



Human Relations
[0018-7267(2000)53:1]
Volume 53(1): 57-86: 010551
Copyright © 2000
The Tavistock Institute ©
SAGE Publications
London, Thousand Oaks CA,
New Delhi

The role of intuition in strategic decision making

Naresh Khatri and H. Alvin Ng

ABSTRACT

Although intuitive processes are critical for effective strategic decision making, there is little in the way of applied research on the topic. Apart from many popularized treatments of intuition in the literature today, there are only a handful of serious scholarly works on the subject. The majority of them are essentially theoretical in nature; field research in management settings is virtually nonexistent. This study examined this neglected but important process 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 associated with organizational performance in an unstable environment, but negatively so in a stable environment.

KEYWORDS

experience ■ gut-feelings ■ intuition ■ judgment ■ rationality ■ strategic decision making

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 choices which are superior to those coming from intuitive processes. However, this assumption has recently come under fire. 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 which 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 the 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, 1990a; 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 to the existing research on intuition. First, putting aside many of the more popularized treatments of intuition in the literature today, there are only a handful of serious scholarly works on the subject (Agor, 1990b). 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, 1990a; 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). Intuition 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, 1990c: 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 a 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). Intuition can ‘deal with systems more complex than those which can be figured out in our conscious minds’ (Parikh, 1994: 33). 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 grounds 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 the 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). 'Remember that "quantitative" approaches are 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 (Hammond 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-analytical 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) assumes that an expert and somebody who has access to more information than others² are not different (Prietula & Simon, 1989) and that data and ideas are the same thing. The rational-analytical approach treats information and knowledge as the same (Harper, 1990).³ However, data are not free of interpretation bias and questions of validity, nor are the ways of obtaining them and the sources always credible (Daellenbach, 1994).

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 hypothesis

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 versus formula' controversy (see Kleinmuntz, 1990 for details), that is based mostly on laboratory studies, established the superiority of the rational-analytical approach over the soft judgmental or intuitive approach. The extension of this approach to strategic decision making is problematic, however. This is because strategic decisions are characterized by incomplete knowledge, especially in the 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 the 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.

(Harper, 1990: 112)

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

In a stable environment, data are more reliable. There is not much pressure to collect data quickly and perhaps data gathering is less costly. Decisions based on facts may then achieve better performance than decisions based on judgment or hunch.

An unstable environment, however, poses three challenges to fact-oriented information processing or data analysis: (1) time constraint on collecting data/information; (2) need to collect a large amount of data to deal with environmental instability; and (3) 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 may 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 plays 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; Harper, 1988; Eisenhardt, 1989; Prietula & Simon, 1989). Agor (1990d) has identified several conditions under which the use of intuition is appropriate: (a) there is a high level of uncertainty in the environment; (b) there is little previous precedent for action in the face of new emerging trends; (c) there are limited or no 'facts'; and (d) there are several plausible alternative solutions to choose from with good factual support for each option.

According to Thompson (1967), decision making involves two major dimensions: (1) belief about cause/effect relations; and (2) preferences regarding possible outcomes. Depending upon the amount of uncertainty level on each dimension, different decision-making strategies are called for. A 'computational strategy' will be preferred where there is certainty regarding both causation and outcome preferences. Where outcome preferences are clear but cause/effect relationships are uncertain, the 'judgmental strategy' for decision making is more appropriate. And, where there is uncertainty on both dimensions, decision making may require 'inspirational strategy'.

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 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 is greater in an unstable environment than in a stable environment.

Hypothesis 2: in an unstable environment, intuitive synthesis is positively associated with organizational performance.

Hypothesis 3: in a stable environment, intuitive synthesis has 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.

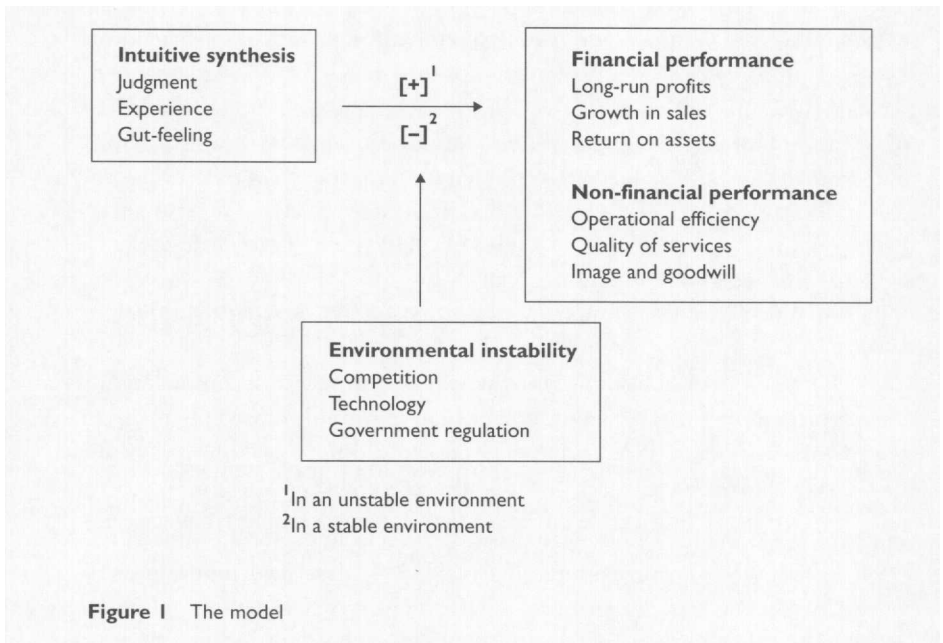
Next we discuss the operational indicators of the three constructs in detail.

