ROLE OF INTUITION IN STRATEGIC DECISION MAKING

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We are very grateful to Ray Hunt for his guidance and direction on the research project on which it is based. We would also like to thank Rohit Bhatnagar and Shobha Das for their helpful comments on this article. This research was partially funded by a research grant from the Mark Diamond Research Fund, State University of New York at Buffalo.

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ABSTRACT

Although both intuitive and rational processes are equally important for effective strategic decision making, there is little in the way of applied research on the role of intuition in strategic decision processes. Apart from many popularized treatments of intuition in the literature today, there is only a handful of serious scholarly works on the subject. Of these, the majority are essentially theoretical in nature; field research in management settings is virtually nonexistent. This study examined this neglected but important phenomenon in strategic decision making.

We surveyed senior managers of companies representing computer, banking, and utility industries in the United States and found that intuitive processes are used often in organizational decision making. Use of intuitive synthesis was found to be positively related to organizational performance in an unstable environment, but negatively related to it in a stable environment.

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> "You get data from hundreds of places, from reading and talking to people. Say, you have a store of knowledge in your mind. I couldn't tell everybody all the data I have in my mind that affect decision making. The data capturing model is strange. I mean, this comes from many places and many conversations, many things linked together."
>
> - The Chief Executive of a computer company

> "There is something that is present in all business decisions, but that is little discussed and perhaps poorly understood. It is intuition, founded upon a solid and complete grasp of the details of the business and experience in relating with people".
>
> - An Entrepreneur

One of the most basic assumptions about management is that systematic and careful analysis yields superior choices than those coming from intuitive processes. However, this assumption has recently come under fire (Mintzberg, 1994). Mintzberg (1994), in his book 'The Rise and Fall of Strategic Planning', concludes that the term "strategic planning" is an oxymoron. He argues that strategy cannot be planned because planning is about analysis and strategy is about synthesis. That is why, he asserts, such a planning approach has failed so often and so dramatically. In a similar vein, Peters and Waterman (1982) viewed "the rational model" as a major reason for the problems United States firms encountered in competing with foreign companies in the 1970s and 1980s

The purpose of this study is not to argue that rational analysis is a futile exercise. Rational analysis is a useful and indispensable tool in strategy-making which even Mintzberg (1994), a strong critic of strategic rationality, concedes. Our stand is that a theory of strategic decision making has to take into account both rational and intuitive processes (Pondy, 1983; Simon, 1987). As Jonas Salk, the discoverer of polio vaccine, noted: "...if we combine our intuition and our reason, we can respond in an evolutionary sound way to our problems..." (cited in Ray & Myers, 1990:249).

To date, scholars have emphasized rational decision making over intuitive decision making. One major reason for such a tendency is that , to many scholars, intuitive processes, perhaps, fall into the realm of irrational or paranormal. As a result, they believe that intuitive processes are beyond the scope of a scientific study. Recent advances in cognitive science and artificial intelligence, however, suggest that there is nothing mystical or magical about intuitive processes and that they are

not paranormal or irrational (Simon, 1987; Prietula & Simon, 1989). Rather, intuitive processes

evolve from long experience and learning (Isenberg, 1984; Simon, 1987; Prietula & Simon, 1989; Agor, 1990; Kleinmuntz, 1990; Ray & Myers, 1990; Harung, 1993; Seebo, 1993; Parikh, 1994) and "consist of the mass of facts, patterns, concepts, techniques, abstractions, and generally what we call formal knowledge or beliefs, which are impressed on our minds" [Barnard cited in Simon (1987)].

There are three major limitations in the existing research on intuition. First, putting aside many of the more popularized treatments of intuition in the literature today, there is only a handful of serious scholarly works on the subject (Agor, 1990a). Of these, the majority are essentially theoretical in nature and tend to be produced almost exclusively by psychologists. Field research in applied management settings is quite sparse. Second, intuition has been conceptualized in a number of ways. Some authors even skip back and forth among conceptualizations in a single work (Behling & Eckel, 1991). The differences among the conceptualizations are not trivial, however. Each definition has different implications for managers and researchers. Finally, although previous research does suggest that senior (or top) managers often use intuition in decision making (Agor, 1990; Parikh, 1994), it has failed to examine the crucial link between intuition and organizational performance.

This study addresses the above limitations. We provide a comprehensive definition of intuition and then examine its relationship with organizational performance in a sufficiently large sample of senior managers of for-profit organizations.

INTUITION : DEFINITION AND PROPERTIES

Carl Jung noted that intuition does not denote something contrary to reason, but something outside the province of reason. It is neither a magical sixth sense nor a paranormal process. Intuition is not the opposite of rationality, nor is it a random process of guessing. It is a sophisticated form of reasoning based on "chunking" that an expert hones over years of job-specific experience (Prietula & Simon, 1989). It does not come easily; it requires years of experience in problem-solving and is founded upon a solid and complete grasp of the details of the business (Isenberg, 1984; Seebo, 1993). To the extent that the lessons of experience are logical and well-founded, so is intuition (Isenberg, 1984). Intuition means "being able to bring to bear on situation everything you've seen, felt, tasted, and experienced in an industry"[H. Ross Perot quoted in Rowan (1990:83)].

Intuition is a "synthetic" psychological function in that it apprehends the totality of a given situation (Vaughan, 1990): it allows us to synthesize isolated bits of data and experiences into an integrated picture. It is a holistic perception of reality that transcends rational ways of knowing.

