitive capacity to fully consider all implications (Bazerman, 2005). Therefore, decision makers use cues from the task to help identify which information to consider.

The way in which information is presented may cause the decision maker to notice or ignore that particular piece of information. For example, a decision maker may focus on information that is easier to retrieve, more familiar, or easier to imagine (i.e., availability heuristic; Tversky and Kahneman, 1974). Alternately, they may put too much emphasis on their initial hypothesis or guess and fail to adjust when faced with new information (Sanbonmatsu et al., 1998). As managers estimate the likelihood of an event's occurrence, they may overestimate the representativeness of a piece of information and draw inaccurate conclusions (Bazerman, 2005).

Finally, elements of the task may serve to increase the salience of information (Nisbett and Ross, 1980), ability to recall information from memory (Tversky and Kahneman, 1973) or vividness of the elements of that decision (Nisbett and Ross, 1980; Taylor and Thomp-

son, 1982). All of these have been shown to influence decisions within the context of marketing and psychology, but are less often applied in operations management contexts.

The vividness literature is particularly important when looking at decisions in a business context because vividness enhances an individual's ability to visualize a future outcome (e.g., Shiv and Huber, 2000) and it can produce a more positive imagined future outcome (Nowlis et al., 2004). The source of information affects the vividness such that information that is obtained first-hand (compared to information from a second-hand or formal source) is more likely to be vividly recalled from memory (Gilovich, 1987). Further, a meta-analysis of product label studies suggest that vividness-enhancing characteristics in a product warning increases the attention paid by consumers to that warning (Argo and Main, 2004). Extrapolated into the business environment, and in particular to supply chain make–buy decision-making, we expect information about an insource/outsource decision to be more influential if it came from a vivid or personal source.

2.2. Risk and violations of the expected utility model

Another task related characteristic involves the risk associated with the decision. Risk can influence the decision in various ways depending on the presentation of the risk information. Decision makers have a differential response to risk depending on whether the risk is associated with a gain or a loss. Specifically, more risk-taking will occur under conditions of potential loss than under conditions of potential gain regardless of whether the decision involves a medical treatment (Tversky and Kahneman, 1986), an industrial buying decision (Puto, 1987), an ethical selling situation (Kellaris et al., 1994; Mantel, 2005) or a hiring decision (Marshall et al., 2001). In each of these settings, the research shows that decision makers are more willing to risk a larger loss in exchange for the possibility that no loss will occur, but are more likely to choose to accept the smaller sure gain rather than the possibility of a larger gain. In all cases, the risky and sure scenarios had equal expected values and all risks were known at the time of the decision. Therefore, this reversal in risk preference cannot be due to an expected utility model.

Another famous violation of an expected utility model relates to Ellsberg's paradox (Ellsberg, 1961). Ellsberg showed that decision makers would prefer to bet on outcomes with known probabilities over outcomes of unknown risk. In his famous experiment, Ellsberg describes an urn that contains 90 balls. Thirty of the balls are red, and the remaining balls are either black or white. When asked to place a bet on a draw of a red ball versus a black ball, subjects preferred to bet on the red ball (i.e., the red ball draw has a known probability of 33%, but the black ball draw has an unknown probability between 0 and 67%). Conversely, when asked to bet on a draw of either a red ball or a white ball (unknown probability between 33 and 100%) versus a draw of either a black ball or a white ball (known probability of 67%), subjects preferred to bet on the black/white combination. This reversal in preference shows that decision makers prefer to bet on known probabilities even when there is a chance of greater gain in the other condition. These preference reversals suggest that decision-making does not conform to economic utility function modeling and needs to be evaluated via a descriptive model that takes into account the intransitivity of risk (Tamura, 2005).

These behavioral decision-making concepts behind the general models apply directly to the specific management context of supply chain make–buy decision-making. It is essential to consider not only the absolute level of risk, but also the portion of that risk driven by known versus unknown factors.

2.3. Personal characteristics

Of the many personal characteristics that can influence the decision process, one issue especially relevant to the supply chain decision-making context is the perception of importance. When a decision maker feels that the judgment is important they tend to become more involved in the decision process (Petty et al., 1983). Intuitively one might expect that a feeling of importance or involvement in the decision would increase the accuracy of the judgment. However, although involvement has been shown to increase the human decision maker's motivation to make a good decision, it does not necessarily increase the likelihood that the decision maker will make an accurate judgment (Johnson and Eagly, 1989; Kruglanski, 1989). It has been shown that individuals spend more time considering and evaluating an important decision (Celsi and Olson, 1988); however, this motivation to process the decision does not appear to be sufficient by itself to increase judgmental accuracy because the decision maker tries harder, but continues to use the decision processing strategy dictated by other elements in the situation (Mantel and Kardes, 1999). When these findings are adapted to the make–buy decision, this would suggest that, while importance (e.g., core

competency) will influence the decision, other factors (e.g., risk) might have a greater influence.

3. Conceptual framework

3.1. Framework overview and integration of the two literatures

The conceptual framework (see Fig. 1) addresses behavioral factors influencing the supply chain make versus buy decision. Such a decision is simultaneously an important, fundamental operational task and a human-based decision process. As Hopp (2004) notes, there is a real need to consider the human role in, and interaction with, materials flow processes and decisions.

Since it is the insource or outsource decision itself that is the task at hand, the conceptual framework employs ''likelihood to outsource'' as the dependent variable. A basic influence on likelihood to outsource is the perceived importance of the given sub-assembly to the firm's competitive ability, that is, the ''core competency'' represented by the sub-assembly. This variable reflects the task importance concept from the personal-characteristics aspects of behavioral decision-making literature, and is also a key strategic variable per the operational make–buy literature.

