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Strategic Decision Making: The Influence Of CEO Experience And Use Of Tacit Knowledge

Erich N. Brockmann

Assistant Professor of Management

The Chinese University of Hong Kong

Paul G. Simmonds

Assistant Professor of Management

Florida State University

At any given moment one is conscious of only a small section of what one knows. Intuition allows one to draw on that vast storehouse of unconscious knowledge that includes not only everything that one has experienced or learned either consciously or subliminally, but also the infinite reservoir of the collective or universal unconscious, in which individual separateness and ego boundaries are transcended.

Francis E. Vaughan, American psychologist, (1979: 26).

Unlimited access to Vaughan's reservoir of knowledge would be akin to Nirvana for strategic planners. Accessing that information would be a strong basis for strategic planning and crucial to the long-term survival of any organization. Therefore, if strategic decision makers could tap only a portion of this incalculable knowledge resource during strategy formulation, better decisions should develop and ultimately result in improved organizational performance. Furthermore, as less formalized methods of decision making prove capable of accessing this knowledge inventory, they bear closer scrutiny. One potentially fruitful, albeit controversial, informal decision-making

method relies on the use of tacit knowledge.

A manager's tacit knowledge inventory (TKI) (Sternberg et al., 1995) is analogous to Vaughan's (1979) reservoir of knowledge. Tacit knowledge is defined as work-related practical know-how that is learned informally on the job (Wagner and Sternberg, 1986); it is manifest by people knowing more than they can tell (Polanyi, 1966). It is sometimes associated with intuition, which is defined as choice made without formal analysis (Behling and Eckel, 1991), since intuition serves as a conduit for knowledge transfer (Anthony et al., 1993; Parikh et al., 1994).

Today's practitioners are continually plagued by a perceived inconsis-

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tency in their thought process. They sense an expectation for purely rational thought (Mintzberg et al., 1995), but have discovered through experience that their use of tacit, or hidden, knowledge is quite beneficial (Isenberg, 1984). Such benefits include a faster decision-making process (Eisenhardt, 1990), effective decisions (Agor, 1985a), and fewer pertinent factors necessary for a decision (Wagner, 1987).

Tacit knowledge is particularly germane to strategic decision making. Strategy is plagued by a stigma of unsystematic reasoning (Ansoff, 1988). Incomplete searches for strategic alternatives, satisficing, and bounded rationality (Simon, 1960) influence this perception. In fact, instead of problems seeking a solution, an organization may draw from its "garbage can" of ready-made solutions and apply them to problems as they arise (Cohen et al., 1972). Perhaps more appropriately, these seemingly unsystematic decision methods may simply be applications of tacit knowledge. They are examples of what Mintzberg et al. (1976) refer to as managers trying to apply structure to unstructured decisions as they attempt to identify whatever is familiar to them early in the decision process. That is, the use of tacit knowledge may be useful in explaining why many of the seemingly unsystematic decisions are in fact logical.

The purpose of this study is not to condemn the traditional and analytical methods of making decisions. We agree with Herbert Simon that "The effective manager does not have the luxury of choosing between analytic and intuitive approaches to problems" (1987: 63). Each decision must be a balanced combination of both, much like the brain depends on both

hemispheres for proper operation and orientation (Mintzberg, 1994). We seek to identify critical variables that affect the use of tacit knowledge. This study expands previous work linking the experience level of the decision makers with their use of tacit knowledge by focusing on the cognitive process of the key strategy maker. Specifically, this study examines the effect of experience and intuition on the use of tacit knowledge in the strategic decision-making process of Chief Executive Officers (CEOs).

LITERATURE REVIEW

Research in the process area of strategic management has been reviewed extensively (e.g., Huff and Reger 1987; Schwenk, 1995). These reviews suggest that importing more concepts and research from related areas into strategic management may be instrumental in understanding such issues as individual biases and cognitive processes in strategy making. Our study attempts to meet the need to understand cognitive processes by integrating the management and psychological literatures in an exploration of the strategic management process.

Several empirical studies have examined management decision making and intuition. Agor (1984) gathered a wealth of information from surveys about when, where, and how managers use intuition in their decisions. Parikh et al. (1994) gathered similar information on a much larger scale. Both studies showed that top managers use and rely on intuition. The managers acknowledged the value in using intuition particularly in decisions surrounding unstructured problems. Although these two studies are significant, they did not specifi-

cally address strategic decisions or those decision makers specifically charged with strategic responsibility (i.e., the CEO).