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 (1990c) 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; Agor, 1990c; Vaughan, 1990; Harung, 1993; Mintzberg, 1994; Parikh, 1994). 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 (1990c) described intuition as: 'a sense of excitement', 'a growing excitement in the pit of the 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

Industry has been used often as an indicator of environmental instability in previous research (Dess & Beard, 1984; Dess et al., 1990; Judge & Miller, 1991; Haleblan & Finkelstein, 1993; among others). We used the same approach. 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.⁴

Alternatively, we included three Likert-type items as indicators of perceived instability in the above three industries: impact of technology, intensity of competition, and the government regulation (see Appendix). A composite score on the three items indexed the level of perceived environmental instability.

Organizational performance

Organizational performance is defined as the way an organization performs vis-a-vis other similar organizations in its industry, not only on traditional financial indicators of performance, but on important non-financial indicators as well.

Evidence is accumulating which suggests that simple accounting or financial measures alone are unsatisfactory indicators of organizational performance and that organizational performance is a multi-faceted construct (Dess & Robinson, 1984; Venkatraman & Ramanujam, 1986; Ramanujam & Venkatraman, 1987; Ginsberg, 1988; Hart & Banbury, 1994). A narrow conception of business performance centers on 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 assets (ROA), and return on equity (ROE), among others.

A broader view of organizational performance, however, includes indicators of non-financial performance in addition to those of financial performance. The TQM movement and the current emphasis on customer needs have highlighted the importance of non-financial criteria. Further, the institutional theory literature suggests that legitimacy is vital for organizational survival. Thus, legitimacy in the form of public image or reputation needs to be considered as an important aspect of organizational performance. In this study, we include the above criteria of non-financial performance. Specifically, our measure included indicators of quality of customer services, operating efficiency, and public image and good will.

Performance was measured subjectively (self-reports). The financial and non-financial performance measures used in the study are included in the Appendix.

Methods

Unit of study

This was a study of senior (or top) management. The early research which was done on the linkage between top managers and the strategies they pursue focused mainly on the chief executive, assuming that strategic decision making is limited to the chief executive (Hambrick & Mason, 1984; Mintzberg, 1990). More recent research is examining strategic issues using senior management including the chief executive; thus, admitting the fact that a CEO is subject to influence from dominant members of the organization because he or she relies on them to implement decisions (Ancona & Nadler,

1989; Haleblian & Finkelstein, 1993; Finkelstein & Hambrick, 1996). Therefore, three to four senior managers, including the CEO, in each organization were questioned for this study.

Control variables

Many variables affect firm performance and not all of them can be included in a single study. Still, when testing hypotheses, variables, other than those under investigation, that might influence and confound analyses need to be controlled. To that end, three important control variables were identified: organizational size, industry, and geographical region. First, organization size may interact with intuitive synthesis and thus its effect needs to be controlled. Small organizations are likely to rely on intuition more than large ones. Second, much evidence suggests that organizational performance is a function of the industry in which the organization operates (e.g. Dess et al., 1990). Judge and Miller (1991) suggested that the strategic decision-making processes needed to be studied on an industry-by-industry, context-specific basis. In this study, we identified three industries – banking, computer, and utility – to control for unspecified industry effects. Third, economic indicators are found to vary from one region of the United States to another. Thus, the unknown effects of region need to be controlled. Hence, companies selected for this study were from one region of the United States: the Northeast.

Sampling and data collection

The study used a questionnaire/survey to collect quantitative data. It included three measures, one each for intuitive synthesis, environmental instability, and organizational performance (see Appendix).

The Thompson Bank Directory provided names and addresses of CEOs and other senior managers of the banking industry, and the Million Dollar Directory for those of utilities and computer companies. In all, 1530 surveys were mailed individually to the CEO and other senior officers of a selected sample of 433 companies from the banking, computer, and utility industries. Companies were selected from the nine northeastern states of the United States. All companies from the computer and utility industries having sales of more than \$10 million were included in the study sample. The sample for the banking industry included state and national commercial banks with assets ranging from \$50 million to \$350 million. Thus, banks either too large or too small were excluded.