Another influence on likelihood to outsource is ''strategic vulnerability'', the perceived supply risk. The operational make–buy literature recognizes the importance of evaluating supply uncertainty, and has identified a number of contributors to it. Our framework incorporates three key contributors to supply risk (out of the many contributors that could be studied). These three contributors constitute a variety of important task-characteristics and personal-characteristics from the behavioral decision-making literature, and are: ''number of [qualified] suppliers'', ''cost implications'' of the outsourcing and ''information sufficiency''. Number of qualified suppliers and cost implications are specifically presented in the experiment scenarios (see Section 4), and

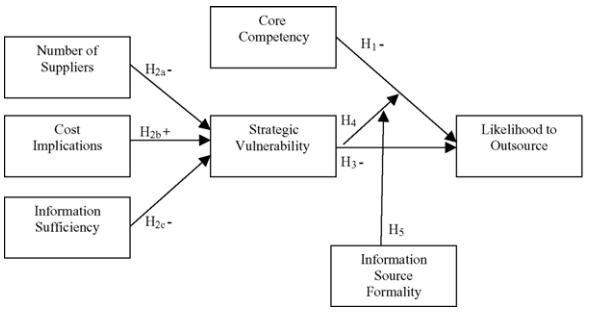

Fig. 1. Conceptual framework.

represent *known* contributors to supply risk and are representative task-characteristics from the behavioral decision-making literature. In contrast, information sufficiency reflects the individual's sense of how much is as yet *unknown* about potential contributors to supply risk. Perceived information sufficiency is dependent on personal perspectives, and is a personal-characteristic per the behavioral decision-making literature. Together, these three variables capture selected known and unknown contributors to supply risk and predict strategic vulnerability. This constitutes the strategic variability sub-model within the greater conceptual framework.

The final independent variable in the conceptual framework is ''information source''. This variable is addressed by both the operational make–buy literature and the behavioral decision-making literature. The operational make–buy literature explains that information to support the insource/outsource decision can come from different sources and have different formats. Our conceptual framework considers the formality of the source of the information. This is a task-characteristic per the behavioral decision-making literature.

In sum, all of the independent variables have origins in the operational make–buy literature. But they also have important human-level nuances which are drawn from the behavioral decision-making literature. As such, the conceptual framework purposefully integrates ideas from both literature streams.

3.2. Core competency

The basic relationship between core competency and the likelihood to outsource has been studied and refined over many years (Quinn and Hilmer, 1994). Across many industries and many research methods, it has been shown that a part, product, function or process that is high in core competency (i.e., it is important to the firm's sustainable competitive advantage in the marketplace) will be less likely to be outsourced than a peripheral function (Quinn, 1999; McIvor, 2005). While this is a well-defined relationship, it will be tested in our model in order to replicate previous research and to investigate its relationships with other variables in the model.

Hypothesis 1. The likelihood to outsource is negatively related to the level of core competency represented by the sub-assembly.

3.3. Strategic vulnerability

Strategic vulnerability is the level of risk associated with a given supply alternative (March and

Shapira, 1987). Here, we consider three contributors to supply risk.

When the number of qualified suppliers is limited, the risk associated with outsourcing increases due to the costs associated with negotiation, set up, dispute resolution and monitoring supplier behavior (Vining and Globerman, 1999; Fill and Visser, 2000). When there are many suppliers the danger of dependency is minimized (Quinn and Hilmer, 1994), but when the number of qualified suppliers is limited, the risk is high because outsourcing may cause the firm to be overly dependent on a given supplier (Lonsdale, 1999; Tayles and Drury, 2001). There is risk of non-supply, unreliable supply or poor quality supply when fewer redundant capable suppliers are present. Clearly, the smaller the number of qualified suppliers, the greater the supply risk. Another aspect of supply risk is economic risk (Spekman, 1988; Quinn and Hilmer, 1994). This risk is greater as the fully loaded cost projections or quotations associated with an outsourcing alternative escalate. Simply, greater cost is associated with greater supply risk. In our framework, both the number of suppliers and cost implications are known risks. Accordingly, we posit the following two hypotheses:

Hypothesis 2a. Perceived strategic vulnerability is negatively related to the number of qualified suppliers in the market.

Hypothesis 2b. Perceived strategic vulnerability is positively related to the increased cost related to the sourcing option.

Information sufficiency is the perceived amount of information available to make the decision (Spekman, 1988; Quinn and Hilmer, 1994). Information sufficiency has been linked to strategic vulnerability or decision risk within the management literature (McIvor, 2005). It has been shown that managers perceive higher control (and lower risk) when they have a high level of information available to them (Nellore and Soderquist, 2000). Perceived information sufficiency increases the decision maker's belief that they have sufficient knowledge of the tradeoffs. In our framework, the perceived lack of information represents unknown risk. As such, we posit that information sufficiency will decrease the perception of strategic vulnerability:

Hypothesis 2c. Perceived strategic vulnerability is negatively related to the information sufficiency.

Regardless of the known and unknown contributors to supply risk, theory supports a straightforward inverse relationship between perceived strategic vulnerability and the likelihood to outsource:

Hypothesis 3. The likelihood to outsource is negatively related to the level of perceived strategic vulnerability.

3.4. Core competency and strategic vulnerability

An important element missing from the extant literature is the interaction between core competency and strategic vulnerability. The literature suggests that core competency and strategic vulnerability are additive in their extremes. When both core competency and strategic vulnerability are high, the likelihood to outsource should be low. When both core competency and strategic vulnerability are low, the likelihood to outsource should be high (Quinn and Hilmer, 1994; Quinn, 1999).

The theory is less clear as to the form of the interaction when the levels of core competency and strategic vulnerability are mixed (i.e., low/high or high/low). In order to draw a hypothesis on the form of the interaction, we can draw from the human decision-making literature. The research in psychology and marketing suggests that decision makers are more willing to bet on a risk when the amount of risk is known rather than unknown. Therefore, we would expect that the difference in likelihood to outsource should be greater between high and low core competency conditions when the strategic vulnerability is high (unknown risk) compared to the condition when the strategic vulnerability is low (less unknown risk):

Hypothesis 4. Core competency and strategic vulnerability will interact such that when both are high (low) there will be a lower (higher) likelihood to outsource.