Eisenhardt (1989, 1990) and Bourgeois and Eisenhardt (1988) examined the speed of strategic decisions by CEOs in the California computer industry. Their results showed a significant contribution by intuition to the increased speed of decisions. However, because the sample size was very small and a single industry was involved, the results may not be sufficiently generalizable. Isenberg (1986) used verbal protocol analysis to analyze the thought processes of students and executives faced with simulated work related problems. He found that intuition aided decision makers' efficiency by reducing the amount of information needed to make a decision. However, the small sample size, lack of a strategy linkage, and the focus on students and general managers limit the generalizability of his study.

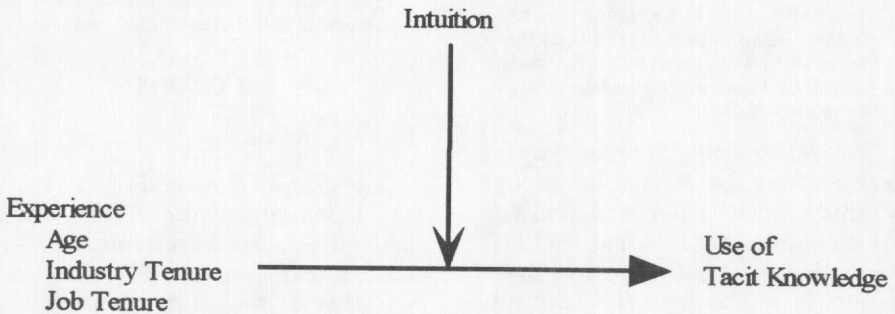
Studies on tacit knowledge are primarily found in the psychology literature. The discipline's leaders, Wagner (1987, 1991) and Wagner and Sternberg (1986, 1987), tested the level of tacit knowledge in students and faculty in a university psychology department and then extended their experiments to the business environment. Wagner and Sternberg (1987) used work-related questions to develop the concept of a tacit knowledge inventory (TKI); it is used to reflect an individual's level of tacit knowledge. They found that peoples' TKI differed in relation to their amount of experience. Similarly, Wagner (1987) showed that an individual's level of tacit knowledge varied with that person's level of professional advancement. Wagner and

Sternberg (1986) showed a performance relation held with managers; those with more tacit knowledge received higher performance ratings. Wagner (1991) summarized the research of tacit knowledge showing that a manager's use of rational thought and level of tacit knowledge complement each other during decisions made in the business environment.

HYPOTHESES DEVELOPMENT

Early developments in the strategic management literature stressed rationality and the use of formal analysis (Andrews, 1971; Ansoff, 1965). However, the nature of strategic decisions (significant uncertainty, little or no precedent, limited facts, numerous possible alternatives, and high cost of failure) makes them ill-defined and unstructured (Mintzberg et al., 1976), and not easily adaptable to analytical problem solving (Behling and Eckel, 1991; Schoemaker and Russo, 1993). Recently, a new stream of research has challenged the voracity of a rational analytical process to produce effective decisions in the current hyperturbulent environments that strategic decision makers face (D'Aveni and Gunther, 1995; Mintzberg, 1990; 1991; Nonaka, 1994). It is argued that a more informal emergent process linked to trial and experience is the best model when faced with such uncertainty (Mintzberg, 1990, 1991). Since the emergent process is not universally accepted (Ansoff, 1991), the arguments seem to suggest that tacit knowledge is a key ingredient in the strategy-making process. Therefore, those factors affecting the use of tacit knowledge are important elements of the overall strategy-making

Figure I
Model of Hypotheses



process. Based on this line of reasoning, Figure I identifies two important variables that determine the use of tacit knowledge—experience and intuition.

Ansoff (1988) posits that knowledge, particularly that which is related to strategy, can be gained only tacitly or experientially. Therefore, as tenure increases so does an individual's exposure to different problems and their related solutions. Through such exposure, an extensive repertoire of experiences, problems, and their related solutions become hierarchically organized in a person's memory (Hogarth, 1987). An external cue will then trigger a subconscious memory recall function that will subsequently develop a "feeling" about the situation (Agor, 1986). That is, an intuitive feeling of excitement, warmth, or recognition of insight will develop to indicate tacit support. Polanyi (1966) refers to the connection as the basic structure of tacit knowing. We are consciously aware of the recall only as it relates to the current situation or cue.

