Environmental Scanning as Information Seeking and Organizational Learning

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Introduction

Environmental scanning is the acquisition and use of information about events, trends, and relationships in an organization's external environment, the knowledge of which would assist management in planning the organization's future course of action (Aguilar 1967, Choo and Auster 1993). Organizations scan the environment in order to understand the external forces of change so that they may develop effective responses which secure or improve their position in the future. They scan in order to avoid surprises, identify threats and opportunities, gain competitive advantage, and improve long- and short-term planning (Sutton 1988). To the extent that an organization's ability to adapt to its outside environment is dependent on knowing and interpreting the external changes that are taking place, environmental scanning constitutes a primary mode of organizational learning. Environmental scanning includes both *looking at* information (viewing) and *looking for* information (searching). It could range from a casual conversation at the lunch table or a chance observation of an angry customer, to a formal market research program or a scenario planning exercise.

1 Research on Scanning

Scanning or browsing behavior is influenced by external factors such as environmental turbulence and resource dependency, organizational factors such as the nature of the business and the strategy pursued, information factors such as the availability and quality of information, and personal factors such as the scanner's knowledge or cognitive style. Thus, many research studies on scanning investigate the effect of situational dimensions, organizational strategies, information needs, and personal traits on scanning behavior (Figure 1). *Situational dimensions* are often studied by measuring the perceived uncertainty of the external environment, a concept that is closely related to the perceived environmental analyzability of the scanning-interpretation-learning model that we discussed in the last section. *Organizational strategies* refer to the

position or stance of the organization vis-à-vis the outside environment, and two examples of well-known strategy typologies are those developed by Miles and Snow (1978) and Porter (1980). *Managerial traits* that have been studied include the managers' functional specialty, hierarchical level, and cognitive style. Scanning as a form of information behavior comprises information needs, information seeking, and information use. In the context of environmental scanning, *information needs* are often studied with respect to the focus and scope of scanning, particularly the environmental sectors where scanning is most intense. *Information seeking* has been examined in terms of the sources that are used to scan the environment as well as the organizational methods and systems deployed to monitor the environment. Finally, *information use* is usually looked at in relation to decision making, strategic planning, or equivocality reduction.

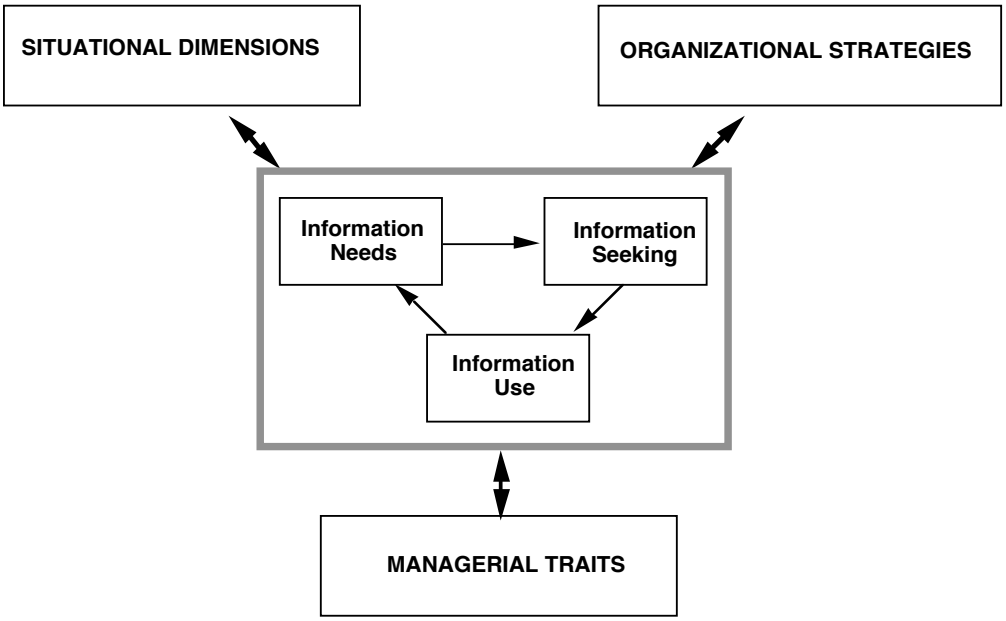

Figure 1 A Conceptual Framework for Environmental Scanning

What may be gleaned from the research that has been completed so far on environmental scanning as a mode of strategic organizational learning? A summary may include the following observations (Choo 2001).