3.5. Information source formality

Information is needed to assess the potential opportunities and risks associated with the make versus buy decision. The source of that information can be differentiated between formal (industry publication/secondary data) or informal (i.e., from a personal acquaintance or friend) (Spekman, 1988). Qualitative research suggests that personal sources of information are viewed as more credible than formal sources (Daft and Weick, 1984). The behavioral decision-making literature also suggests that personal information sources are more vivid (Gilovich, 1987), and thus may be more likely to suggest a positive future outcome is possible (e.g., Shiv and Huber, 2000; Nowlis et al.,

2004). Therefore, we posit that the source of the information will have an influence on likelihood to outsource when other indicators are contradictory. That is, when core competency is low, and strategic vulnerability is high (or vice versa), the direction of the outsourcing decision is not clear from the two main predictors. Under these circumstances, the source of the information should tip the balance such that when the source is informal (that is, from a personal source) the likelihood to outsource will be higher than when the source is more formal.

Hypothesis 5. When core competency and strategic vulnerability are mixed (high/low or low/high), the likelihood to outsource will depend on the information source such that a(n) informal (formal) source will increase (decrease) the likelihood to outsource.

4. Methods

4.1. Why an experiment?

To our knowledge, the use of a mail-survey based experiment is relatively novel in the operations management literature.[1] An experiment complements the more traditional methodologies (i.e., case study, cross-sectional survey and mathematical models) by providing a controlled test of the hypothesized causal relationships. While the designed experiment has been widely used in fields such as consumer behavior, psychology and others that study behavioral decision-making (cf. Payne et al., 1993; Bazerman, 2005), it has been lacking in fields such as operations management and general management where the target sample is geographically disperse or in some other way not conducive to laboratory research designs. Even so, leaders in these fields have called for the use of experimental designs to expand the current research agenda and study behavioral issues (Leigh and Marshall, 2001; Marshall and Michaels, 2001; Ingram et al., 2002; Hopp, 2004).

Experiment-based research in operations management presents special challenges. Unlike research in the areas of consumer behavior or psychology where a convenience sample (i.e., undergraduate students) can be used, the ideal sample for supply chain research constitutes ''real'' business people. Given the diverse locations of these real business people, it is difficult (if not infeasible) to conduct a traditional laboratory experiment. By using a mailed questionnaire one can overcome the geographical dispersion while still maintaining the control of an experimental design. The experiment that we report in this paper has random assignment to cells, manipulated independent variables and measured dependent variables. The format of the mailed questionnaire, while appearing like a survey, contains all the components of an experimental design, and thus can be shown to eliminate the possibility of systematic differences in the participants or the environment that could affect the outcomes (Cresswell, 2002). Therefore, the observed differences noted can be attributed to the experimental treatments (Keppel, 1991), thus allowing a step beyond correlation tests to actual tests of causality (Spector, 1981).

4.2. Experimental design and instrument administration

This study investigates differences in behavioral decision-making among supply managers based on situational elements contained in the decision. These differences were investigated under varying levels of risk and importance using a 2 (core competency: high/low) × 2 (strategic vulnerability: high/low) × 2 (information source: informal/formal) between subjects design for the main experiment (Spector, 1981). This experiment was executed via self-administered questionnaires mailed to randomly selected purchasing managers identified via a list of members from the Institute for Supply Management (ISM). This method of using scenario-based mailed questionnaires to implement a controlled experiment among geographically dispersed subjects has been used in the past to study behavioral decision-making among industrial sales people, retail sales people and industrial buyers (e.g., Qualls and Puto, 1989; Dubinsky et al., 1992; Mantel, 2005).

4.2.1. Decision scenarios

The scenarios used for this study were modeled after the scenarios used in Kellaris et al. (1994) and were pretested in order to ensure realism. Two make versus buy scenarios were selected such that the variables of interest were manipulated using a complete block design (Spector, 1981). All other elements of the scenarios were held constant. Two different make versus buy situations from two different industries (electronics and automotive) were used to maximize the chance that our results are not industry-dependent, and thus increase construct validity and generalizability

[1] One related prior study (on industrial buying) was published in a Marketing journal (Qualls and Puto, 1989).

(Cook and Campbell, 1979). The actual text of the two scenarios is shown in Appendix A.

4.2.2. Pre-test

A pre-test was employed to verify and select the experimental materials. The pre-test also served as a preliminary validity check and assessment of results (Alreck and Settle, 1994; Montgomery, 2005). The two selected scenarios were chosen via a pre-test executed among 121 MBA students at a major Midwestern university.[2] Participants received extra course credit in exchange for their participation in the study.

Several aspects of the sample were examined to assess the appropriateness of this pre-test sample. The stated job titles among the MBA students suggest that they were able to evaluate the realism of the presented make versus buy decisions. Over one-third of the sample stated that they were middle or top-level managers (33.6%) and another 17% indicated that they were sales representatives. Thus over half of the sample was in professional positions that should be knowledgeable about purchasing situations. The remainder included engineers and various lower-level supervisors and analysts. As a further test of robustness, the pre-test analysis was re-run with the reduced sample of experts (i.e., sales representatives, middle and upper level managers only) and the same two scenarios were rated as the most realistic. Further, there were no significant differences in the realism rating for any of the scenarios when comparing the stated experts to those that did not classify themselves into senior management or sales. Therefore, the entire sample was used in all further analysis of the pre-test data.[3]

In the pre-test, each respondent evaluated four make versus buy scenarios. After reading and evaluating all four scenarios, the respondents rated the extent to which each scenario seemed realistic on a scale from 1 (not realistic at all) to 7 (totally realistic). All four scenarios were rated as ''realistic'' with means ranging from a low of 4.34 to a high of 4.63. The two scenarios that received the highest reality ratings (4.58 and 4.63, respectively) were selected for use in the final study.