To understand intuition we need to understand its important properties:

Intuition is subconscious

Although intuition lies along a continuum of consciousness-subconsciousness, only a fraction of lessons of experience become fully crystallized as facts and are thus accessible to the conscious mind. Most of it "is a subconscious drawing from innumerable experiences that are stored. [We] draw from this reserve without conscious thought" (Agor, 1990b:158). Some of these stored experiences (or knowledge) in the subconscious are more readily available than others via intuition.

Parikh (1994) observed that intuition could well be a form of intelligence at a level we simply cannot access with rational thought. According to him, intuition consists of "accessing the internal reservoir of cumulative experience and expertise developed over a period of years, and distilling out of that a response, or an urge to do or not to do something, or choose from some alternatives - again without being able to understand consciously how we get the answers" (1994:38)[1].

Many years of preparation and work provide raw materials and conditions for incubation of ideas in the subconscious (Ray & Myers, 1990). Although the realization (or intuitive flash) may arrive at seemingly magical moment, it comes usually after a long, hard pondering of a problem (Rowan, 1990).

Intuition is complex

Because of the subtle quantitative and qualitative balances it can embrace, intuition (subconscious feel for all the factors, their importance, and relationships) is probably superior to a purely rigorous quantitative model (Quinn, 1980; Kleinmuntz, 1990). It can "deal with systems more complex than those which can be figured out in our conscious minds" (Parikh, 1994:33).

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[1] Parikh (1994) has discussed intuition consisting of four levels: logical consciousness, subconsciousness, unconsciousness, and supraconsciousness. Intuition defined here subsumes first two levels - logical consciousness and subconsciousness. The other two levels, unconscious and supraconsciousness, are beyond the scope of this study.

Most of the rational-analytical models are confined because of the assumption of linearity. Intuition permits an overcoming of the limits of rationality in an unstable environment (Prietula & Simon, 1989).

Intuition is quick

The process of intuition is very quick (Seebo, 1993). It is the smooth automatic performance of learned behavior sequences and often can short-circuit a step-wise decision-making, thus, allowing an individual to know almost instantly what the best course of action is. It compresses years of experience and learning into split seconds (Isenberg, 1984). Intuitive synthesis allows calling a number of related problems or issues at the same time. One by-product is that a manager can attain economies of effort (Isenberg, 1984). An expert learns to ignore the irrelevant patterns or pieces of information and concentrate on the critical ones (Prietula & Simon, 1989; Kirschenbaum, 1992; Harung, 1993).

Intuition is not emotion

One might mistrust intuition on the ground that it springs from emotion as opposed to reason. But intuition does not come from emotion (Simon, 1987; Vaughan, 1990; Ray & Myers, 1990). Vaughan (1990) observed that fear and desire both interfere with intuitive perception. If you are anxious, angry or emotionally upset, you are not likely to be receptive to the subtle messages which can come into consciousness via intuition. Similarly, Ray and Myers (1990) noted that fear, anxiety, and wishful thinking get in the way of clear operation of intuition.

Intuition is not biased

A stream of research in cognitive psychology suggests that intuitive (subjective or use of head) decision making is fraught with cognitive biases. If we look at all the sources of systematic error in human judgment identified in the above line of research, one has to wonder how we are able to make decisions in business at all, much less effective decisions (Harung, 1993). However, another growing body of research suggests that intuition is not necessarily a biased process; it can be uncannily accurate (Ilgen & Feldman, 1983; Kleinmuntz, 1990; Harung, 1993; Seebo, 1993). For example, Kleinmuntz (1990) suggested that everyday inductive reasoning which managers or decision makers use is in a way roughly equivalent to using formal statistical principles. Ilgen and Feldman (1983) noted that research has focused on bias and invalidity

almost exclusively, thus, creating the impression that valid judgments based upon intuition are rare. They further argued that the cognitive process by which valid judgments are made is exactly the same as the one that generates biased ones, just as the forces determining an arrow's flight are the same whether or not the arrow is on target.

If intuitive synthesis suffers from biases or errors, so does rational analysis (Seebo, 1993; Harung, 1993). This is so because, quantitative or rational- analytical reasoning too is based upon perceptions and assumptions that are not necessarily accurate and correct" (Seebo, 1993:27). Thus, it is not without error; it can produce extreme error (Hammonds et al., 1987).

Intuition is part of all decisions

Intuition is central to all decisions, even those based on the most concrete, hard facts. Rational-analytic methods can "seldom be used exclusively; by its very nature, prediction deals with the unknown, and we can calculate or measure only what is known... At the very least, a forecaster has to use intuition in gathering and interpreting data and in deciding which unusual future events might influence the outcome. Hence in virtually every [decision] there is always some intuitive component" (Goldberg, 1990:73).

The analytical approach (or use of formula over head) [see Kleinmuntz (1990) for detailed references and arguments for the formula-over-head debate] does not appear to distinguish between an expert and somebody who has access to more information than others[2] (Prietula & Simon, 1989). It assumes that data and ideas are same things and treats information and knowledge similarly (Harper, 1990). Our point, however, is that all data are irrelevant unless interpreted meaningfully and the interpretation of data is necessarily subjective, and requires a deep understanding of the situation or context to which it pertains; and thus, necessitates the use of judgment/intuition.

In sum, intuition is not an irrational process. It is based on a deep understanding of the situation. It is a complex phenomenon that draws from the store of knowledge in our subconscious and is rooted in past experience. It is quick, but not necessarily biased as presumed in previous research on rational decision making.

THEORY AND HYPOTHESES

[2] Or, maybe, it assumes that the person who is gathering and interpreting data is an expert. In such a case, the rational-analytical approach is assuming that intuition (judgment of the expert) is important in decision making.