The response rate was satisfactory at the company level given the sensitivity of the questionnaire and the level of managers queried; 61.4, 51, and

39.4 percent of the selected banks, utilities, and computer companies, respectively, responded. The response rate for individual respondents was on the lower side, however, despite using various techniques to enhance it (Dillman, 1978); 23.5, 17.5, and 12.7 percent of the respondents from banks, utilities, and computer companies, respectively, responded. The average age of those responding was 46 years. The respondents had an average experience of 14 years in the current company and 21 years in the industry. Twenty percent of the respondents were females (see Table 1 for further information on response rates and characteristics of respondents).

The titles of those who responded were: Chief Executives, 14.6 percent; Presidents (or Chairmen), 6.1 percent; Chief Financial Officers, 5.7 percent; Chief Operating Officers or Controllers, 6.5 percent; Senior Vice Presidents, 14.6 percent, and Vice Presidents, 30.8 percent. There were no substantial differences in the titles of the respondents between industries.

In all, 281 individuals from 221 companies responded (excluding 12 non-usable responses). There were eight companies with three responses each, 44 companies with two, and 169 companies with one response each.

Validation of measures used in the study

Schwenk and Dalton (1991) found too little attention given to construct validation of measures in the strategic management research. Over 70 percent of the studies reviewed by them did not address construct validity at all. Similarly, Rajagopalan et al. (1993), in their review of research on strategic decision processes, found only a few studies making use of multi-item measures or providing tests for scale reliability and validity.

In this study, several means were employed to test the validities of measures used. First, multi-rater agreement was used to test the validity of the survey instrument. Assessing the degree of agreement in responses by multiple respondents from single firms as an indicator of convergent validity is

Table 1 Response rates and characteristics of the respondents

Scale	Banking	Computers	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
Age (years)	45	47	48	46
Experience in the industry (years)	21.5	18	20.6	20.8

Banking, $N = 97$; computer industry, $N = 56$; utilities, $N = 68$.

a commonly used tactic (Venkatraman, 1989; Kukalis, 1991; Finkelstein, 1992; Parkhe, 1993; Dean & Sharfman, 1993). Recall that this study used senior managers (several from each company) as the unit of study, thus, giving an opportunity to use multi-rater agreement as one way to check the validity of measures used in the study. Of all the usable responses received (281), two responses per company were received in 44 cases and three responses per company in eight cases. Hence, there were two or more respondents per firm in 52 cases. The survey was examined for multi-rater agreement using the Kendall's Coefficient of Concordance. Fully 35 of the 52 cases (66 percent) demonstrated significant inter-rater reliability at the 5 percent level or better. Another seven cases (14 percent) were significant at the 10 percent level. These results provide a modest support for the multi-rater agreement of the measures used in the study.

Internal consistency was assessed by computing Cronbach alphas for the three measures. Although there are no standard guidelines available on appropriate magnitude for the coefficient, in practice, an alpha greater than 0.60 is considered reasonable in organizational research (Finkelstein, 1992). Against that standard intuitive synthesis, environmental instability, and financial and non-financial performance measures demonstrated internal consistency in all three industries (see Table 2).

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; Parkhe, 1993) to examine the common-method bias. The assumption underlying the

Table 2 Reliabilities (Cronbach alphas) of the measures used in the study

Scale	Banking	Computers	Utilities	Total
Intuitive synthesis	0.65	0.58	0.61	0.61
Financial performance	0.88	0.87	0.77	0.82
Non-financial performance	0.62	0.62	0.68	0.66
Perceived environment	0.61	0.58	0.62	0.59

Banking, $N = 97$; computer industry, $N = 56$; utilities, $N = 68$.

test is that, if a substantial amount of common-method variance exists in the data, a single factor will emerge from the factor analysis when all the 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, 1975; 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 financial performance in the computer industry, but negatively so in banks and utilities. It shows an insignificant relationship with non-financial performance of banks and computer companies.

Finally, 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'.

Results

The mean scores and standard deviations of intuitive synthesis along with the mean scores and standard deviations of individual items constituting the intuitive synthesis scale are shown in Table 3. On a seven-point scale, the average values for experience were 5.61, 5.66, and 5.29 for banks, computer companies, and utilities, respectively. High mean scores coupled with low standard deviations, especially for banks and computer companies, imply agreement among respondents about the importance they attach to experience in strategic decision making. Similarly, the mean scores on the judgment variable were quite high; 4.99, 5.30, and 4.46 for banks, computer companies, and utilities, respectively. The mean score for gut-feelings for the computer companies was very high (5.55). The above findings taken together suggest that senior managers often use intuitive synthesis in their decision making.

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 4). Managerial perceptions about the intensity of the competition were found to differ significantly across industries ($F = 46.990$, $p < .001$). The Newman-Keuls test revealed that competition in the computer industry was perceived to be more intense than in the other two industries. Bank managers, meanwhile, were perceived to be tougher competition than did their counterparts in utilities.