4.2.3. Independent variables

The independent variables are core competency, information source, strategic vulnerability and the hypothesized predictors of strategic vulnerability (i.e., number of qualified suppliers, cost implications and information sufficiency). The scenarios were constructed such that the variables of interest were consistent with the accepted definitions of the underlying constructs. Specifically, core competency is any activity or skill that allows a company to differentiate itself from other organizations. Therefore, core competency was manipulated in the scenarios by describing the object of the make versus buy decision as either an ''important'' sub-assembly (high core competency) or ''peripheral'' sub-assembly (low core competency). Similarly, information source was manipulated within the scenarios by describing the information available to make the decision as either informal (''a close friend who is familiar with the whole industry'') or formal (''an industry publication'').

Strategic vulnerability is the perceived risk of outsourcing a sub-assembly. Three distinct facets are hypothesized to influence perceived risk: supply uncertainty, monetary implications and information sufficiency.[4] Supply uncertainty was represented by the description of the number of qualified suppliers in the supply market (a very limited number/many). Monetary implications was characterized as the cost differential associated with outsourcing versus the current insourcing (5% more expensive/20% cheaper). Information sufficiency was measured by asking respondents to rate the degree to which they felt ''[there] was enough information provided for you to make the decision of insourcing or outsourcing'' on a scale from ''not at all sufficient'' (−3) to ''completely sufficient'' (3). As is traditionally done when using ANOVA to analyze a measured, personal, independent variable, a median-split was used to separate participants into high and low information sufficiency groups (e.g., Cacioppo and Petty, 1982; Kruglanski et al., 1997; Van Kleef et al., 2004). The resulting mean perceived information sufficiency scores were significantly different between the high and the low groups ($M_{\text{low information sufficiency}} = -2.55$, $M_{\text{high information sufficiency}} = 0.69$, $p < .001$). This provides confidence that the two groups represent

[2] The use of student samples for pre-test purposes is well-accepted and has significant precedence in behaviorally oriented disciplines. With proper design and control, MBA sample subjects have been shown to be competent to respond to simulated business situations and produce data consistent with data collected from ''real'' business subjects (Remus, 1986; Schriesheim and Hinkin, 1990; Fernandez and Perrewé, 1995).

[3] We also conducted a post hoc analysis comparing the results of the entire pre-test sample with the full-administration sample, and found no significant differences (see also footnote 6).

[4] These three factors were chosen due to their importance in previous behavioral and operations literature. All other contributing factors to risk were held constant across the scenarios in order to control for their effects.

significantly different perceptions of the amount of information provided.

Strategic vulnerability was measured via a one-item risk assessment (i.e., "How would you rate the degree to which you perceived your company to be at risk if you made the wrong choice?") ranging from extremely low (−3) to extremely high (3). This measured variable will function as a dependent variable ("DV") for the analysis of the predictors of strategic vulnerability (Hypothesis 2) and as a predictor variable (independent variable, noted as "IV") when analyzing the model related to the likelihood to outsource. While the full range of the measured variable can be used when considered as the DV in the strategic vulnerability sub-model, the variable must be separated into high and low categories for inclusion as an independent variable in the main model. The two groups were formed using the median split method. The resulting scores were significantly different between the high and the low groups ($M_{\text{low SV}} = -1.48$, $M_{\text{high SV}} = 2.0, p < .0001$) suggesting that the two groups are substantially different in their risk perception.

4.2.4. Dependent variable

For each scenario, respondents were asked to indicate their intention to outsource on a seven-point scale from "insource" (1) to "outsource" (7). The responses were fairly evenly spread across the possible choices with about 41% of the total sample choosing to insource (values of 5–7) and 46% choosing to outsource (values of 1–3). The remaining 13% of the sample choose the center point (4) indicating that they were indifferent to insourcing or outsourcing.

4.2.5. Subjects and questionnaire administration

Subjects were randomly chosen from the members of ISM based on two-digit SIC codes representing companies in the fabricated metal products (34), machinery (35), transportation equipment (37) and instruments and related products (38) industries. An introductory cover letter, the questionnaire, and postage paid return envelope were mailed to 1500 purchasing managers. Ninety-two questionnaires were returned undelivered. A total of 305 questionnaires were returned completed. Therefore, the effective response rate is 21.7%, a figure considered quite reasonable for a mailed questionnaire (Malhotra and Grover, 1998). Each respondent viewed two scenarios and so the full sample includes 610 scenarios. Respondents did not answer the insource/outsource question for seven scenarios (three full questionnaires and one partial questionnaire). Thus, a total of 603 usable scenarios were available for the investigation from a sample of 302 respondents.

A letter of introduction along with a questionnaire was sent to each potential respondent. The letter explained the purpose of the study and assured confidentiality of the responses. First, respondents read a short introduction asking them to "imagine that you are a purchasing manager for the company described . . . imagine that you are actually facing the decision in each case. Then indicate how likely you would be to insource or outsource in each case". Next, the respondents read and responded to each of two scenarios describing a make versus buy decision (see Appendix A). Each respondent evaluated two separate scenarios sequentially. The two scenarios were rotated so that each scenario version was equally likely to be in the first or second sequential position for any given respondent.[5] After recording their insource/outsource decision for the scenario, the respondents rated their perceived risk, and their confidence in their decision. Finally, the respondent was asked to provide demographic and company related information.