Similar to subconscious recognition of a solution is Melone's (1994)

concept of the autonomous stage of learning. At this stage, an individual loses the ability to describe the knowledge from which a skill came. For example, learning feeds back from the experiences to the organizational knowledge affecting the dominant logic. Incoming data or experiences are then filtered automatically, or autonomously, by the dominant logic and the analytic procedures managers use to aid strategy development (Bettis and Prahalad, 1995; Prahalad and Bettis, 1986). Therefore, both intuitive and autonomous recognition are tacit and depend on the amount of learning or level of experience possessed by an individual.

Wagner and Sternberg's (1987) research supports the relationship between experience and the use of tacit knowledge. Their concept of a tacit knowledge inventory can be viewed as a collection of personal experiences. Once gathered, this inventory is used to increase the use, and success rate, of an individual's tacit knowledge. Agor (1986) found a similar linkage between good intuitive decisions and the number of years of experience and applicable education. Therefore,

the increased experience of a CEO coupled with the ambiguous nature of strategic decisions should lead to an increased use of tacit knowledge.

Hypothesis 1. A CEO's use of tacit knowledge is positively related to the level of CEO experience; that is, the more experiences a CEO has, the more likely the CEO will use tacit knowledge when making strategic decisions.

The relationship between experience and the use of tacit knowledge is influenced by a person's ability to use tacit knowledge. Hogarth (1987) posits that everyone perceives experiences in similar ways (i.e., the subconsciousness detects everything). However, we are not alike in our ability to use specific talents. Therefore, with a measure of a person's ability to use tacit knowledge, we can examine the relationship between a person's ability and their actual use of this talent. Agor (1984, 1986) used applicable sections from the Myers-Briggs Type Indicator (MBTI) to measure thought style. He contends that the instrument, designed to measure the perception of one's style (i.e., thinker or feeler) (Myers, 1984), is also a valid proxy of one's actual intuitive ability. Even though the MBTI does not measure a person's actual use of, but rather the ability to use, intuition, it can be reasonably assumed that a person with a particular talent will have a high propensity to use that talent.

Therefore, as a CEO experiences more problems and solutions, the tacit knowledge inventory will increase. Analogous to a bank account, the more deposits made, the higher the inventory, and therefore a higher likelihood for a withdrawal. Furthermore, if the same CEO also has an increased propensity to use intuition as reflected in the classification as a feeler, then the likelihood of a withdrawal, or use, is further increased.

We therefore have a moderating effect of ability on the use of a talent.

Hypothesis 2. The CEO's propensity to use intuition will moderate the relationship between the CEO's level of experience and the use of tacit knowledge when making strategic decisions.

METHODS

Sample and data

The sample consisted of 110 CEOs (33 belonging to the 1995 Fortune 500). The average respondent's age was 53 years, tenure in the industry was 23 years, and respondents had an average 18 years in the present organization. Data was collected through a self-administered questionnaire.

Variables

Use of Tacit Knowledge. This variable (UseOfTK) was based on responses to 18 questions from our measurement tool (see Appendix). The questions were developed by modifying and combining relevant questions from Agor's (1984), Parikh et al.'s (1994) and Daake's (1995) questionnaires on tacit knowledge while maintaining a focus on strategic issues.

We analyzed the measurement tool using confirmatory factor analysis from LISREL 8 (Jöreskog and Sörbom, 1993) and principle component analysis (PCA) from SPSS7.0 (SPSS, 1996). A summary of the questions and their individual R^2 s are identified in Table 1. Analysis through PCA with prior communality estimates of one and the principal axis method showed satisfactory results. The Kaiser-Meyer-Olkin measure of sampling adequacy ($KMO = 0.72$) supported the use of factor analysis as appropriate by being greater than the required minimum

0.50 (Hair et al., 1995). The Bartlett test of Sphericity, showing the overall level of significance for the correlation matrix, was significant ($\beta = 448.87$, $p\text{-value} < 0.0001$). Finally, scale reliability (Cronbach's alpha = 0.81) exceeds the widely accepted reliability coefficient of 0.70 (Nunnally, 1978).

Experience. Because experience can come via numerous avenues, three different experience variables were collected from the CEOs. First, a broad level of experience may come from familiarity with general events experienced throughout life. Broad experience was operationalized as the age of the CEO (AGE). Second, a more specific level of experience is gained from exposure to events in the current organization as well as those from other related organizations in the same industry. This more specific experience level was operationalized by the respondent's tenure in the current organization as well as that from other organizations in the same industry (IND). Third, an even more specific level of experience comes from exposure in the current organization. This firm specific level of experience was operationalized by the respondent's tenure in the current organization (ORGL).