Table 3 Descriptive statistics and one-way analysis of variance of means of intuitive synthesis items/variables for each industry

Variables	Banks		Computers		Utilities		F
	Means	SD	Means	SD	Means	SD	
Intuitive synthesis	14.89	3.09	16.52	2.23	13.93	3.04	12.561**
– Judgment	4.99	1.56	5.30	1.11	4.46	1.39	5.858**
– Experience	5.61	0.86	5.66	0.77	5.29	1.23	2.822+
– Gut-feeling	4.30	1.48	5.55	1.11	4.18	1.39	19.183**

Banking, $N = 97$; computer industry, $N = 56$; utilities, $N = 68$.
 $+ p < .10$; $* p < .05$; $** p < .01$.

Table 4 Descriptive statistics and one-way analysis of variance of means of environment variables for each industry.

Variables	Banks		Computers		Utilities		F
	Means	SD	Means	SD	Means	SD	
Intensity of competition	6.01	1.03	6.45	0.43	4.66	1.45	46.990**
Impact of technology	5.97	1.00	6.11	1.37	5.31	1.25	8.748**
Impact of government regulation	6.34	0.98	2.96	1.84	5.96	1.01	137.990**

Banking, $N = 97$; computer industry, $N = 56$; utilities, $N = 68$.
 $+ p < .10$; $* p < .05$; $** p < .01$.

Senior managers differ significantly across industries in the perceived impact of technology on the performance of their businesses ($F = 8.748, p < .001$). 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 ($F = 137.990, p < .001$). 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 the 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 (the first half of 1994). As a result, managers of utility companies reported greater intensity in competition and more perception in terms of technological changes than are normally associated with the utility industry.

Hypotheses testing

We performed two sets of analyses to test the proposed hypotheses. First, the computer, banking, and utility industries were treated as proxies for a highly unstable environment, a moderately unstable environment, and a stable environment, respectively. Each hypothesis was then tested for each industry using one-way ANOVA and regression analyses. Second, the level of perceived environment determined whether a company was classified as operating in a stable or unstable environment (classification of environment based on industries was ignored). The top one-third and bottom one-third companies based on their scores on the perceived environment scale were classified into high environment and low environment, respectively. Hypotheses were then tested using one-way ANOVA and regression analyses.

The one-way analysis of variance results of intuitive synthesis in each industry/group are presented in Table 5.⁵ Intuitive synthesis varied greatly from one industry to another ($F = 12.561, p < .001$). The mean scores of the 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 banks. Banks, on the other hand, use more intuitive synthesis than utilities. The three individual indicators of intuitive synthesis (judgment, experience, and gut-feelings) also vary significantly according to industry. Senior managers in banks and computer companies exercise more judgment than their counterparts in utilities

Table 5 Comparison of mean scores of strategy process variables using ANOVA

	Strategy construct	Industry/group	Mean	SD	F
One-way ANOVA: (by industry)	Intuitive synthesis	Banking	14.89	3.09	12.561**
		Computer	16.52	2.23	
		Utilities	13.93	3.04	
One-way ANOVA: (total sample)	Intuitive synthesis	Low environment	14.61	3.03	4.369*
		High environment	15.40	2.85	

Banks, $N = 97$; computer companies, $N = 56$; utilities, $N = 68$; low environment, $N = 69$; high environment, $N = 68$.
 $+ p < .10$; * $p < .05$; ** $p < .01$.

($F = 5.858$, $p < .003$). Managers in banks and computer companies depend on their previous experiences more than 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 their counterparts in banks and utilities ($F = 19.183$, $p < .001$).

One-way ANOVA results of high and low environment groups provide support to the results of one-way ANOVA results as regards industry. Companies in the high perceived environment group used intuitive synthesis more than companies in the low perceived environment group ($F = 4.369$, $p < .05$). In sum, the results lend strong support to Hypothesis 1 that use of intuitive synthesis in strategic decision making would be greater in an unstable environment than in a stable environment.

The results of the regression analyses are presented in Table 6. In all, we performed 10 separate regressions: five each using financial and non-financial performance as dependent variables. Six regressions were performed on three industries and four regressions (two each) on high and low perceived environment groups.

In step 1, the logarithm of organizational size (total sales) was entered to control for size. Interestingly, size was found to have a significant effect on performance in a number of cases. For example, size was positively related to the financial and non-financial performance of banks. It was also related positively to the financial performance of utilities and the non-financial performance of the low perceived environment group. It was negatively related with the financial performance of companies in the high perceived environment group.