An analysis of early versus late responders showed no significant difference in demographic distribution, company or position title, or analytical results between the two groups. Further, a comparison of the results from the laboratory experiment among MBA students (i.e., the pre-test) and the full experiment executed through the mail (i.e., the main experiment) shows that the results are consistent across the two datasets.[6] Taken together, these results suggest that non-response bias is not an issue for this sample (Alreck and Settle, 1994).

The sample respondents held position titles of purchasing manager (45.5%), buyer, purchasing

[5] The rotation was achieved through the sequencing of the surveys such that any given respondent was equally likely to receive any of the scenario sequences and designed set of manipulated variable levels.

[6] A preliminary analysis of the pre-test data was performed pooled across all four pre-test scenarios. The planned *t*-tests and an ANOVA were run on the pre-test data to evaluate the hypothesized relationships. The ANOVA showed a main effect of strategic vulnerability and a main effect of core competency. As expected, the sub-assembly that has a high degree of perceived strategic vulnerability and high core competency is likely to be kept in-house (mean = 2.83), whereas the low strategic vulnerability/low core competency sub-assembly is likely to be outsourced (mean = 4.23, $t = 3.943$, $p < .001$). In addition, the results show a main effect for information source ($F_{(1,466)} = 5.431$; $p < .02$; $\eta^2 = 0.012$) and an interactive effect for all three fixed factors ($F_{(1,466)} = 73.827$; $p = .005$; $\eta^2 = 0.017$). Further analyses confirm that information source has an effect on the results from the mixed strategic vulnerability/core competency cells. Specifically, intention to outsource is significantly stronger ($p < .001$) with informal (versus formal) information when core competency is high and strategic vulnerability is low. Conversely, information source has no effect on intention to outsource when core competency is low and strategic vulnerability is high.

agent/analyst or materials manager (26.7%), middle or top manager (20.2%) and others (7.6%). Respondent ages ranged from 25 to 69 years with a median age of 50. Seventy-four percent were male and 26% were female. In general, respondents rated their company's attitude toward outsourcing as varied with their responses fairly evenly distributed across all choices from 1 (most activities outsourced) to 7 (few activities outsourced). The average for all respondents on this question was 3.71 suggesting that the sample was not skewed either for or against outsourcing. In all, these results suggest the respondents were competent to respond to the scenario questions.

Inherent in the experimental design is an assumption of random assignment to cells (Cresswell, 2002). In order to check the randomness in the sample, the returned questionnaires were evaluated across cells. First, the sample sizes were distributed relatively evenly across the eight cells of the experimental design (see Table 1 for specific cell sizes). In addition, the distribution of the demographic- and company-related variables did not differ significantly across cells. Taken together, this suggests that random assignment was attained and is likely to have controlled for the influence of potential variables that were outside of the scope of the study (Cresswell, 2002).

4.2.6. Pooling test

Pooling tests were conducted to rule out order effects (i.e., to test that results are consistent regardless of whether the particular scenario appeared first or second) and to ensure that results could be combined across scenarios. To that end, we included scenario version and scenario order into an ANOVA looking at the effect of the independent variables on the dependent variable. Results show that there were no significant effects of either scenario version ($F = 0.003$; *ns*) or scenario order ($F = 1.88$; *ns*). In addition, the full set of analyses was run separately for the first scenario evaluated, the second scenario evaluated, the electronics scenario and the automotive scenario. All results are consistent with each other and the pooled results. Therefore, all subsequent analyses "pool" replicates within conditions.

Table 1
Sample cell sizes

Total ($N = 603$)	Cell sample sizes
Core competency	
Important (high core competency)	302
Peripheral (low core competency)	301
Risk perception (median split)	
Low perceived risk	320
High perceived risk	283
Information source	
Formal	313
Informal	290

5. Statistical analysis and results

Hypothesis 1 posits that the likelihood to outsource is inversely related to the level of core competency. In order to test this hypothesis, we conduct a *t*-test to show that the mean likelihood to outsource among those that were evaluating an important sub-assembly were more likely to insource ($X = 3.6$) than those that were evaluating a peripheral sub-assembly ($X = 4.6$, $t = 6.6$, $p < .001$). Therefore, Hypothesis 1 is strongly supported. This is consistent with and serves to replicate previous research findings.

Hypothesis 2 addresses the strategic vulnerability sub-model which posits that the level of strategic vulnerability will be inversely related to the number of qualified suppliers, directly related to the cost implications and inversely related to the perceived information sufficiency. In order to test these relationships, an ANOVA was run with perceived strategic vulnerability as the dependent variable and the hypothesized predictors as the independent (see Table 2 for descriptive statistics and Table 3 for ANOVA results). The ANOVA shows three main effects: number of qualified suppliers ($F = 22.48$, $p < .001$), cost implications ($F = 14.02$, $p < .001$) and information sufficiency ($F = 8.73$, $p = .003$) on perceived strategic vulnerability in the expected directions. In addition, there is a two-way interaction between cost and information sufficiency ($F = 8.54$, $p = .004$). Taken together this strongly supports Hypothesis 2.

Hypothesis 3 posits an inverse relationship between strategic vulnerability and likelihood to outsource. A *t*-test strongly confirms this relationship such that those in the high strategic vulnerability group have a lower likelihood to outsource ($M = 3.2$) compared to those who are in the low strategic vulnerability group ($M = 4.6$, $t = 8.8$, $p < .001$).

Hypothesis 4 posits that core competency and strategic vulnerability will interact such that when both are high, the choice will be to outsource and when both are low, the choice will be to insource. In order to test this interaction, an ANOVA was run on likelihood to outsource with core competency and the median split of strategic vulnerability as independent variables (see Table 4 for descriptive statistics).