(1) *Situational dimensions: The effect of perceived environmental uncertainty.* Managers who perceive the environment to be more uncertain will tend to scan more. Perceived

environmental uncertainty is indicated by the complexity, pace of change, and importance of the sectors comprising the external environment.

(2) *Organizational strategy and scanning strategy.* An organization's overall strategy is related to the sophistication and scope of its scanning activities. Scanning must be able to provide the information and information processing needed to develop and pursue the elected strategy.

(3) *Managerial traits: Unanswered questions.* Little is known with confidence about the effect of the manager's job-related and cognitive traits on scanning. Upper-level managers seem to scan more than lower-level managers. Functional managers scan beyond the limits of their specializations.

(4) *Information needs: The focus of environmental scanning.* Most studies look at scanning in various environmental sectors: customers, competitors, suppliers, technology; social, political, economic conditions. Business organizations focus their scanning on market-related sectors of the environment.

(5) *Information seeking: Source usage and preferences.* Although managers scan with a wide range of sources, they prefer personal sources to formal, impersonal sources, especially when seeking information about developments in the fluid market-related sectors.

(6) *Information seeking: Scanning methods.* Organizations scan in a variety of modes, depending on the organization's size, dependence and perception of the environment, experience with scanning and planning, and the industry that the organization is in.

(7) *Information use: Strategic planning and enhanced organizational learning.* Information from scanning is increasingly being used to drive the strategic planning process. Research suggests that effective scanning and planning is linked to improved organizational learning and performance.

Figure 2 outlines these principal findings, using the conceptual framework of Figure 1.

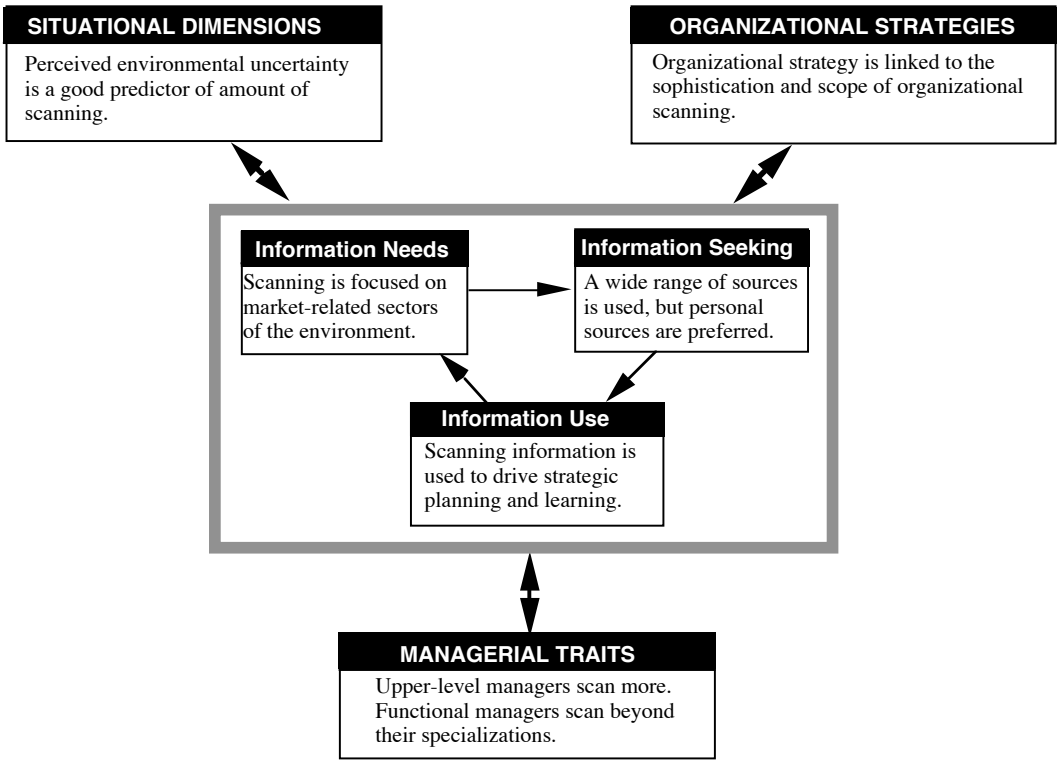

Figure 2 Summary of Principal Findings from Research on Environmental Scanning
(adapted from Figure 4.4, pg. 120, Choo 2001)