Table 6 Results of regression analyses

Industry/ group	Dependent variable	Statistic	Step 1 Log (size)	Step 2 (Intuitive synthesis)	R ²	F	df
Banks	Financial	β	0.174+	-0.206*	0.071	4.49**	2,95
		ΔR^2	0.030+	0.041*			
	Non-financial	β	0.244**	-0.034	0.061	3.75*	2,95
		ΔR^2	0.059**	0.001			
Utilities	Financial	β	0.355**	-0.243*	0.185	6.59**	2,61
		ΔR^2	0.126**	0.059*			
	Non-financial	β	-0.273*	-0.219+	0.122	4.19*	2,61
		ΔR^2	0.075*	0.048+			
Computer companies	Financial	β	-0.152	0.406**	0.152	4.31*	2,49
		ΔR^2	0.023	0.129*			
	Non-financial	β	-0.182	0.212	0.069	1.66	2,49
		ΔR^2	0.033	0.036			
Low environment	Financial	β	-0.076	-0.188	0.041	1.37	2,64
		ΔR^2	0.006	0.035			
	Non-financial	β	0.214+	-0.243*	0.105	3.70*	2,64
		ΔR^2	0.046+	0.059*			
High environment	Financial	β	-0.227+	-0.030	0.052	1.52	2,61
		ΔR^2	0.051+	0.001			
	Non-financial	β	-0.192	-0.173	0.066	1.91	2,61
		ΔR^2	0.037	0.029			

+ $p < .10$; * $p < .05$; ** $p < .01$.

Intuitive synthesis was entered in the second step. Intuitive synthesis showed a negative and significant relationship with the financial and non-financial performance of utilities ($\beta = -0.243$, $p < .05$; $\beta = -0.219$, $p < .10$, respectively), and the non-financial performance of companies in the low perceived environment group ($\beta = -0.243$, $p < .05$). Intuitive synthesis had a non-significant relationship with the financial performance of companies in the low perceived environment group, however. These results lend support to Hypothesis 3 that intuitive synthesis would have a negative or no relationship with performance in a stable environment.

Intuitive synthesis had a highly significant and positive relationship with computer companies ($\beta = 0.406, p < .01$) but an insignificant relationship with non-financial performance ($\beta = 0.212, p < .19$). Intuitive synthesis showed no significant relationship with the financial and non-financial performance of companies in the high perceived environment group ($\beta = -0.030$ and $\beta = -0.173$, respectively). Thus, Hypothesis 2 stating that intuitive synthesis would be positively associated with performance is only partly supported.

Intuitive synthesis was negatively associated with the financial performance of banks (moderately unstable environment), but had no significant relationship with their non-financial performance.

Discussion and conclusions

Despite the fact that intuitive synthesis is not a much explored construct in the mainstream of strategic management research, it may come as no surprise that managers often use it. We found intuitive synthesis to be an important strategy process factor which managers often exhibit in their strategic decision making. Experience and judgment variables (two of the three indicators used to measure intuitive synthesis), especially, were used extensively in strategic decision making. Further, the experience variable showed a 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 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'.

Surprisingly, intuitive synthesis showed a stronger relationship with financial

performance than non-financial performance. Intuitive synthesis was significantly negatively associated with the financial performance of banks and utilities and strongly positively associated with the financial performance of computer companies. It showed a negative relationship with non-financial performance only for the low perceived environment group. The popular belief is that the rational-analytical approach is more suited to financial analysis. Thus, contrary to conventional wisdom, findings of our study suggest that experience, judgment and gut-feelings may play a significant role in financial performance.

The findings of the study suggest that intuition needs to be used cautiously and less often (perhaps, in combination with rational analysis) in a stable and moderately unstable environment, but more often in a highly unstable context.

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 (Quinn, 1980; Harper, 1988; Agor, 1990a; Mintzberg, 1994), but none of these studies explicitly examined whether intuition in fact had any bearing on business performance. Similarly, 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. Judge and Miller (1991) 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. Both the above studies focused on the influence of intuition on the pace of strategic decision making; none, however, looked directly at the intuition-performance relationship. The findings of the present study, therefore, fill an important gap in the literature by relating intuitive synthesis to organizational performance in both stable and unstable environments.

In view of the general trend of increasing complexity and dynamism in most business environments, intuition is likely to play an 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 could 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 combine 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.

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 (Ramanujam et al., 1986; Shortell & Zajac, 1990; Thomas & McDaniel, 1990), the 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 is clearly needed to establish their reliabilities and validities firmly. Future research might attempt to find additional indicators of intuitive synthesis and examine further the three indicators used in this study. In fact, we would suggest that the findings and measures of our study should be treated as exploratory. Future research needs to develop more comprehensive measures of intuitive synthesis including the indicators used in this study.

In conclusion, we believe that understanding of intuitive synthesis is central to the understanding of strategic decision processes. Unfortunately, there is little work. This study suggests that intuitive synthesis is worth exploring and requires much more research effort.