Table 2
Means and standard deviations: strategic vulnerability sub-model (Hypothesis 2)

Total ($N = 603$)	Perceived strategic vulnerability (−3 to 3)	
	Mean	Standard deviation
Information sufficient		
Many qualified suppliers		
Cost increase	−0.31	1.95
Cost decrease	−0.79	1.90
Few qualified suppliers		
Cost increase	0.34	1.84
Cost decrease	0.56	2.06
Information insufficient		
Many qualified suppliers		
Cost increase	0.65	1.78
Cost decrease	−0.32	1.92
Few qualified suppliers		
Cost increase	1.23	1.56
Cost decrease	0.10	2.14

Table 3
ANOVA: strategic vulnerability sub-model (Hypothesis 2)

Tests of between-subjects effects			
Dependent variable: perceived strategic vulnerability			
Source of variation	Mean square	F	Sig.
Corrected model	30.74	8.4	0.000
Constant	19.83	5.4	0.020
Number of qualified suppliers	82.24	22.5	0.000
Cost	51.28	14.0	0.000
Information sufficiency (median split)	31.95	8.7	0.003
Suppliers × cost	2.64	0.7	ns
Suppliers × information	8.89	2.4	ns
Cost × information	31.23	8.5	0.004
Supplier × cost × information	6.67	1.8	ns

We observed main effects for strategic vulnerability ($F_{(1,599)} = 106.8$; $p < .001$; $\eta^2 = 0.15$)[7] and core competency ($F_{(1,599)} = 74.2$; $p < .001$; $\eta^2 = 0.11$) as well as an interaction between the two ($F_{(1,599)} = 4.5$; $p = .035$; $\eta^2 = 0.07$) (see Table 5). Fig. 2 shows the pattern of likelihood to outsource across the strategic vulnerability and core competency groups. A planned contrast confirms that the item under consideration is likely to be kept in-house when there is a high degree of perceived strategic vulnerability and high core competency (mean = 2.2), whereas the item is likely to be outsourced when there is a low degree of strategic vulnerability and low core competency (mean = 5.1, $t = 14.9$, $p < .001$). Therefore, the evidence is consistent with the pre-test data and strongly supports Hypotheses 1, 3 and 4.

Hypothesis 5 posits an effect of information source in conjunction with strategic vulnerability and core competency on the outsourcing decision. It is hypothesized that information source will be most influential when core competency and strategic vulnerability do not match (i.e., one is low and the other is high). In order to test this, another ANOVA was run with core

[7] The η^2 statistic is a consistent measure of effect size for F and t tests (Stevens, 2001). According to Cohen (1988), these effects can be classified into small ($\eta^2 = 0.01$), medium ($\eta^2 = 0.06$) and large ($\eta^2 = 0.14$) based on the calculated η^2. Therefore, the main effect for strategic vulnerability is large while the main effects for core competency and the interaction term are medium.

Table 4
Means and standard deviations: Hypothesis 4

Total ($N = 603$)	Likelihood to outsource	
	Mean	Standard deviation
High strategic vulnerability		
High degree of core competency	2.2	1.26
Low degree of core competency	3.9	1.98
Low strategic vulnerability		
High degree of core competency	4.1	1.93
Low degree of core competency	5.1	1.57

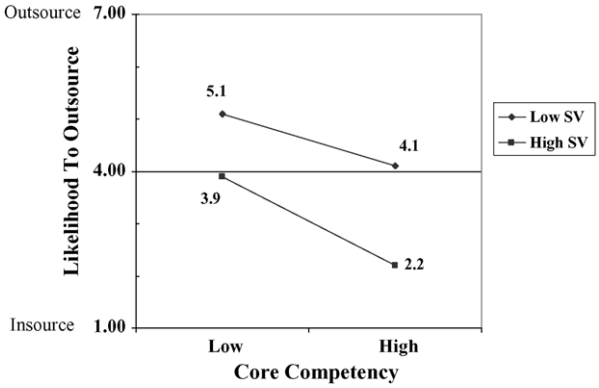

Fig. 2. Likelihood to outsource: core competence and strategic vulnerability predictors.

Table 5
ANOVA: Hypothesis 4

Tests of between-subjects effects				
Dependent variable: likelihood to outsource				
Source of variation	Mean square	F	Sig.	η^2
Corrected model	165.39	53.7	0.000	
Constant	7781.13	2525.3	0.000	
Perceived strategic vulnerability	329.18	106.8	0.000	0.151
Core competency	228.69	74.2	0.000	0.110
Strategic vulnerability × core competency	13.80	4.5	0.035	0.010

competency, median split of strategic vulnerability and information source as independent variables, and likelihood to outsource as the dependent variable (see Table 6 and Fig. 3a and b for descriptive statistics).

The results show a main effect for information source ($F_{(1,595)} = 7.8$; $p < .01$; $\eta^2 = 0.01$), a main effect for core competency ($F_{(1,595)} = 80.3$; $p < .001$; $\eta^2 = 0.12$) and a main effect for strategic vulnerability ($F_{(1,595)} = 88.3$; $p < .001$; $\eta^2 = 0.13$), an interactive effect between core competency and information source ($F_{(1,595)} = 5.4$; $p < .02$; $\eta^2 = 0.01$), and interactive effect for all three fixed factors ($F_{(1,595)} = 5.3$; $p < .02$; $\eta^2 = 0.01$) (see Table 7). The planned comparison results indicate that the likelihood to outsource when there is a high degree of core competency and low strategic vulnerability is stronger if the information comes from an informal source (mean = 4.6) than from a formal source (mean = 3.4, $t = 4.7$, $p < .001$). Conversely, the likelihood to outsource when there is a low degree of core competency and high strategic vulnerability is not influenced by the information source ($M_{\text{informal source}} = 4.1$ versus $M_{\text{formal source}} = 3.8$; $t = 0.92$, ns). Therefore, Hypothesis 5 is partially supported.