2 Scanning and Performance

Does environmental scanning improve organizational performance? Several studies suggest that this is the case. Miller and Friesen (1977) analyzed 81 detailed case studies of successful and failing businesses, and categorized them according to ten archetypes — six for successful and four for unsuccessful firms. The study found that intelligence-rationality factor, which comprises environmental scanning, controls, communication, adaptiveness, analysis, integration, multiplexity, and industry experience, was by far the most important factor in separating the successful companies from the unsuccessful, accounting for more than half of the observed variance. The environmental scanning and intelligence activity in all but one of successful archetypes were judged to be ‘substantial’ or ‘concerted,’ whereas the intelligence effort in the failing firms were described as ‘poor’ and ‘weak.’ Miller and Friesen observed that

> One fact is particularly worth noting. That is that the highest intelligence/rationality score amongst the failure archetypes is lower than the lowest intelligence/rationality score amongst the successful archetypes. The intelligence factor discriminates perfectly amongst failure and successful archetypes. (Miller and Friesen 1977, p.269)

Newgren et al (1984) compared the economic performance of 28 US corporations which practised environmental scanning with 22 non-practising firms. Performance was measured over a five-year period (1975-1980) using the firm's share price/earning ratio, normalized by industry. Data analysis showed that scanning firms significantly outperformed non-scanning firms. The average annual performance of the scanning firms was also consistently better than the non-scanning firms throughout the period. The study concluded that environmental scanning and assessment has a positive influence on corporate performance. Scanning also benefits small businesses.

West (1988) examined the relationship of organizational strategy *and* environmental scanning to performance in the US foodservice industry. Data were collected from 65 companies over the period 1982 to 1986. Strategy was classified according to Porter's (1980) typology of product differentiation, low cost leadership, and niche focus. The study found that strategy and environmental scanning had a substantial influence on the firm's return on assets and return on sales. High-performing firms in both differentiation and low cost strategies engaged in significantly greater amounts of scanning than low-performing firms in those two strategic groups.

Daft et al's 1988 study of scanning by chief executives found that executives of high-performing firms (those with higher return on assets) increased the frequency, intensity, and breadth of their scanning as external uncertainty rose.

Subramanian and his associates' studied scanning and performance in US Fortune 500 companies and found support for a relationship between performance, measured by profitability and growth, and advanced scanning systems: firms using advanced systems to monitor external

events showed higher growth and profitability than firms that did not have such systems (Subramanian et al 1993a).

Subramanian led another study of over 600 hospitals of the American Hospital Association which concluded that hospitals with the more sophisticated scanning functions performed significantly better than hospitals that used less advanced or basic methods to monitor the environment (Subramanian et al 1994). The sophisticated scanners scored high in their ability to obtain information *and* their ability to use the scanning information in the strategic planning process. These hospitals performed better in terms of occupancy rates and per bed expenditures.

Ahituv, Zif and Machlin (1998) interviewed CEOs in 46 Israeli firms to study their environmental scanning behavior in relation to new product introduction. A firm's success with new products was measured by the percentage of profit from new products relative to total annual profits. The more successful firms showed a larger correlation between strategic uncertainty and scanning frequency in the technology, economic, and socio-cultural sectors compared to the less successful firms. They scanned at a higher frequency in the competitor, customer, and technology sectors, making greater use of formal and personal sources.

The benefits of scanning were not solely economic or financial. In an in-depth case study of environmental scanning at the Georgia Center for Continuing Education, Murphy (1987) concluded that scanning is an important component of the organization's strategic planning process, improving the Center's ability to react to and implement change in response to external factors. Furthermore, scanning has also contributed to increased communication among the line and staff personnel of the organization, and greater employee involvement in the decision making process. Ptaszynski (1989) examined the effect of the introduction of environmental scanning in another educational organization. The study found scanning to have a positive effect on the organization in these areas: communication, shared vision, strategic planning and management, and future orientation. The most significant effect was that scanning provided a structured process which encouraged people to regularly participate in face-to-face discussions on planning issues. As a result, the organization was able to develop a number of strategic options that could be used proactively to cope with external change.

Information derived from environmental scanning is increasingly being used to drive the strategic planning process by business and public-sector organizations in most developed countries. There is research evidence to show that environmental scanning is linked with improved organizational performance. However, the practice of scanning by itself is insufficient to assure performance – scanning must be *aligned* with strategy, and scanning information must be effectively *utilized* in the strategic planning process. An important effect of scanning is to increase and enhance communication and discussion about future-oriented issues by people in the organization. Coupled with the availability of information on external change, scanning can induce strategic, generative organizational learning.