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:*^a 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)

^aReverse-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 three indicators each for financial and non-financial performance on a scale of 1 = low to 10 = high. The three indicators for financial performance are: long-run level of profitability, growth rate of sales or revenues, return on assets in the last 10 years. The three indicators used to measure non-financial performance are: efficiency of operations, public image and good will, 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)

Notes

- 1 Parikh (1994) has discussed intuition consisting of four levels: logical consciousness, subconsciousness, unconsciousness, and supraconsciousness. Intuition defined here subsumes the first two levels – logical consciousness and subconsciousness. The other two levels, unconsciousness and supraconsciousness, are beyond the scope of this study.
- 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.
- 3 The expected utility model has been the most widely used model in rational approaches to decision making. However, much research evidence has emerged suggesting that decision makers willingly violate expected utility theory when making choices (Camerer, 1989; Lattimore et al., 1988). As a result, alternative models of rational decision making which take into account beliefs, biases, and subjectivity have been put forward by scholars in the field, for example, the prospect theory (Kahneman & Tversky, 1979, 1992). The criticism of rational models by Mintzberg (1994) is less applicable to the newer models. Similarly, operational research models have traditionally been too restrictive in their assumptions and consequently not of much use in strategic decision making (Rosenhead, 1989). However, new methodologies such as soft systems and problem structuring overcome many of the limitations of the traditional operational research methods (Rosenhead, 1989; Daellenbach, 1994).
- 4 Haleblian and Finkelstein (1993) also selected computer and utility industries for their study because of high and low instabilities, respectively.
- 5 We noted earlier 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 cleaner results (e.g. slightly better reliabilities of scales, etc.).

Acknowledgements

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

References

- Agor, W.H. *Intuition in organizations: Leading and managing productively*. Newbury Park, CA: Sage Publications, 1990a.
- Agor, W.H. The logic of intuitive decision making: An agenda for future research. In W.H. Agor (Ed.), *Intuition in organizations*. Newbury Park, CA: Sage Publications, 1990b, pp. 263–4.
- Agor, W.H. The logic of intuition: How top executives make important decisions. In W.H. Agor (Ed.), *Intuition in organizations*. Newbury Park, CA: Sage Publications, 1990c, pp. 157–70.
- Agor, W.H. Wanted: The intuitive director. In W.H. Agor (Ed.), *Intuition in organizations*. Newbury Park, CA: Sage Publications, 1990d, pp. 125–30.
- Ancona, D.G. & Nadler, D.A. Top hats and executive tales: Designing the senior team. *Sloan Management Review*, Fall 1989, 19–28.
- Bass, B.M. *Bass and Stogdill's handbook of leadership*. New York: Free Press, 1990.
- Behling, O. & Eckel, N.L. Making sense out of intuition. *Academy of Management Executive*, 1991, 5(1), 46–54.
- Binning, J.F., Zaba, J.A. & Whattam, J.C. Explaining the biasing effects of performance cues in terms of cognitive categorization. *Academy of Management Journal*, 1986, 29(3), 521–35.
- Bunge, M. *Intuition and science*. Westport, CT: Greenwood Press, 1975.
- Camerer, C.F. An experimental test of several generalized utility theories. *Journal of Risk and Uncertainty*, 1989, 2(1), 61–104.
- Daellenbach, H.G. Alternative OR. *OR/MS Today*, 1994, 21(6), 44–9.
- Dean, J.W., Jr. & Sharfman, M.P. Procedural rationality in the strategic decision making process. *Journal of Management Studies*, 1993, 30(4), 587–609.
- Dess, G.G. & Beard, D.W. Dimensions of organizational task environments. *Administrative Science Quarterly*, 1984, 29(1), 52–73.
- Dess, G., Ireland, R.D., & Hitt, M. Industry effects and strategic management research. *Journal of Management*, 1990, 16(1), 7–27.
- Dillman, D.A. *Mail and telephone surveys: The total design method*. New York: Wiley, 1978.
- Eisenhardt, K. Making fast strategic decisions in high-velocity environments. *Academy of Management Journal*, 1989, 32(3), 543–76.
- Finkelstein, S. Power in top management teams: Dimensions, measurement, and validation. *Academy of Management Journal*, 1992, 35(3), 505–38.
- Fredrickson, J.W. & Iaquinto, A.L. Inertia and creeping rationality in strategic decision processes. *Academy of Management Journal*, 1989, 32(3), 516–42.