In this section, we make two arguments: (1) intuitive synthesis is more appropriate for strategic (or non-routine) decisions than for day-to-day operational (or routine) decisions, and (2) intuitive synthesis is more effective in an unstable environment than in a stable environment. At the end of the discussion, we propose three specific hypotheses for empirical tests.

Intuitive synthesis is more appropriate in strategic decision making

The popular 'head vs formula' controversy (see Kleinmuntz, 1990) that is based mostly on laboratory studies established the superiority of rational-analytical approaches over soft judgmental or intuitive approaches. The extension of this approach to strategic decision making is problematic, however. This is because strategic decisions are characterized by incomplete knowledge, especially, in dynamic business environments prevalent today. Consequently, it may be impossible to identify quantitative equations among variables or find numeric values for parameters and initial states. Kleinmuntz (1990) noted that the answer as to why people still use their heads instead of formulas is that many management decisions and problems have yet no available formulas. Similarly, Bass (1990) observed that intuition plays an important role in effective management and leadership, particularly at higher organizational levels.

Strategic problems are ill-structured and hence cannot be programmed (Mintzberg et al., 1976). In fact, an important issue facing scholars in management of information systems area is whether or not decision support systems (or expert systems) can be designed for senior managers. There is a growing realization that, to be effective, decision support systems must incorporate intuitive aspects of decision making (Quah et al., 1994).

Intuition is not the opposite of quantitative analysis, nor is it an attempt to eliminate quantitative analysis. The need to understand and use intuition exists because few strategic business decisions have the benefit of complete, accurate, and timely information. Harper observed:

"Like the brain surgeon, the top executive may not have to use intuition very often. But, when the data do not provide a clear answer, these executives have the uncanny ability to sense what should be done and the courage of their convictions to act decisively" (1990: 112).

Intuitive synthesis is more appropriate in an unstable environment than in a stable environment

In a stable environment, data tend to be more reliable. There is no pressure to collect data quickly and it is possible to collect it at a relatively low cost. Decisions based on facts may

then achieve better performance than decisions based on judgments or hunches.

An unstable environment, however, poses three challenges to fact-oriented information processing or data analysis: (1) a time constraint on collecting data/information, (2) a need to collect a large amount of data to deal with environmental instability, and (3) a lack of reliability of the data or information. In fact, managers face an even more fundamental problem, which is to know what data are relevant. Thus, given that hard information tends to be limited or unreliable, mental processes using soft information may be more appropriate (Mintzberg, 1994). Decision makers in such situations may benefit from intuitive synthesis which may play a key role in developing an understanding of the situation by drawing upon previously learned information associated with that situation to arrive at a decision (Quinn, 1980).

In times of change, intuitive synthesis enables experienced senior managers to size up a situation, integrate and synthesize large amounts of data, and deal with incomplete information. Quinn (1980) has even suggested that, because of the subtle and qualitative balances it can embrace, intuitive synthesis is probably superior to any rigorous model. In a "high-velocity" environment, strategic decisions need to be made swiftly, and in the absence of data or prior precedent (Eisenhardt, 1989). Hence, several scholars have suggested using intuitive synthesis to enhance decision quality in such contexts (Quinn, 1980; Eisenhardt, 1989; Prietula & Simon, 1989; Harper, 1988). Agor (1990c) has identified several conditions under which the use of intuition is appropriate: (a) there is a high level of uncertainty, (b) there is little previous precedent for action in the face of new emerging trends, (c) “facts” are limited or of little use, and (d) there are several plausible alternative solutions to choose from with good factual support for each option.

Current belief tends to be that fast decisions are achieved by using a less thorough strategic decision making process involving limited information, analysis, and participation (Fredrickson & Mitchell, 1984; Fredrickson & Iaquinto, 1989). However, Eisenhardt (1989), in her study on how executives make fast strategic decisions in "high-velocity" environments, found that fast decision makers actually use more information and develop more alternatives than do slow decision makers, and that fast decisions led to superior performance. As an explanation of this contradiction, she suggested that fast decision making executives use "real-time" information rather than "planning" information. This "real-time" information is based on their intimate knowledge of their businesses: "aided by intuition, they [fast decision making executives] ... react quickly and accurately to changing stimuli in their firm or its environment" (1989:555).

However, Eisenhardt did not explicitly test the above assertion.

Based on the above arguments, we propose the following hypotheses.

Hypothesis 1: Use of intuitive synthesis in strategic decision making will be greater in an unstable environment than in a stable environment.

Hypothesis 2: In an unstable environment, intuitive synthesis will be positively associated with organizational performance.

Hypothesis 3: In a stable environment, intuitive synthesis will have a negative or no relationship with organizational performance.

THE OPERATIONAL MODEL

This study used three constructs: intuitive synthesis, environmental instability, and organizational performance. A model showing relationships between the constructs together with operational indicators is presented in Figure 1.

Insert Figure 1 about here

Now we examine the operational indicators of the three constructs in some detail.

Intuitive Synthesis

Intuitive synthesis is a concept that has yet to make a significant impact on mainstream organizational research. Consequently, no well-established indicators of intuitive synthesis exist. Based on an understanding of the concept, however, three operational indicators were identified.

Reliance on judgment. One important facet of intuitive synthesis as suggested in previous works on the topic is use of judgment in decision-making. Intuitive synthesis involves making decisions, when the decision is to be made quickly, in the absence of adequate information and without precedent. Such situations call for judgment. Simon has treated intuition and judgment

as synonymous concepts: "Intuition and judgment, at least good judgment, are simply analyses frozen into habit and into the capacity for rapid response through recognition" (Simon, 1987:63). Bunge (1975) also has suggested that good judgment is a part of intuition. Priem (1994) argued that the judgment of top executives is important to both organizational alignment and firm performance. "Whether called insight, judgment, wisdom, ... or sixth sense, these skills help executives see things that other people don't see and incorporate factors which strict logical processes still cannot handle. This judgmental quality, more than any other, may be what separates the true executive from the hundreds of thousands of managers" (Harper, 1990:112).