Table 6
Means and standard deviations: Hypothesis 5

Total ($N = 603$)	Likelihood to outsource	
	Mean	Standard deviation
High degree of core competency		
High strategic vulnerability		
Informal information source	2.4	1.3
Formal information source	2.1	1.2
Low strategic vulnerability		
Informal information source	4.6	1.8
Formal information source	4.1	1.9
Low degree of core competency		
High strategic vulnerability		
Informal information source	4.1	1.7
Formal information source	3.8	2.1
Low strategic vulnerability		
Informal information source	5.0	1.6
Formal information source	5.2	1.5

In all, four of the five hypotheses were strongly supported. One hypothesis, Hypothesis 5, was partially supported.

Table 7
ANOVA: Hypothesis 5

Tests of between-subjects effects				
Dependent variable: likelihood to outsource				
Source of variation	Mean square	F	Sig.	η^2
Corrected model	82.99	28.04	0.000	
Constant	7164.50	2420.80	0.000	
Strategic vulnerability	261.25	88.28	0.000	0.129
Core competency	237.54	80.26	0.000	0.119
Information source	23.17	7.80	0.005	0.013
Strategic vulnerability × core competency	10.33	3.49	0.062	
Information source × core competency	16.09	5.44	0.020	0.009
Information source × strategic vulnerability	0.37	0.13	0.724	
Strategic vulnerability × core competency × information source	15.58	5.26	0.022	0.009

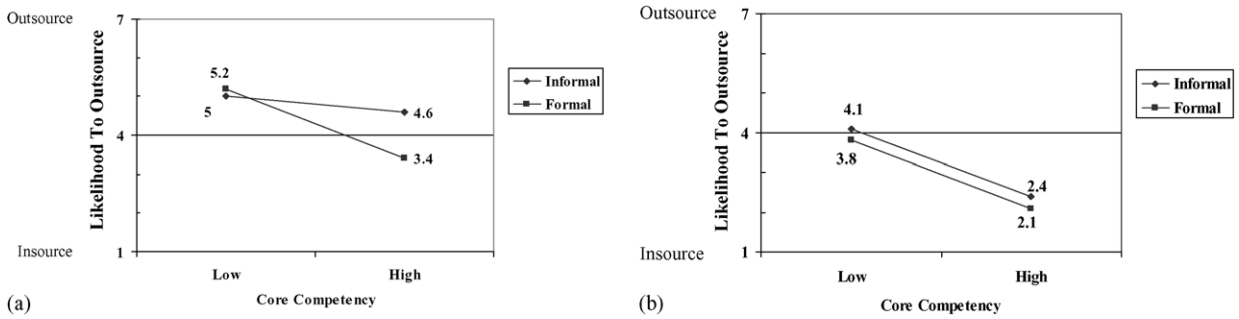

Fig. 3. (a) Low strategic vulnerability and (b) high strategic vulnerability.

6. Discussion of results

6.1. Competence, risk and information

The empirical results extend the literature to date in three essential ways. First, the strategic vulnerability sub-model shows three possible contributors to perceived strategic vulnerability; second, the experimental method allows for more controlled examination of the causal relationships in both the sub-model and the main model investigated; and third, the results offer insights into how the human element in the make–buy decision impacts the end result.

For the strategic vulnerability sub-model, the results confirm that strategic vulnerability is driven by a combination of underlying factors such as number of qualified suppliers, cost implications and information sufficiency. The theory predicts three main effects which are found in the data. These effects comprise both known and unknown risk contributors.

The experimental method allows us to measure the relative importance of various relationships. While past studies have shown the main effects of core competency and strategic vulnerability, the interaction remained largely unstudied. By using the experimental method, we were able to tease apart the mixed cells to understand the relative importance of core competency and strategic vulnerability. The behavioral decision-making literature suggests that risk may be a stronger driver of the likelihood to outsource. The data support this theory in two ways. First, the main effect of strategic vulnerability has a large effect size ($\eta^2 = 0.15$) while the core competency has an effect size that is between medium and large ($\eta^2 = 0.11$). Second, the form of the interaction seen in the data suggests that subjects are more sensitive to a higher unknown risk (high strategic vulnerability) than they are to a lower unknown risk (low strategic vulnerability). This is seen by the larger difference in likelihood to outsource across core competency groups for high strategic vulnerability than for low strategic vulnerability. Given this, it appears that strategic vulnerability is a stronger influence than core competency on the likelihood to outsource.

The experimental method also allowed us to test the influence of information source on the make–buy decision process. Prior research suggests that an informal source of information may be more influential, but through this experiment we can see some implications of when and how information source plays a role. Specifically, the behavioral literature suggests that because the informal information source is more vivid it will be more influential in the decision process. From this we hypothesized that the informal information source would be more influential when the core competency and strategic vulnerability were mixed. Although this hypothesis was only partially supported, the data show that for the high core competency/low strategic vulnerability group, those that viewed an informal information source were more likely to outsource. It may be that strategic vulnerability has a greater effect on the process; that is, the high strategic vulnerability overwhelmed any influence that the informal information source might have had when strategic vulnerability was high and core competency was low.

6.2. Implications for practice

Practical implications arise for both buyers and suppliers. To the buyer, the empirical results confirm that some behavioral biases found in psychological studies are also present in the make–buy decision. After all, the decision is made not by the corporation, but by an employee of that firm. It appears that vividness of the information and perceived risk may be working together

to produce a decision that is different from the one that would be predicted by the expected utility model (which assumes rational decision-making). This is important for managers to understand since many of the behavioral decision biases known to affect human decision-making processes can be de-biased simply by calling attention to the bias. For example, we know that vivid information will be considered more fully than non-vivid information. If the decision maker is told to consider all information fully, this bias is minimized. Therefore, management can ensure a more rational view of the make–buy decision if they understand the biases that may influence the decision and point these potential biases out to the decision maker.