- Fredrickson, J.W. & Mitchell, T.R. Strategic decision processes: Comprehensiveness and performance in an industry with an unstable environment. *Academy of Management Journal*, 1984, 27, 399–423.
- Ginsberg, A. Measuring and modeling changes in strategy: Theoretical foundations and empirical directions. *Strategic Management Journal*, 1988, 9, 559–75.
- Goldberg, P. The many faces of intuition. In W.H. Agor (Ed.), *Intuition in organizations*. Newbury Park, CA: Sage Publications, 1990, pp. 62–77.
- Greene, C.N. & Organ, D.W. An evaluation of causal models linking the received roles with the job satisfaction. *Administrative Science Quarterly*, 1973, 18, 95–103.
- Haleblian, J. & Finkelstein, S. Top management team size, CEO dominance, and firm performance. *Academy of Management Review*, 1993, 36(4), 844–63.
- Hambrick, D. & Mason, P. Upper echelons: The organization as a reflection of its top managers. *Academy of Management Review*, 1984, 9(2), 193–206.
- Hammond, K.R., Hamm, R.M., Grassia, J. & Pearson, T. Direct comparison of the efficacy of intuitive and analytical cognition in expert judgment. *IEEE Transactions on Systems, Man, and Cybernetics*, 1987, SMC-16, 428–33.
- Harman, H.H. *Modern factor analysis*. Chicago: University of Chicago Press, 1967.
- Harper, S.C. Intuition: What separates executives from managers. *Business Horizons*, 1988, Sept.–Oct., 13–19.
- Harper, S.C. Intuition: What separates executives from managers. In W.H. Agor (Ed.), *Intuition in organizations*, Newbury Park, CA: Sage Publications, 1990, pp. 111–24.
- Hart, S.L. An integrative framework for strategy-making processes. *Academy of Management Review*, 1992, 17(2), 327–51.
- Hart, S.L. & Banbury, C. How strategy-making processes can make a difference. *Strategic Management Journal*, 1994, 15(4), 251–69.
- Harung, H.S. More effective decisions through synergy of objective and subjective approaches. *Management Decision*, 1993, 31(7), 38–45.
- Ilgen, D.R. & Feldman, J.M. Performance appraisal: a process focus. In B.M. Staw and L.L. Cummings (Eds), *Research in Organizational Behavior*. Greenwich, CT: JAI Press, 1983, pp. 141–97.
- Iserberg, D. How senior managers think? *Harvard Business Review*, 1984, Dec./Jan., 81–90.
- Judge, W.Q. & Miller, A. Antecedents and outcomes of decision speed in different environmental contexts. *Academy of Management Journal*, 1991, 34(2), 449–63.
- Kahneman, D. & Tversky, A. Prospect theory: An analysis of decision under risk. *Econometrica*, 1979, 47(2), 263–91.

- Kahneman, D. & Tversky, A. Advances in prospect theory: Cumulative representation of uncertainty. *Journal of Risk and Uncertainty*, 1992, 5(4), 297–323.
- Kirschenbaum, S.S. Influence of experience on information-gathering strategies. *Journal of Applied Psychology*, 1992, 77(3), 343–52.
- Kleinmuntz, B. Why we still use our heads instead of formulas: Toward an integrative approach. *Psychological Bulletin*, 1990, 107(3), 296–310.
- Kukalis, S. Determinants of strategic planning systems in large organizations. *Journal of Management Studies*, 1991, 28(2), 143–60.
- Lattimore, P., Witte, A.N. & Baker, J. An empirical assessment of alternative models of risky decision making. National Bureau of Economic Research Working Paper 2717, 1988.
- Lorenzi, P., Sims, H.P., Jr & Slocum, J.W., Jr Perceived environmental uncertainty: An individual or environmental attribute. *Journal of Management*, 1981, 7(2), 27–41.
- Milliken, F.J. Perceiving and interpreting environmental change. *Academy of Management Journal*, 1990, 33(1), 42–63.
- Mintzberg, H. The design school, reconsidering the basic premises of strategic management. *Strategic Management Journal*, 1990, 11(3), 171–195.
- Mintzberg, H. *The rise and fall of strategic planning*. The Free Press: New York, 1994.
- Mintzberg, H., Raisinghani, D. & Theoret, A. The structure of 'unstructured' decision processes. *Administrative Science Quarterly*, 1976, 21(2), 246–75.
- Parikh, J. *Intuition: The new frontier of management*. Oxford: Blackwell Business, 1994.
- Parkhe, A. Strategic alliance structuring. *Academy of Management Journal*, 1993, 36(4), 794–829.
- Peters, T. & Waterman, R. *In search of excellence*. New York: Harper and Row, 1982.
- Podsakoff, P.M., Todor, W.D., Grover, R.A. & Huber, V. Situational moderators of leader reward and punishment behaviors: Fact or fiction? *Organizational Behavior and Human Performance*, 1984, 34, 21–63.
- Pondy, L.R. The union of rationality and intuition in management action. Introduction: common themes in executive thought and action. In S. Srivastava and associates (Eds), *The executive mind*. San Francisco, CA: Jossey-Bass, 1983, p. 181.
- Porter, M.E. *Competitive advantage: Creating and sustaining superior performance*. New York: Free Press, 1985.
- Priem, R.L. Executive judgment, organizational congruence, and firm performance. *Organization Science*, 1994, 5(3), 421–37.
- Prietula, M.J. & Simon, H.A. The experts in your midst. *Harvard Business Review*, 1989, 67(1), 120–4.