***Reliance on past experience*.** In line with Prietula and Simon (1989), we treat intuitive synthesis as a form of expertise or distilled experience based on a deep knowledge of the problems that continually come up on a specific job or environment, knowledge that is accumulated via experience in handling these problems (Prietula & Simon, 1989). Thus, the extent to which senior managers rely on their past experiences will be suggestive of their use of intuitive synthesis in making strategic decisions.

Many top executives interviewed by Agor (1990b) stressed that intuitive processes, in part, were based on inputs from facts and experience gained over the years. "Experiences are the accumulated memory of past impressions, actions, and achievements. It is likely that, with growing experience, a person increasingly relies on this for the decision process. In contrast, the novice will tend to go more by the principles which he or she learned from books during his or her education" (Harung, 1993:41). Consequently, a second important facet of intuitive synthesis is the extent to which an individual relies on past experiences in his or her decision-making.

Use of "gut-feeling". We identify use of "gut-feeling" as the third facet of intuitive synthesis. Many researchers suggest that intuition manifests itself in the form of "gut-feeling" (Harper, 1988; Mintzberg, 1994; Parikh, 1994; Harung, 1993; Agor, 1990b; Vaughan, 1990). For example, Parikh (1994) described intuition as a process of "feeling out" the problem or trusting one's "gut-feeling". Harung (1993) noted that some people feel in their stomach - "gut-feeling". Executives interviewed by Agor (1990b) described intuition as: "a sense of excitement", "a growing excitement in the pit of stomach or gut-feeling", or "a burst of enthusiasm and energy".

In sum, intuitive synthesis involves judgment, relies on past experiences, and manifests itself in

the form of “gut-feelings”.

Environmental instability

Next, we discuss the operationalization aspects of the second component of our model, environmental instability (see Figure 1). Researchers have commonly used industry as an indicator of environmental instability (Dess & Beard, 1984; Finkelstein, 1992; Dess et al., 1990; Judge & Miller, 1991, among others). We have adopted this measure in our study. The Standard and Poor’s Industry Surveys, which provide detailed and up-to-date information on the prevailing conditions of all major industries, were used to identify industries representing various levels of environmental instability. Three industries, banking, computer, and utility, were identified. While the computer industry appeared to be high on environmental instability, banking was moderately so. The utility industry appeared to be the least unstable of the three industries. Haleblian and Finkelstein (1993) in their study also selected the computer and utility industries because the two industries were high and low, respectively, in terms of environmental instability.

In addition to the industry indicator, we also developed a “perceived environmental” measure as a cross-check. At present no suitable “perceived environment” measure exists that could be used in differing contexts. In fact, some researchers have recommended the use of situation specific measures of environment because the key factors may vary from one environment to the other and also because the global or general environmental measures are not reliable (Lorenzi et al., 1981; Milliken, 1990). An in-depth review of the computer, banking, and utility industries yielded major environmental factors specific to each industry. Specifically, competition and technological changes were two major factors of the computer industry. In the banking industry, apart from competition and technology, government regulation was an important factor. As for the utilities, government regulation was the major environmental factor. These factors were included in the environmental measure (see Appendix).

Organizational performance

Numerous indicators of organizational performance exist. Three kinds were used in this study: financial, operational, and institutional.

Researchers have long argued for additional measures of organizational performance

apart from the traditional accounting or financial measures. This is because organizational performance is recognized as a multi-faceted construct (Dess & Robinson, 1984; Venkatraman & Ramanujam, 1986; Ramanujam & Venkatraman, 1987; Ginsberg, 1988; Hart, 1992). The typical conception of business performance centers on the use of simple outcome-based financial indicators that are assumed to reflect the fulfillment of the economic goals of the firm (Venkatraman & Ramanujam, 1986): typical indicators are sales growth, return on investment, and return on equity.

A broader conceptualization of organizational performance would, however, include indicators of operational performance in addition to financial performance indicators. Indicators of operational performance include product quality, quality of customer services, and operating efficiency. Including institutional indicators such as public image or goodwill is a broader concept still. The measure of organizational performance employed in this study used all of the three types of indicators mentioned above (see Appendix).

METHODS

Unit of study

The unit of inquiry for this study was senior (or top) management. The early research on the linkage between top managers and the strategies they pursue focused mainly on the chief executive (Haleblian & Finkelstein, 1993; Hambrick & Mason, 1984; Mintzberg, 1990). More recent research is examining strategic issues using senior management including the chief executive; thus admitting that a CEO is subject to influence from dominant members of the organization because he or she depends on those members for implementation of decisions. In large organizations, the CEO has to delegate and depend on other senior managers for information, consultation, and decision analysis. Especially, responding to complex and often changing environments and managing diverse yet interdependent units inside corporations drive organizations toward team management at the most senior levels (Ancona & Nadler, 1989;). As a result, each member of a senior management group is likely to influence strategic decision

making significantly. Thus, senior managers (about three to four), including the CEO, in each organization were included in the survey sample[3].

Control variables

When testing hypotheses, it is necessary to control variables other than those under investigation that might influence either the dependent variable or have some relationship with independent or moderating variables. In order to extract possible confounds, three control variables were identified: industry, geographical region, and size.