To the seller, the results suggest that they should do whatever is reasonable to affect the factors influencing the likelihood to outsource in order to enhance the chance of receiving the contract. This could be done through statements of assurance of non-intent to compete or co-opt (the production of the given sub-assembly), development of trust which will serve to reduce the buyer's fear of a subsequent adversarial relationship (reflecting an ''unknown'' contributor to supply risk) and provision of ''preferred customer'' status to the buyer on internal production capacity, key raw materials or finished goods stores in order to assure priority and product availability. All of these may serve to reduce perceived supply risk and modify the sense of concern over core competency. Another action is the promotion of informal information channels. This is somewhat analogous to purposeful efforts by marketers to create ''buzz'' around a product. Finally, we note that several of the implications for both buyer and seller are consistent with the tenets of ''lean'' operations and the total quality movement (i.e., long-term, assured relationships and contracts, with relatively few players, but with a second qualified supplier kept in mind).

6.3. Limitations and implications for future research

This paper promulgated a base conceptual framework that can be deepened and broadened in a number of ways. We studied decision-making for an established sub-assembly as the item to be insourced or outsourced. Future research should consider items with different characteristics including new, risky, or only partially specified parts, as are typical in new product development and ramp-up efforts (Tatikonda and Rosenthal, 2000; Tatikonda and Montoya-Weiss, 2001). Future inquiry should also extend beyond physical goods to consider behavioral issues in the make–buy decision for new and existing services (Menor et al., 2002; Wade, 2003). In addition, a variety of aspects of global sourcing should also be considered in future research. Offshore sourcing introduces factors that may change the perceived risk. For example, global sourcing could increase strategic vulnerability due to logistical issues, or it might lower strategic vulnerability due to a lower cost structure (Trent and Monczka, 2003).

The make–buy decision need not be a binary decision. That is, the percentage of the production of a given item which is outsourced or insourced can vary, and outsourcing of a given item to two or more vendors is possible. Therefore, future research should investigate these hybrid decisions. In addition, core competency applies not only as a static characteristic of a given item, but also to an evolving item as it belongs to a product family stream or portfolio over time.

This study considered a one-shot make–buy decision. Future research should consider group purchasing decisions (where a supplier provides more than one SKU) and multiple supplier options (both internal and external to the OEM). Future research should further develop the information source construct to consider additional aspects of the informational elements, decision criteria, and supply options. In addition, incorporating emergent supply uncertainties and competency vulnerabilities would capture a more dynamic business decision context.

Recall that the behavioral decision-making literature identifies three broad classes of factors. This paper incorporated in the model both task-related characteristics and personal characteristics of the decision maker. Future research should incorporate and explore context characteristics as well, towards an even richer understanding of the make–buy decision process. Some additional realistic behavioral elements (task-, personal- and context-characteristics) that should be addressed in future research include organizational politics and stated or unstated preferences by certain parties towards given supply options; the incentives to the decision-maker regarding quality of decision as well as the use of internal capacity; and the nature of ''ownership'' felt by the decision-maker towards the item under make–buy evaluation.

7. Conclusions

This study aimed to understand individual influence in corporate decision-making and, to that end,

integrated operational and behavioral literature in a way that has not been done before. The conceptual framework sets a base for further study of the human element in operational decision-making. And the empirical results show that the behavioral decision-making process for make–buy evaluation is indeed highly nuanced, with certain factors having greater influence under specific conditions.

This paper also presented a research method that allows tests of causal relationships through a controlled experiment format with a sample of real managers, without incurring the infeasibility of a single, centralized laboratory setting. While the work here investigates supply manager decision-making, the method can generalize to a wide variety of operational contexts where what is typically perceived as a ''firm'' level decision is made by one or more humans. Representative contexts include portfolio decision-making for product and process development, and assessment of and decision-making around SBU-level operations strategy alternatives.

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Appendix A

A.1. Scenario 1

Your company takes pride in being one of the world's premier electronics manufacturers. By working closely with supply partners your company contributes to the advancement of electronic technologies to improve the quality of life. As a purchasing manager, part of your job is to help manage the supply chain in order to contribute to competitiveness. At the management level, improvement strategies have been discussed, such as moving a certain [important/peripheral] component from an in-house sourcing status to an external supplier. So, it is your responsibility to evaluate this insource/outsource.

To do so, you start by collecting information about qualified suppliers. You know from [a close friend who is very familiar with the whole industry/an electronic industry publication] that there [are a very limited number of/many] suppliers that can provide the sub-assembly with the high quality needed. It is estimated that the cost will be [20% cheaper/5% more expensive] if you choose to outsource rather than insource the sub-assembly.

Given the above information, how likely are you to choose to keep the production internal (insource) versus outsource the sub-assembly.

Insource 1 2 3 4 5 6 7 Outsource

A.2. Scenario 2

You are the purchasing manager in charge of coordinating the supply chain for one of your company's most popular automobiles, a luxury sports coupe. Your company has a global reputation and is known for technologically advanced luxury cars. Your competitors in this market include both national and international brands and the market is highly competitive. As with all high-end sports cars, the final products are complex and you, as the buyer, must coordinate the supply channel with the in-house sourcing for many components, systems and sub-assemblies.

From time to time, part of your job includes the evaluation of a proposal to move a component or sub-assembly from an in-house sourcing status to an external supplier. Recently, you have been asked to evaluate this insource/outsource decision for a(n) [important/peripheral] sub-assembly needed for the production of your product line. You have received information from [a close friend who is very familiar with the whole industry/an automotive industry publication], that there [are a very limited number of/many] suppliers who can provide the quality sub-assembly that is superior to your current in-house production. The cost will be [20% cheaper/5% more expensive] if you choose to outsource rather than insource the sub-assembly.

Given the above information, how likely are you to choose to keep the production internal (insource) versus outsource the sub-assembly.

Insource 1 2 3 4 5 6 7 Outsource

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