Towards A Model of Organizational Scanning

Despite its importance, our theoretical understanding of organizational scanning remains limited. Although all forms of scanning necessarily involves the seeking and use of information about the environment, different organizations operating in different environments may be expected to scan quite differently. Aguilar (1967) identified four modes of managerial scanning based on his field research. Daft and Weick (1984) and Weick and Daft (1983) build on Aguilar's work and develop a general model of organizational scanning based on the two dimensions of environmental analyzability ("can we analyze what is happening in the environment?") and organizational intrusiveness ("do we intrude actively into the environment to collect information?"). The objective of this paper is to expand the Aguilar/Daft and Weick model in two ways. First, since scanning is a quintessential form of organizational information seeking, we elaborate the model by detailing the information needs, information seeking, and information use patterns that characterize organizational scanning. Second, since the goal of scanning is the gaining of new knowledge that enables action, we elaborate the model by detailing the sensemaking, knowledge-creation, and decision-making processes that constitute organizational scanning.

Depending on the organization's beliefs about environmental analyzability and the extent that it intrudes into the environment to understand it, four modes of scanning may be differentiated: undirected viewing, conditioned viewing, enacting, and searching.

3 Environmental Analyzability and Organizational Intrusiveness

Daft and Weick (1984) suggest that organizations differ in their modes of scanning, depending on management's beliefs about the analyzability of the external environment, and the extent to which the organization intrudes into the environment to understand it. An organization that believes the environment to be analyzable, in which events and processes are determinable and measurable, might seek to discover the 'correct' interpretation through systematic information gathering and analysis. Conversely, an organization that perceives the environment to be unanalyzable might create or enact what it believes to be a reasonable interpretation that can explain past behavior and suggest future actions.

Daft and Weick (1984) hypothesize that differences in perceptions of **environmental analyzability** are due to characteristics of the environment combined with management's previous interpretation experience. We may postulate further that analyzability would be closely related to the concept of perceived environmental uncertainty. Perceived environmental uncertainty is the variable that measures the totality of the scanner's perception of the external environment's complexity and changeability. Duncan (1972) identified dimensions of the environment that would determine its perceived uncertainty: the simple-complex dimension (the number of environmental factors considered in decision making) and the static-dynamic dimension (the degree to which these factors change over time). Decision makers in environments that are dynamic and complex experience the greatest amount of perceived environmental uncertainty. Thus, perceived environmental uncertainty is determined by the perceived complexity (number of factors, opacity of causal relationships) and perceived dynamism (rate of change) of the external environment. The combined effect of a large number of external factors and actors, unclear cause-and-effect linkages, and the rapid rate of change is the perception that the environment is unanalyzable. Empirical research on scanning suggests that managers who experience higher levels of perceived environmental uncertainty tend to do a larger amount of environmental scanning (Choo 2001).

Besides environmental uncertainty, the level of knowledge and information available about the environment may also be an important factor. Some industries regularly collect and analyze data

about products, markets, and competitors. In many cases automation and the use of information technology have made it possible to efficiently amass and analyze data and trends (for example, computerized reservation systems in the airline industry, and point of sales systems in the retail industry). Information that is available affordably, and that is sufficiently detailed and timely to support decision making, may lead to the perception that the environment is analyzable.

An organization that intrudes actively into the environment is one that allocates substantial resources for information search and for testing or manipulating the environment. A passive organization on the other hand takes whatever environmental information comes its way, and tries to interpret the environment with the given information.

Daft and Weick (1984) hypothesize that differences in organizational intrusiveness are due to the degree of conflict between the organization and its environment. They cite Wilensky's argument that when the environment is seen as hostile or threatening, or when the organization depends heavily on the environment, more resources are allocated to the scanning function (Wilensky 1967). A hostile environment increases scanning because of new problems and the need to identify new opportunities and niches. Conversely, organizations in benevolent environments have weaker incentives to be intrusive. This line of reasoning is congruous with resource-dependency theory and institutional theory.

In resource-dependency theory (Pfeffer and Salancik 1978), the environment is seen as a source of resources upon which the organization is dependent. Resource dependence is affected by munificence, or the abundance of resources; concentration, the extent to which power and authority in the environment is dispersed; and interconnectedness, the number and pattern of linkages among organizations in the environment. The degree of dependence would be great when resources are scarce, and when entities in the environment are highly concentrated or interconnected. An organization can manage increasing dependence by adapting to or avoiding external demands; changing the patterns of interdependence through growth, merger, and diversification; establishing collective structures to form a ‘negotiated environment;’ and using legal, political or social action to form a ‘created environment.’ (Pfeffer and Salancik 1978)

Thus, "managers are manipulators and schemers vis-à-vis their environments." (Aldrich 1999, p. 65)

Institutional theory (Powell and DiMaggio 1991) generally regards organizations as being "forced to respond to, adapt to, or imitate the ebb and flow of normative and regulatory currents in their environments." (Aldrich 1999, p. 49) Organization-environment relations are described by verbs that carry the connotation that environments dominate or overpower organizations: change is imposed, authorized, induced, imprinted, and incorporated (Scott 1987).