There is strong evidence that organizational performance is a function of the industry in which the organization operates (Porter, 1985; Dess et al., 1990). This is because organizations in an industry commonly face similar environmental forces. Findings of studies investigating organizations across industries thus may be confounded unless they control for various unspecified industry effects. We selected three industries and performed an industry-wise analysis.

Economic indicators vary significantly from one geographical region of the United States to the other suggesting that environmental conditions in different geographical regions may be different. The control of unknown effects enables study of true variance rather than variance muddied by unknown factors and thus provides more confidence in findings. Hence, companies selected for this study were from one region of the United States: the Northeast.

Explicit attention needs to be paid to organization size. Small organizations tend to use more of informal/intuitive decision making and less of formal analysis than large organizations (Robinson & Pearce, 1983; Kukalis, 1991). The effect of the size was controlled in two ways. First, by sampling firms in a restricted range in terms of their size (sales volume). Second, the effect was controlled statistically (see Results section for details) .

Sampling and data collection

Since our hypotheses involved differing environmental contexts, we studied three industries representative of varying environmental contexts: banking, computer, and utilities. The

[3] The idea behind multiple responses was to overcome error in individual responses by averaging across multiple respondents from each firm. However, as discussed later, single responses dominate our sample. Thus, to the

computer industry is known for its turbulence; but electric and gas companies operate in a relatively stable, noncompetitive, and protected environment. The banking industry has moderate level of instability.

This study used a questionnaire/survey to collect quantitative data. It included three measures; one for each of the three constructs. All three instruments used in the survey were original and the items constituting them were all specifically constructed for this study.

The measures were exclusively subjective indicators (or self-reports) except in banks where both objective and subjective indicators were used to measure performance. The Thompson Bank Directory contains objective data on total assets, total equity, and net income of all the banks included in this study. Thus, the banking industry provided a way to examine convergent validity of subjective and objective measures of financial performance. In fact, we used the banking industry as a validity check on the performance instrument for all industries given that objective indicators of financial performance for companies in other industries were not available (more details later).

In all, 1530 surveys were mailed individually to the CEO and other senior officers of 433 companies. An industry-wise break-down of companies and individual respondents is shown in Table 1. Respondents (senior managers) represented all major titles and functional areas.

Insert Table 1 about here

The Thompson Bank Directory was used as a source of addresses and important information about banks. It is updated every six months and includes all essential financial data as well as the names of senior officers with their titles and functional areas. This information allowed questionnaires to be mailed directly to individual officers.

The Million Dollar Directory provided information about computer and utility companies. It contains information on annual sales volume, total employment size, and company officers and directors by name and title.

extent that we are using single responses in our analysis, we are compromising with some error or bias that might be inherent in single responses.

All companies from the computer and the utility industries in the Northeast with sales of more than $10 million were included in the study sample. The sample for the banking industry included state and national commercial banks from the nine Northeastern states with assets ranging from $50 million to $350 million. Thus, banks which were either too large or too small were excluded. Savings banks and other such financial institutions were not included as they have a different focus and environmental context than commercial banks.

The response rate was satisfactory, given the sensitivity of the questionnaire and the level of managers queried (see Table 2). About 68 percent of the respondents requested a summary report of survey results, reflecting their interest in the topic and perhaps the seriousness of their responses (Finkelstein, 1992). The response rate was good in the banking industry where 23.5 percent of all respondents representing 61.4 percent of the selected banks responded. Similarly, the response rate in utility and computer companies was satisfactory: 51 and 39 percent, respectively, of the selected companies responded.

Insert Table 2 about here

In all, 281 individuals from 221 companies responded to the survey (excluding 12 non-usable responses). There were 8 companies with three responses each, 44 companies with two, and 169 companies with one response each. Multiple responses were averaged across companies to provide a single score per company for each item on the questionnaire (except for the background characteristics).

The average age of those responding was 46 years. The respondents had an average experience of 14 years in the current company. They had an average working experience of 21 years in the industry. Twenty percent of the respondents were females.

Response bias was examined by comparing respondent and non-respondent companies on their sales volume and number of employees. The comparison showed no statistically significant difference across two sets of firms.

Validation of measures used in the study

We tested the validities of measures used in this study in several ways. As an indicator of

congruent validity (Venkatraman, 1989; Finkelstein, 1992; Parkhe, 1993; Kukalis, 1991; Snell, 1992; Dean & Sharfman, 1993), we assessed the agreement in responses by multiple respondents from single firms. Two responses per company were received in 44 cases and three responses in 8 cases. Hence, there were two or more respondents per firm in 52 cases (out of a total of 281 responses). The survey was examined for multi-rater agreement using the Kendall's Coefficient of Concordance. Table 3 shows the results, reporting both the value of the statistic and its significance. Fully 35 of the 52 cases (66%) demonstrated significant inter-rater reliability at the 5 percent level or better. Another 7 cases (14%) were significant at the 10 percent level. These results appear to support the validity of the measures used in the study.

Insert Tables 3 & 4 about here

Another test of validity came from the comparison of objective and subjective indicators of performance for the banking industry. Overall, perceived performance showed a strong positive relationship with objective performance measures ($r = .60$, $p < .01$ with objective Return on Assets and $r = .53$, $p < .01$ with objective Return on Equity). Further, all perceived financial indicators of performance, viz., long-run profitability, growth in sales, return on assets over the last ten years, showed convergence with both objective financial measures of performance. Given that the reported correlations were of measures from two different data sources, these results indicate convergent validity and provide support for the use of subjective measures of performance. Wooldridge and Floyd (1990), and Hart and Banbury (1994) used similar approaches to validate their measures. Dess and Robinson (1984) have also noted that subjective measures of performance can be reliable and valid, and suggest that perceived measures of performance may be used successfully when objective measures of performance are not available.