Intuition. While this dimension is recognized as being difficult to measure, the Myers-Briggs Type Indicator (MBTI) test is the most readily accepted method of identifying intuition (Agor, 1985b, 1989; Behling and Eckel, 1991; Myers, 1984) and was used in this study. The scale of Thinker/Feeler is dichotomous with the higher value indicating an increased ability to use intuition (i.e., 1 implies a feeler; 0 implies a thinker). Thinkers are individuals who predict logically and decide impersonally on

the basis of cause and effect while Feelers take into account anything that is important thus deciding on the basis of personal values (Myers, 1984).

Statistical method

The data were analyzed using multiple linear regression with ordinary least squares (OLS) and subgroup analysis for the moderation effect (Venkatraman, 1986). The use of OLS regression is appropriate because of the postulated linear relationship with the outcome variable dependent on multiple independent variables (Cohen and Cohen, 1983; Lewis-Beck, 1980). Subgroup analysis is selected as more appropriate than complementary moderated regression analysis because a direct effect from intuition on the use of tacit knowledge is not expected; a lack of a direct effect supports the subgroup option (Venkatraman, 1986).

RESULTS

The descriptive statistics are provided in Table 2 and the standardized regressions coefficients for the various analyses are provided in Table 3. Hypothesis 1, which stated a CEO would use more tacit knowledge with increased experience, was not supported. Multiple regression results, where each of the three measures for experience were included as independent variables in one regression, were not significant (see Table 3). Additional analysis combining the three different operationalizations of experience into a single latent variable was likewise not significant ($\beta = 0.108$, $p\text{-value} > 0.10$). However, when the different operationalizations for experience were analyzed in

Table 1
Latent and Observed Variables from CFA

	Variables	R ²	Loading	z-score
Experience				
	Age ("AGE")	0.534	1.154	7.665*
	Industry Tenure ("IND")	0.768	1.739	9.255*
	Organizational Tenure ("ORGL")	0.369	1.457	6.313*
Intuition				
	Myers-Briggs Type Indicator ("MBTI")	1.000	1.728	14.659*
Decision Style ("UseOfTK")				
TK1	Immediate response not required implying time for analysis.	0.18	0.36	4.54*
TK2	Immediate response required implying no time for analysis.	0.30	0.47	5.27*
TK3	Minimize personal conflicts or someone's pet project.	0.18	0.51	4.33*
TK4	Difficult to differentiate among numerous alternatives.	0.12	0.35	3.46*
TK5	Decision requires creativity and novelty.	0.06	0.18	2.38*
TK6	Personal preference desired for corporate direction.	0.15	0.33	3.98*
TK7	Problem is unstructured and unfamiliar.	0.32	0.63	5.78*
TK8	Similar decisions made in the past implying familiarity.	0.25	0.52	5.40*
TK9	Venturing into a new area with no familiarity.	0.12	0.33	3.68*
TK10	Radically different strategy not before encountered.	0.17	0.40	4.40*
TK11	Unclear reason for change but know it is necessary.	0.09	0.29	3.01*
TK12	Setting future direction without external impetus.	0.27	0.38	5.29*
TK13	Responding to issues raised by governmental entities.	0.33	0.60	5.96*
TK14	Responding to issues raised by the news media.	0.17	0.44	4.20*
TK15	No clear need for change is necessary.	0.15	0.30	3.87*
TK16	Actions after initial identification of a problem.	0.20	0.43	4.39*
TK17	Deciding on a decision after discussion is over.	0.31	0.45	5.99*
TK18	Quick response to environment change necessary.	0.23	0.36	4.97*

Note: * p-value < 0.05

three separate regressions, only Industry Tenure (IND) was significant ($\beta = 0.141$, p-value < 0.10). These latter results become more interesting when evaluating the second hypothesis.