In addition to the relationship with its environment, the organization's overall business strategy may also be related to the sophistication, scope, and intensity of its intrusiveness. An organization that follows a particular strategy, such as a product differentiation, cost leadership, or focus strategy (Porter 1980), or adopt a certain strategic stance, such as prospector, analyzer, or defender (Miles and Snow 1978), is likely to adopt a scanning mode that provides the required information and information gathering capabilities to pursue its desired strategy.

Besides organization-environment relationship and strategy, we may postulate that intrusiveness would also be affected by: organizational size and inertia; organizational slack or the availability of resources to allocate to active scanning; past experience with scanning and interpreting the environment; and the availability of action or communication channels allowing the organization to influence the environment.

4 Environmental Scanning as Information Seeking and Organizational Learning

In the next section, we will look at each mode of scanning by examining its characteristic information needs, information seeking, and information use behaviors. In addition, we will analyze organizational learning processes by considering the sensemaking, knowledge creating and decision making processes at work in each mode.

An organization processes information to make sense of its environment, to create new knowledge, and to make decisions (Choo 1998). *Sensemaking* is induced by changes in the environment that create discontinuity in the flow of experience engaging the people and

activities of an organization. People enact or actively construct the environment that they attend to by bracketing experience, and by creating new features in the environment (Weick 1995). Organizational sensemaking can be driven by beliefs or by actions (Weick 1995). In *belief-driven processes*, people start from an initial set of beliefs that are sufficiently clear and plausible, and use them as nodes to connect more and more information into larger structures of meaning. People may use beliefs as expectations to guide the choice of plausible interpretations, or they may argue about beliefs and their relevance when these beliefs conflict with current information. In *action-driven processes*, people start from their actions and grow their structures of meaning around them, modifying the structures in order to give significance to those actions. People may create meaning to *justify* actions that they are already committed to, or they may create meaning to *explain* actions that have been taken to manipulate the environment.

An organization possesses three kinds of knowledge: tacit knowledge, explicit knowledge; and cultural knowledge (Choo and Bontis 2002). *Tacit knowledge* is the personal knowledge that is learned through extended periods of experiencing and doing a task, during which the individual develops a feel for and a capacity to make intuitive judgments about the successful execution of the activity. *Explicit knowledge* is knowledge that is expressed formally using a system of symbols, and may be object-based or rule-based. Knowledge is object-based when it is represented using strings of symbols (documents, software code), or is embodied in physical entities (equipment, substances). Explicit knowledge is rule-based when the knowledge is codified into rules, routines, or operating procedures. *Cultural knowledge* consists of the beliefs an organization holds to be true based on experience, observation, reflection about itself and its environment. Over time, an organization develops shared beliefs about the nature of its main business, core capabilities, markets, competitors, and so on. These beliefs then form the criteria for evaluating information and allocating attention. Nonaka and Takeuchi (1995) argue that organizations create new innovations and capabilities by continuously converting and combining its tacit and explicit knowledge.

Completely rational decision making requires information gathering and information processing beyond the capabilities of any organization. In practice, organizational decision making departs from the rational ideal in important ways depending on: (1) the clarity of organizational goals

that impinge on preferences and choices (goal ambiguity or conflict), and (2) the uncertainty or amount of information about the methods and processes by which the goals are to be attained (technical or procedural uncertainty). In the *boundedly rational mode*, when goal and procedural clarity are both high, choice is guided by performance programs (March and Simon 1993). Thus, decision makers 'simplify' their representation of the problem situation; 'satisfice' rather than maximize their searches; and follow 'action programs' or routinized procedures. In the *process mode* (Mintzberg et al, 1976), when strategic goals are clear but the methods to attain them are not, decision making becomes a process that is highly dynamic, with many internal and external factors interrupting and changing the tempo and direction of the decision process. In the *political mode* (Allison and Zelikow 1999), goals are contested by interest groups but procedural certainty is high within the groups: each group believes that its preferred alternative is best for the organization. Decisions and actions are then the results of the bargaining among players pursuing their own interests and manipulating their available instruments of influence. In the *anarchic mode* (also known as the Garbage Can model of decision making) (Cohen et al, 1972), when goal and procedural uncertainty are both high, decision situations consist of independent streams of problems, solutions, participants, and choice opportunities arriving and leaving. A decision then happens when problems, solutions, participants, and choices coincide. When they do, solutions are attached to problems, and problems to choices by participants who are present and have the interest, time and energy to do so.