Internal consistency was assessed by computing Cronbach alphas to obtain reliability estimates for intuitive synthesis and organizational performance scales (see Table 4). Although there are no standard guidelines available on appropriate magnitudes for the coefficient, in practice an alpha greater than .60 is considered reasonable in organizational research (Finkelstein, 1992), especially, when items/indicators used in an instrument represent a broad

domain (versus a narrow one) as in this study. Against that standard intuitive synthesis and organizational performance measures demonstrated satisfactory internal consistency.

Checks for attribution and common-method biases

When self-reported data on two or more variables are collected from the same source at one time, correlations among them may be systematically contaminated by any biases in that source. We addressed the potential problems of attribution and common-method variance using statistical, post hoc, and procedural remedies discussed below.

First, we used Harman's single-factor test (see Harman, 1967; Greene & Organ, 1973; Parkhe, 1993; Podsakoff et al., 1984) to examine the common-method bias. The assumption underlying the test is that if a substantial amount of common method variance exists in data, a single factor will emerge from factor analysis when all variables are entered together, or a general factor that accounts for most of the variance will result. The results of factor analyses (rotated or unrotated) revealed neither a single factor nor a general factor, suggesting that any significant systematic variance common to the measures was lacking.

Second, attribution may underlie many correlations between organizational variables and organizational performance in self-reported data (Staw, 1978; Binning et al., 1986; and others). For example, it is possible for managers of better performing companies to report greater use of intuitive synthesis in their strategic decisions, irrespective of the actual level used. We believe that if attribution had been a source of underlying relationships, we would have found a consistency in magnitudes and signs of relationships across industries. However, the magnitudes and signs of relationship vary considerably. For example, intuitive synthesis is positively related with performance in the computer industry, but negatively so in utilities. It has a negative but insignificant relationship with organizational performance in banks.

Third, respondents in the study were senior-level executives having a lot of experience in the current company and industry (average experience of 14 years in the current company and 21 years in the industry). From that fact alone, one could expect a certain level of accuracy in their responses (Ramanujam et al., 1986). As Shortell and Zajac (1990:828,829) have observed, "using knowledgeable key informants' perceptions of an organization's strategic orientation is a valid approach to measuring strategy".

Finally, we have devoted a great deal of effort and time in analyzing and understanding

the study data. Our intimate knowledge of the data does not suggest any significant attribution and common-method biases that often occur in self-report data.

RESULTS

Banking, computer, and utility industries were selected primarily because they provide environmental contexts varying in instability. This study collected data on environmental variables using measures discussed earlier. The data offered an opportunity to assess the nature of business environments as perceived by managers of these industries (see Table 5). Managerial perceptions about the intensity of the competition were found to differ significantly across industries (F-Ratio = 46.99, $p < .001$). The Newman-Keuls test revealed that competition in the computer industry is perceived as more intense than in the other two industries. Bank managers, meanwhile, perceived tougher competition than did their counterparts in utilities.

Insert Table 5 about here

Senior managers differ significantly across industries in the perceived impact of technology on the performance of their businesses (F-Ratio = 8.748, $p < .001$). The Newman-Keuls test showed that managers in banks and computer companies perceived a significantly higher impact of technology on the performance of their companies than managers in utilities.

As expected, government regulation was perceived as a major environmental factor in banks and utilities, but was not important in the computer industry (F-Ratio = 137.990, $p < .001$). The Newman-Keuls test showed no significant statistical difference between the banking and utility industries.

On the whole, intense competition and rapid technological changes suggest that the computer industry is most unstable of the three industries. Banks, although high on all three indicators, are facing a moderately unstable environment. The utility industry was in transition and being deregulated at the time the study was conducted. As a result, managers of utility companies reported relatively higher intensity in competition and relatively greater perception in terms of technological changes than is normally associated with the utility industry. Despite the regulation, we believe that strategic decision processes have not changed significantly

after the deregulation and that it would take many more years before strategic decision making reflects the increased instability in the industry.

Hypotheses Testing

The industry-wise descriptive statistics along with one-way analysis of variance results are presented in Table 6[4]. Intuitive Synthesis varied greatly from one industry to another (F-Ratio = 12.561, $p < .001$). The mean scores of three industries on intuitive synthesis were investigated using the Newman-Keuls procedure. The results suggest that computer companies use significantly higher levels of intuitive synthesis than do banks. Banks, on the other hand, use more intuitive synthesis than do utilities. The three individual indicators of intuitive synthesis (judgment, experience, and gut-feeling) also vary significantly according to industry. Senior managers in banks and computer companies exercise more judgment than do their counterparts in utilities (F-Ratio = 5.858, $p < .003$). Managers in banks and computer companies depend on their previous experiences more than do those in utilities when making important decisions. A highly significant finding is that senior managers of computer companies rely on their gut-feelings far more than do their counterparts in banks and utilities (F-Ratio = 19.183, $p < .001$). In sum, the findings lend strong support to Hypothesis 1 that use of intuitive synthesis in strategic decision making will be greater in an unstable environment than in a stable environment.

Insert Table 6 about here

The results of correlation analysis are presented in Table 7. They suggest a negative relationship ($r = -.23$, $p < .06$) between intuitive synthesis and performance of utilities. Thus, Hypothesis 3 that, in a stable environment, intuitive synthesis will have a negative relationship with organizational performance is supported. The results indicated a positive relationship of intuitive synthesis with the performance of computer companies ($r = .28$, $p < .04$). Thus,

[4] We noted above that multiple responses were averaged across companies to provide a single score per company. However, findings or conclusions remained the same whether we used composite or individual scores. This is not surprising considering the significant multi-rater agreement. The use of composite scores (company-level analysis), however, provided relatively cleaner results (e.g., slightly better reliabilities of scales, etc.).