Hypothesis 2, which stated a moderating effect of the CEO's intuition, was supported. When using subgroup analysis, moderation is present when

one of the regression coefficients is significant and the other is not (Venkatraman, 1989). The analysis showed such a difference, one statistically significant and one nonsignificant, in the regression coefficients for Industry Tenure (IND) between the levels of intuition (see Subgroup section of Table 3). That is, the regression coefficient for Feelers (Intuition

Table 2

Descriptive Statistics and Correlation Matrix

	Mean	s.d.	1	2	3	4	5
1. AGE	4.07	1.60	1.000				
2. IND	6.50	2.00	0.638**	1.000			
3. ORGL	4.59	2.42	0.447**	0.527**	1.000		
4. UseOfTK	0.05	0.01	0.046	0.141	0.082	1.000	
5. Intuition	0.28	0.45	0.077	0.108	0.018	0.043	1.000

Note: ** p-value < 0.01

= 1) was significant ($\beta = 0.353$, p-value < 0.10) while the coefficient for Thinkers (Intuition = 0) was not ($\beta = -0.298$, p-value > 0.10). This difference in significance supports Hypothesis 2—the level of intuition has a moderating effect on the relationship between a CEO's industry experience and use of tacit knowledge.

Similar analysis of the moderating effects of intuition on the relationship between other experience (i.e., AGE and ORGL) and the use of tacit

knowledge showed a lack of moderation. When the regression coefficients for the two groups (i.e., Feeler and Thinker) are both significant or both not significant, moderation is not present (Venkatraman, 1989). For AGE, the Feelers' coefficient was significant ($\beta=0.406$, p-value < 0.10) but so was that of the Thinkers ($\beta = -0.250$, p-value < 0.10). This similarity in individual significance reflects a lack of moderation. Likewise, for ORGL, the Feelers' coefficient was

Table 3

Results of Regression Analysis

Independent Variables	B	SE B	Subgroup Analysis			
			Thinkers		Feelers	
			B	SE B	B	SE B
AGE	-0.077	0.083	0.406*	0.118	-0.250†	0.103
IND	0.178	0.069	-0.298	0.115	0.353*	0.086
ORGL	0.023	0.049	0.131	0.073	0.004	0.062

Note: N = 99, coefficients are standardized, $R^2 = 0.10$.

† p-value < 0.10

* p-value < 0.05

not as significant ($\beta = 0.131$, p -value > 0.10) as was that for the Thinkers ($\beta = 0.004$, p -value > 0.10).

DISCUSSION

The present study was designed to examine CEOs' use of tacit knowledge during decisions of a strategic nature. We endeavored to highlight the application of tacit knowledge as an integral part of the strategic decision-making process. Based on previous research in the area of strategic decision making (e.g., Agor, 1984; Bourgeois and Eisenhardt, 1988; Eisenhardt, 1989, 1990), we hypothesized that as CEOs' experiences increased so would their use of tacit knowledge in strategic decision making. It was further hypothesized that intuition would moderate the relationship between CEO's experience and use of tacit knowledge in the strategic decision-making process.

It appears from our results that experience itself is not sufficient for CEO's to use tacit knowledge. While a tacit knowledge inventory is built up through experience (Wagner, 1991), the use of tacit knowledge is dependent on the combined effects of experience and intuition propensity. It is important to note that there are distinctive differences in what type of experiences are important and how they interact with intuition to affect the use of tacit knowledge. In this study, only experience in the industry was significantly related to the use of tacit knowledge. Meanwhile, experience of a more general nature, as reflected by a respondent's age, as well as more specific experience, as reflected by the respondent's tenure with the organization, were insignificant. One possible reason for this outcome is that industry dynamics are

more applicable to analyzing the competitive environment and therefore are of most significance to strategic decision making. Such an effect implies that the tacit knowledge inventory applicable to strategic decision making comes from experience in the industry.

Our results lend support to previous studies (e.g., Agor, 1984; Eisenhardt, 1989, 1990; Parikh et al., 1994) that showed managers use strategic decision-making processes that are not totally rational. It also extends that research by specifically examining strategic decisions and focusing on the key decision maker. The CEOs noted that their answers to the questions on the survey were based on numerous strategic decisions. This extends the relatively small array of strategies available in Eisenhardt (1989, 1990) and Bourgeois and Eisenhardt (1988), thereby making their results more generalizable. It also provides a convergence of findings by Agor (1984) and Parikh et al. (1994) of general acceptance for using tacit knowledge during the strategic decision-making process.

From a more practical perspective, these results reinforce the potential for CEOs and other executives to improve the success rate of decisions made with tacit knowledge. Agor (1984) noted that managers experiencing success with the use of intuition tend to use intuition more often with future decisions. This result is analogous to simple positive feedback or learning and its influence on organizational intelligence or dominant logic. As Bettis and Prahalad (1995) described organizational learning, tacit knowledge inventory has a significant impact on the filtering of data through the dominant logic and analytical procedures.