5 Modes of Environmental Scanning

Depending on whether the organization believes the environment is analyzable or not, and whether the organization is active or passive about intruding into the environment in order to understand it, four modes of scanning may be differentiated: undirected viewing, conditioned viewing, enacting, and searching (Figure 3).

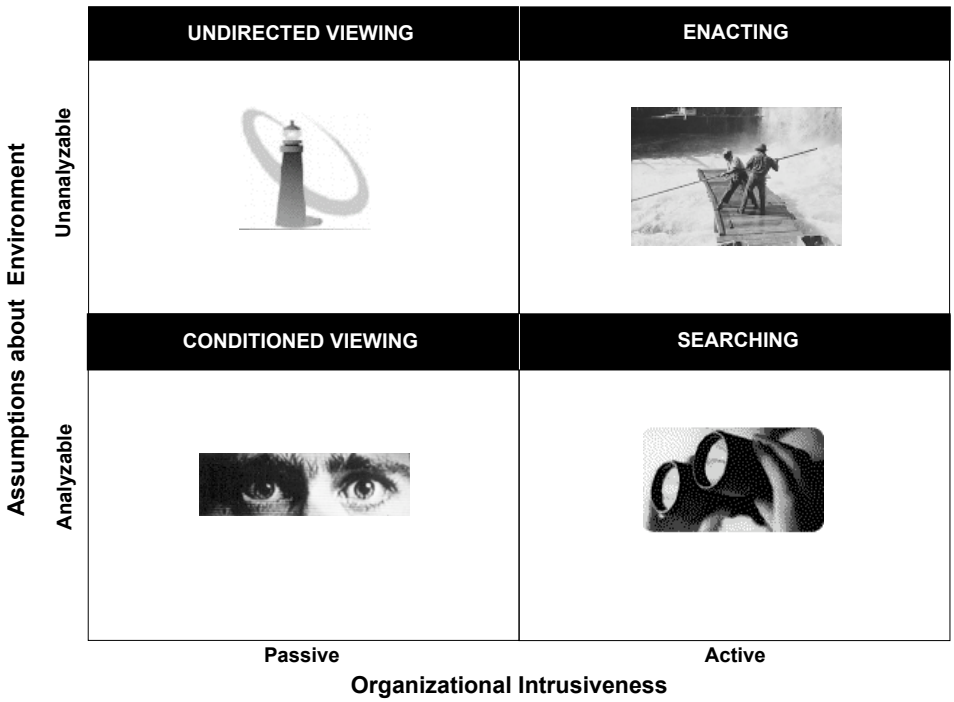

Figure 3. Modes of Environmental Scanning

5.1 Undirected Viewing

Undirected viewing, a term first used by Aguilar (1967) takes place when the organization perceives the environment to be unanalyzable and so does not intrude into the environment to understand it. Information needs are ill-defined and fuzzy, and much of the information obtained is non-routine or informal, usually gained through chance encounters. Since the environment is assumed to be unanalyzable, the organization is satisfied with limited, soft information and does not seek comprehensive, hard data. Information seeking is thus casual and opportunistic, relying more on irregular contacts and casual information from external, people sources. Because the information received is ambiguous and can support multiple interpretations, information use is concerned primarily with reducing high levels of equivocality. Weick (1979) suggests that to reduce equivocality, organizations use assembly rules to shape data into a collective interpretation. The greater the equivocality, the fewer the number of rules activated because of uncertainty about what the information means. At the same time, arriving at a common interpretation requires many cycles of information sharing.

An example of undirected viewing might be a small firm that gathers information through pre-existing personal contacts with a limited number of buyers, suppliers, sales personnel, and associates in other companies. What information gets noticed and used depends on the frequency and intensity of cues that are entering the firm's awareness. Over time, a few of these signals build up in frequency and intensity, and so become “noticed.” The advantage of undirected viewing is that the organization need not expend resources on formalized scanning, but this saving incurs the risk of the organization being surprised or caught off-guard.