Hypothesis 2 which states that, in an unstable environment, intuitive synthesis will be positively associated with organizational performance, was supported.

Further, we performed a hierarchical regression analysis. Correlation analysis and hierarchical regression together provide a more comprehensive and conclusive test of the hypotheses. Results of the regression analysis are presented industry-wise in Table 8. In step 1, logarithm of organizational size was entered to control for size. It will be observed that organizational size had a positive effect on performance of banks and negative effect on performance of utilities. It was statistically insignificant for the computer companies. Intuitive synthesis was entered in the second step. As can be seen in Table 8, intuitive synthesis reached statistical significance for utilities and computer companies. It showed no statistically significant relationship for banks. Further, β coefficient is negative and statistically significant for utilities

Insert Tables 7 & 8 about here

suggesting that the relationship between intuitive synthesis and performance is negative in a stable environment. The finding is thus consistent with Hypothesis 3. Beta coefficient is positive and statistically significant ($p < .10$) for computer companies which provides support to Hypothesis 2 that intuitive synthesis will be positively associated with performance in a dynamic environment . A weaker relationship for computer companies may be attributed to the restriction of range phenomenon in computer companies as reflected in high mean scores and low standard deviations for all three indicators of intuitive synthesis (see Table 6). Intuitive synthesis showed no statistically significant relationship with organizational performance in banks.

DISCUSSION AND CONCLUSIONS

Despite the fact that intuitive synthesis is not a much explored construct in the mainstream of strategic management research, still it may come as no surprise that managers often use intuitive synthesis. We found intuitive synthesis to be an important strategy process factor which managers often exhibit in their strategic decision making. On a seven-point scale, the average values for experience and judgment variables (two of the three indicators used to measure

intuitive synthesis) were 5.66 and 5.30, respectively, in the computer industry, and 5.61 and 4.99, respectively, in the banking industry (Table 6) suggesting that experience and judgment are used extensively in strategic decision making. Further, the experience variable showed low amount of variance which implies agreement among respondents about the importance they attach to experience in strategic decision making.

A significant finding of the study is that the use of "gut-feel" in strategic decision making in the computer industry was much greater than banking and utilities. Indeed, the acceptance by senior managers of the fact that they use "gut-feelings" in strategic decision-making itself is an important finding. In response to an open-ended question of our survey, "we would welcome any comments on strategic decision making which you consider important", a senior manager of a computer company noted: "Although people think that 'gut-feeling' is not a rational decision making method, many people fail to realize that 'gut-feeling' is actually a sub-conscious derivative of the accumulation of years of management experience. An MBA course may provide us the tools to make better decisions, but it is no substitute for management experience. It is, therefore, important that decision making be based on a combination of relevant information and 'gut-feeling'."

The findings of the study (negative relationship of intuition with performance in a stable environment and a positive relationship with it in an unstable environment) suggest that intuition needs to be used cautiously and less often (perhaps, in combination with rational analysis) in a stable environment, but liberally and more often in an unstable environment. For example, based on the findings of this study, we would recommend a greater use of "gut-feelings" in the computer industry and a higher amount of experience and judgment in the computer and banking industries than in the utility industry.

To our knowledge, no study in the past has examined the relationship of intuitive synthesis with performance in a stable environment. Several researchers have suggested that top executives do use intuition in an unstable environment (Harper, 1988; Agor, 1990; Mintzberg, 1994; Quinn, 1980), but none of these studies explicitly examined whether intuition in fact had any bearing on business performance.

Eisenhardt (1989), and Judge and Miller (1991) provide indirect evidence that intuitive synthesis had a positive effect on performance in "high-velocity" environments. Eisenhardt found that fast decision making executives used more information and developed more alternatives than slow decision-makers, and that fast decisions led to superior performance. As an

explanation, she suggested that intuition allowed fast decision-makers to react quickly and accurately to changing stimuli in their firm or its environment. Judge and Miller (1991), using Eisenhardt's framework, found that decision speed (a function of more experience) was associated with higher performance in a high-velocity environment (the biotechnology industry), but was not related to performance in "low-velocity" and "medium-velocity" environments.

In view of the general trend of increasing complexity and dynamism in most business environments, intuition is likely to play increasing role in strategic decision making. This raises a number of important questions. First, can intuition be developed? If, yes, then how?. We believe that intuition can be developed most rapidly through repeated exposure to the complexity of real problems. Managers who go through intensive experiences, under the guidance of mentors, become noticeably more capable and valuable (Quinn et al., 1996).

Second, can the expertise one develops in one situation or context be transferred to other situations or contexts? We believe that as long as the underlying logic of different situations or contexts remains the same, the expertise developed in one situation can be utilized successfully in other situations. This can be an interesting issue for future research.

The third question is whether a combination of intuitive synthesis and rational analysis would be better than using either rational analysis or intuitive synthesis alone ? For example, Pondy (1983) noted that the rational and the intuitive are equal partners, each providing a context within which the other can operate. Similarly, Simon (1987) observed that, to be effective, any organization has to couple analysis and intuition in strategy making.

Naturally definitive conclusions cannot be drawn from this single study. In fact, several limitations of the study warrant mention. First, the study controlled for geography, size, and industry influences in an effort to assure more conclusive evidence. But, further work is needed on samples of small and large firms drawn from diverse geographical and industrial contexts. Important patterns emerged in our examination of three widely disparate industries, but the results may be industry-specific. Future research is needed to verify and extend the findings presented here.