- Quah, T., Tan, C., The, H. & Srinivasan, B. Hedging strategies in international currencies options using neural network expert system. *IBS Computing Quarterly*, Fall 1994, 29–36.
- Quinn, J.B. *Strategies for change: Logical incrementalism*. Homewood, IL: Irwin, 1980.
- Quinn, J.B., Anderson, P. & Finkelstein, S. Managing professional intellect: Making most of the best. *Harvard Business Review*, March–April 1996, 71–80.
- Rajagopalan, N., Rasheed, A.M.A. & Datta, D.K. Strategic decision processes: Critical review and future directions. *Journal of Management*, 19(2), 349–84.
- Ramanujam, V. & Venkatraman, N. Planning system characteristics and planning effectiveness. *Strategic Management Journal*, 1987, 8, 453–68.
- Ramanujam, V., Venkatraman, N. & Camillus, J.C. *Academy of Management Journal*, 1986, 29(2), 347–72.
- Raskin, P.J. Decision-making by intuition. *Chemical Engineering*, 1988, 95(18), 154–6.
- Ray, M. & Myers, R. Practical intuition. In W.H. Agor (Ed.), *Intuition in organizations*. Newbury Park, CA: Sage Publications, 1990, pp. 247–62.
- Robinson, R.B., Jr & Pearce, J.A., II The impact of formalized strategic planning on financial performance in small organizations. *Strategic Management Journal*, 1983, 4, 197–207.
- Rosenhead, J. *Rational analysis for a problematic world*. Chichester: J. Wiley, 1989.
- Rowan, R. Listen for those warning bells. In W.H. Agor (Ed.), *Intuition in organizations*, Newbury Park, CA; Sage Publications, 1990, pp. 195–204.
- Schwenk, C.W. & Dalton, D.R. The changing shape of strategic management research. In P. Shrivastava, A.M.A. Rasheed and D.K. Datta (Eds), *Advances in Strategic Management*, 7, 277–300.
- Seebo, T.C., II The value of experience and intuition. *Financial Management*, 1993, 22(1), 27.
- Shortell, S.M. & Zajac, E.J. Perceptual and archival measures of Miles and Snow's strategy types: A comprehensive assessment of reliability and validity. *Academy of Management Journal*, 1990, 33(4), 817–32.
- Shrivastava, P. & Nachman, S.A. Strategic leadership patterns. *Strategic Management Journal*, 1989, 10, 51–66.
- Simon, H.A. Making management decisions: The role of intuition and emotion. *Academy of Management Executive*, February 1987, 57–64.
- Snell, S.A. Control theory in strategic human resource management. *Academy of Management Journal*, 1992, 35(2), 292–327.
- Staw, B.M. Attributions of the 'cause' of performance: A general alternative

- interpretation of cross-sectional research in organizations. *Organizational Behavior and Human Decision Processes*, 1975, 13, 414–32.
- Thomas, J.B. & McDaniel, R.R., Jr Interpreting strategic issues: Effects of strategy and the information-processing structure of top management teams. *Academy of Management Journal*, 1990, 33(2), 286–306.
- Thompson, J.D. *Organizations in action*. New York: McGraw-Hill, 1967.
- Vaughan, F.E. Varieties of intuitive experience. In W.H. Agor (Ed.), *Intuition in organizations*. Newbury Park, CA: Sage Publications, 1990, pp. 40–61.
- Venkatraman, N. Strategic orientation of business enterprises: The construct, dimensionality, and measurement. *Management Science*, 1989, 35(8), 942–62.
- Venkatraman, N. & Ramanujam, V. Measurement of performance in strategy research: A comparison of approaches. *Academy of Management Review*, 1986, 11, 801–14.
- Wooldridge, B. & Floyd, S. The strategy process, middle management involvement and organizational performance. *Strategic Management Journal*, 1990, 11, 231–41.

Naresh Khatri's research and teaching interests include strategy, leadership, and strategic human resource management. Currently, he is working on several research projects including strategic management of human resources, success factors for expatriate managers, job-hopping: rational or irrational behaviour, and charismatic and visionary leadership. The major thrust of his research is on how to achieve a motivated, committed, and well-equipped workforce. He conducts executive programs on leadership and strategic human resource management for managers of Singapore companies. [E-mail: ankhatri@ntu.edu.sg]

H. Alvin Ng is a Senior Lecturer at the Wellington Polytechnic in New Zealand. His current research interests and publications are in the areas of learning and change, group processes, cross-cultural human resource management and organization strategy. In these areas, he has published papers and presented at various conferences, including the Academy of Management, the Australia and New Zealand Academy of Management, the International Organizational Behavior Teaching Conference and others. [E-mail: alvin@directorat.wnp.ac.nz]