During undirected viewing, sensemaking is characterized by informal bracketing. Bracketing of external signals is informal in that what the organization notices depends on what subjective cues observers happen to be attending to at the time. Partly because multiple observers with different frames of reference may be involved, many cycles of sensemaking are required to reduce equivocality about what is going on in the environment. This may require many episodes of face-to-face communication, involving dialogue, negotiation and persuasion. Often, the issues or questions are not known beforehand, and the organization has to identify or clarify the gaps of understanding. In some situations, issues are defined by the external environment, as when government agencies, industry associations, consumer groups or other stakeholders bring forth areas of concern. Knowledge that is used in undirected viewing is based on tacit beliefs that the complexity, opacity and dynamism of the environment are such as to render it unanalyzable. These beliefs are shared by the organization's members and can remain unspoken and unexamined. There is little by way of a stable stock of knowledge that can be called upon to interpret and make sense of changes in the environment. Decision making has to deal with high levels of uncertainty and ambiguity, and Daft and Weick (1983) suggested that coalition building may be necessary for management to rally around a particular interpretation and a single course of action. Alternatively, a strong, powerful leader may choose the course of action.
Overall, the modus of learning in undirected viewing is one of *stimulus-and-response*: the organization maintains its status quo until a strong stimulus is recognized and necessitates a response. A summary of the information seeking and organizational learning in undirected viewing (as well as the other modes) is shown in Figure 4 and 5 below.

Assumptions about Environment		UNDIRECTED VIEWING	ENACTING	
Unanalyzable	Information Needs	General areas of interest	Information Needs	Specific areas of exploration
	Information Seeking	"Informal"	Information Seeking	"Testing"
	Information Use	"Noticing"	Information Use	"Experimenting"
		CONDITIONED VIEWING	**SEARCHING**	
Analyzable	Information Needs	Sensitized areas of concerns	Information Needs	Detailed search goals
	Information Seeking	"Routinized"	Information Seeking	"Formal"
	Information Use	"Watching"	Information Use	"Discovering"
		Passive	**Active**	

Organizational Intrusiveness

Figure 4. Environmental Scanning as Information Seeking

Environmental Analyzability		UNDIRECTED VIEWING	ENACTING	
Unanalyzable	Sense-making	Waiting for important change	Sense-making	Create features in environment
	Knowledge Creation	Little prexisting knowledge	Knowledge Creation	Tacit knowledge: learn by doing
	Decision Making	Coalition/Political mode	Decision Making	Anarchic/Process mode
		CONDITIONED VIEWING	**SEARCHING**	
Analyzable	Sense-making	Driven by norms and beliefs	Sense-making	Determine objective reality
	Knowledge Creation	Cultural knowledge: expectations, frames	Knowledge Creation	Explicit knowledge: hard data, formal models
	Decision Making	Programmed/Rational mode	Decision Making	Process mode
		Passive	**Active**	

Organizational Intrusiveness

Figure 5. Environmental Scanning as Organizational Learning

5.2 Conditioned Viewing

Conditioned viewing, again from Aguilar (1967), occurs when the organization perceives the environment to be analyzable but is passive about gathering information and influencing the environment. Information needs focus on a small number of relatively well-defined issues or areas of concern. These are often based on widely-accepted industry assumptions and norms. Information seeking makes use of standard procedures, typically employing internal, non-people sources, with a significant amount of data coming from external reports, databases, and sources that are generally respected and widely used in the industry. Thus, viewing is conditioned in the sense that "it is limited to the routine documents, reports, publications, and information systems that have grown up through the years." (Daft and Weick 1984, p. 289) Because the environment is assumed to be knowable, there is less need for equivocality reduction, with a greater number of rules that can be applied to assemble or construct a plausible interpretation.

During conditioned viewing, sensemaking is belief-driven, and there are fewer cycles of equivocality reduction. Over time, the organization (or the industry it is in) has developed a set of assumptions and beliefs about the environment and uses them to define a number of areas of particular interest to structure or "condition" the scanning activity. Fewer cycles of sensemaking are required to reduce equivocality because the organization is starting from an initial set of clear, accepted beliefs, and it is already sensitized to known issues that are deemed critical for the organization. Cultural knowledge plays an important role in conditioned viewing by supplying the assumptions and beliefs about the business and the environment that the organization is in: who are its customers, competitors, stakeholders; what environmental sectors to watch; as well as what information sources to uses. These assumptions and beliefs may be part of the received knowledge that firms in the same industry share. They draw a frame of reference within which knowledge about the environment is created. Decisions tend to be programmed (March & Simon , 1993), following standard procedures and premises derived from past experience. Representation of the decision situation is simplified, search is ‘satisficing,’ and procedures are structured by rules and routines. These rules may be adopted from standard industry practice or developed from the firm's own experience. Overall, the modus of learning in conditioned viewing is for the organization to use its existing knowledge about what is important in the environment to *focus scanning and action taking*.