A second important limitation of the study concerns causality. Correlations do not necessarily reflect causation, and reciprocal causation is a real possibility.

Another important limitation of this research is that the self-report measures it used may not truly reflect the phenomena of interest. Personal bias, values, and misperceptions may influence responses. Although senior managers' representations of strategic decision processes

and environments contain truths (Thomas & McDaniel, 1990; Shortell & Zajac, 1990; Ramanujam et al., 1986), results of the study should be interpreted with caution.

Fourth, although the measures used in this study appear to be robust (they hold across three industries), further research clearly is needed to establish their reliabilities and validities firmly. As a test of external validity, the measures used in this study should be tested on other data sets, including firms of varying sizes operating in a number of different industries/environments. Moreover, future research might attempt to find additional indicators of intuitive synthesis and examine further the three indicators used in this study.

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Table 1. Sampling Frame.

	Total Sample	
	Companies	Individuals
Banking	158	600
Computer	142	480
Utilities	133	450
Total	**433**	**1530**

Table 2. Response rates.

	Banking	Computer	Utilities	Total
Response rate for individuals (%)	23.5	12.7	17.5	18.4
Response rate for companies (%)	61.4	39.4	51.0	51.0

Table 3. Multi-rater reliability of survey respondents.

	Number of respondents in Firm	
	Two	Three
Number of firms	44	8
Average Statistic	.77	.82
Range	.38 to .95	.50 to .87
Percent significant at 5 percent	60	100
Percent significant at 10 percent	15	-
Percent significant, total	75	100

Table 4. Reliabilities (Cronbach alphas) of the measures used in the study.

Scale	Banking	Computers	Utilities	Total
Intuitive Synthesis	.65	.58	.61	.61
Performance	.83	.89	.75	.82

Table 5. Descriptive statistics and one-way analysis of variance of means of environment variables industry-wise.

VARIABLES	BANKS		COMPUTERS		UTILITIES		F-RATIO	F-PROB.
	Means	SD	Means	SD	Means	SD		
Intensity of competition	6.01	1.03	6.45	.43	4.66	1.45	46.990	.001
Impact of technology	5.97	1.00	6.11	1.37	5.31	1.25	8.748	.001
Impact of Govt. regulation	6.34	.98	2.96	1.84	5.96	1.01	137.990	.001

Banking, N = 97; Computer Industry, N = 56; Utilities, N = 68

Table 6. Descriptive statistics and one-way analysis of variance of means of Intuitive Synthesis items/variables industry-wise.

VARIABLES	BANKS		COMPUTERS		UTILITIES		F-RATIO	F-PROB.
	Means	SD	Means	SD	Means	SD		
INTUITIVE SYNTHESIS	14.89	3.09	16.52	2.23	13.93	3.04	**12.561**	**.001**
Judgment	4.99	1.56	5.30	1.11	4.46	1.39	**5.858**	**.003**
Experience	5.61	.86	5.66	.77	5.29	1.23	**2.822**	**.062**
Gut-Feeling	4.30	1.48	5.55	1.11	4.18	1.39	**19.183**	**.001**

Banking, N = 97; Computer Industry, N = 56; Utilities, N = 68

Table 7. Correlation Analysis of Intuitive Synthesis with Organizational Performance (Industry-wise).

INDUSTRY	r	p
Banking	-.16	.12
Computer	.28	.04
Utilities	-.23	.06

Banking, N = 97; Computer Industry, N = 56; Utilities, N = 68

Table 8. Results of Hierarchical Regression Analysis.

Variables	Banks				Computer Industry				Utilities			
	β	ΔR^2	F	Sig F	β	ΔR^2	F	Sig F	β	ΔR^2	F	Sig F
STEP 1												
Log (Size)	.215*	.046	4.459	.037	-.130	.017	.910	.344	-.300*	.090	6.248	.015
STEP 2												
Intuitive Synthesis	-.151	.022	2.158	.145	.251 +	.059	3.346	.073	- .299**	.089	6.710	.012
Overall R^2		.068				.076				.153		
Overall F		3.337				2.148				6.762		
Sig F		.040				.127				.002		
N		97				56				68		

\+ $p < .10$

* $p < .05$

** $P < .01$

Appendix

Intuitive Synthesis Scale

Item 1: To what extent do senior managers in your company rely on pure judgment in making important decisions? (1 = very little, 7 = a great deal)

Item 2: In your company, how much emphasis do senior managers place on past experience in making important decisions? (1 = very little, 7 = a great deal)

Item 3[1]: On many occasions, senior managers do not have enough information, and must make important decisions based on a "gut-feeling". (1 = strongly agree, 7 = strongly disagree)

[1] Reverse-coded item.

Organizational Performance Scale

Compared to companies similar in size and scope to your company, how does your company compare on each of the following measures?

We used six indicators on a scale of 1 = low to 10 = high. The six indicators are: long-run level of profitability, growth rate of sales or revenues, return on assets in the last ten years, efficiency of operations, public image and goodwill, and quality of services.

Perceived Environment Scale (Banks)

The Banking Industry broadly defines your organizational context. Please circle the answers that best describe your views of each of the following aspects of the Banking Industry.

Item 1: Competition in the banking industry is: (1 = not so intense, 7 = very intense)

Item 2: The impact of technological developments (information technology, new products, new processes) on the performance of your bank is: (1 = insignificant, 7 = very significant)

Item 3: The role of government regulation in determining the performance of your company is: (1 = negligible, 7 = critical)