Additionally, Eisenhardt (1989, 1990) and Parikh et al. (1994) contend that intuition is vital in the face of ever quickening changes in the business environment. Those skilled in the successful application of intuition may be able to take advantage of short-lived opportunities in a dynamic environment to increase the chances of business success. The concept of intuition as a conduit connecting the consciousness and the subconsciousness (Parikh et al., 1994) implies decision rapidity on the level of other brain functions. Likewise, intuition's autonomous nature (Melone, 1994) is developed only at the highest level of learning. This would imply a link between decisions made without explicit rationale and business success. Examining such a connection may prove difficult and should not be confused with decisions in the total absence of data. Such decisions may be described as ignorance exemplified with "I've already made up my mind, don't confuse me with the data" (Harper, 1988).

One major limitation of this study is that it was narrowly focused on the CEO. Research on the entire top management team (TMT) is often more enlightening than focusing on only the CEO or a single tier of management (Hambrick and Mason, 1984; Wiersema and Bantel, 1992). Such a team focus would have been appropriate since respondents claimed to use a team or combination team/individual type of decision process, supporting Thompson's (1967) concept of a dominant coalition. Therefore, an extension of this study to the top management team

and their dominant logic (Prahalad and Bettis, 1986) or collective mind (Weick and Roberts, 1993) may be of value.

Another limitation of this study is its comingling of strategic decisions. That is, both corporate level as well as business level decisions were considered to be part of the strategic decision-making process. A potentially fruitful extension of this study would be to separate the different types of strategic decisions to test for similar relationships found here.

Finally, determining a link to firm performance should complete the entire decision-making, implementing, and evaluating phases of the strategic management process. Such a holistic view would not only incorporate the decision-making procedure, but include all of the problems associated with implementation and success evaluation. For instance, the TQM philosophy of including the end-users in the decision-making process provides a natural extension to the strategic decision-making process. If the TMT includes those people responsible for implementing the decision in the decision-making process, implementation should be easier.

Intuitively, the easier a decision is to implement the better the firm performance should be, other things being equal. If successful firm performance results from the use of tacit knowledge in the decision process, the decision maker is more likely to use tacit knowledge in future decisions. Such success should remove the remaining negative stigma and bring the use of tacit knowledge out of the private offices and into the boardrooms.

Appendix

The following response descriptions correspond to the scale (1-5) used in coding the responses to the questions below:

1. Rely primarily upon formal reports of scientifically generated facts and figures.
 2. Rely more heavily on scientifically generated facts and figures than on my own insight or perception.
 3. Rely about equally on formal reports of scientifically generated facts and figures, and my own insight and perception.
 4. Rely more heavily on my insight and perceptions than on scientifically generated facts and figures.
 5. Rely primarily on my own insight and perception.
1. Once the need for a strategic decision is identified, and an immediate response is not required, how do you decide the next step?
 2. Once the need for a strategic decision is identified, and an immediate response is required, how do you decide on the next step?
 3. When it is important to minimize conflict, or attacking someone's "pet project," how do you decide what to do next?
 4. If it is difficult to differentiate among plausible solutions to a problem (i.e., they can't be easily rank ordered by preference) because each has good arguments, how do you decide to proceed to the next step?
 5. If a strategic decision requires creativity and novelty, how do you proceed to the next step?
 6. For a personal preference concerning corporate direction, with immediate implementation unnecessary, how do you proceed to a formal decision?
 7. When encountering a problem that is unstructured and has not been encountered before, how do you decide on the next step?
 8. If you have been recently faced with a similar decision, how do you decide on the next step?
 9. If you are considering venturing into an area where your company has never ventured before, how do you decide to continue?
 10. If you have decided to pursue a strategy radically different from any that your company has been previously involved in, how do you decide on the correct course of action?
 11. In general, when deciding to change the strategic direction of the company, but the reason for the change is unclear, how do you decide to continue?
 12. When anticipating the future direction of the company, as opposed to responding to an identifiable problem, how do you decide on an appropriate strategy?
 13. When responding to issues raised by Governmental or Regulatory officials, how do you determine the appropriate course of action?
 14. When responding to problems or issues raised by the News media, how do you select the appropriate course of action?

15. In the absence of clear signals for strategic change, how do you decide what alterations (if any) to make to the strategic plan for the upcoming year?
16. When a problem or opportunity is initially identified, how do you decide on the next step?
17. When a final decision must be made on a strategic issue of major importance, how is that decision made?
18. When a quick response is necessary because of very rapidly changing circumstances, how do you proceed?

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