An illustration of conditioned viewing gone awry is provided by a recent analysis of the computer disk drive industry (Christensen 1997). Several generations of disk drive manufacturers were highly focused on listening carefully to their largest customers, and failed to see how new technologies that were rejected by their best customers, had in fact appealing features to new customer groups which then expanded into new market segments. Thus while one advantage of conditioned viewing is having established procedures and mental model to structure the scanning process, the disadvantage is that these rules and routines might miss detecting the emergence of new, possibly disruptive technologies or developments.

5.3 Enacting

Enacting takes place when the organization perceives the environment to be unanalyzable but it then proceeds to intrude actively into the environment in order to influence events and outcomes. Information needs are those required for experimentation and testing the environment. This could involve identifying areas for fruitful intervention. Information seeking is from external sources and channels that the organization has created through its intervention, and this may include collecting feedback about actions that the organization has taken. Enacting organizations "construct their own environments. They gather information by trying new behaviors and seeing what happens. They experiment, test, and stimulate, and they ignore precedent, rules, and traditional expectations." (Daft and Weick 1984, p. 288) Information use is focused on the actions that have been taken, and this information is used to reduce equivocality as well as to test existing rules and precedents.

An example of enacting would be a firm that introduces and markets a new product based on what it thinks it can sell, rather than waiting for research to assess market demand. Another example would be an organization that actively influences and shapes the attitudes of its shareholders: it may try to "manipulate shareholder perceptions toward itself, environmental issues, or political candidates by sending information to shareholders through various media." (Daft and Weick 1984, p. 290) In today's network society, organizations are increasingly using the World Wide Web as a channel for innovative ways of enacting their environment. For example, organizations have given away free products and services to test new products or

increase market share; hosted online forums and communities to promote discussion and drum up support for issues; and created new Web sites to disseminate information as well as to solicit feedback on topics of interest.

During enacting, sensemaking is action-driven. The organization intrudes actively into the environment to construct new features and concentrate sensemaking on these features. For example, an organization may test-market a new product; organize a seminar or workshop; or produce a document for public comment. The information generated from these enactments then constitutes new raw material for sensemaking. Thus equivocality is reduced by testing and probing the environment. Tacit knowledge is important in enacting since the kinds of enactments to be pursued as well as the interpretation of the generated information depends on individual intuition and creativity (existing tacit knowledge). New tacit knowledge may also be the outcome of enacting, as the organization acquires new ways of seeing the environment while it reflects on signals returned by their enactments. Daft and Weick (1983) suggest that *decision making* in enacting follows the process model described by Mintzberg et al (1976): the organization decides on a course of action, designs a custom solution, tries it, and recycles the process if the solution does not work. In addition to the process model, we may also expect the decision process to resemble that of the anarchic mode presented earlier. Here, actions are not goal-driven but are taken in order to discover goals. Decisions happen when solutions (enactments) appear to work and they become attached to problems. Overall, the modus of learning in enacting is for the organization to *learn by doing* — by trying out new actions in order to reveal new goals and methods.

5.4 Searching

Searching (labeled as Discovery in the original Daft and Weick paper) takes place when the organization perceives the environment to be analyzable and it actively intrudes into the environment to collect an accurate set of facts about the environment. Information needs are based on well-defined search goals that are broad, detailed, and open-ended. The organization is prepared to be surprised by unexpected findings that reveal new information needs. Information seeking is for hard, formal, often quantitative data, typically from surveys, market research activities that are rigorous, objective. The organization is likely to have its own scanning unit

whose staff systematically analyzes data to produce market forecasts, trend analysis, and intelligence reports. There are important differences between conditioned viewing and searching. Information seeking and use in conditioned viewing is *restricted* to a few issues; *routinized*; and based on *received* knowledge. In contrast, searching is broad, open, and based on a willingness to revise or update existing knowledge.

An example of formalized searching would be Motorola's strategic intelligence system, one of the first to be established in corporate America in the 1980s. To develop the system, Motorola hired Jan Herring, a professional intelligence officer who later helped to found the Society for Competitive Intelligence Professionals. Herring designed the scanning system as follows. The corporate intelligence office maintained the central database, coordinated collection and served as the clearing house for strategic intelligence reporting. It led corporate-wide analysis projects, and supported operational divisions' intelligence activities. The operating divisions, on the other hand, ran their own operational or tactical intelligence collection, performed division-level analysis, and supported corporate collection and analysis efforts. A high-level policy committee, comprising all group vice presidents and chiefs of headquarters functions, assigned intelligence priorities to the unit. The staff of the corporate office were highly trained, some with both intelligence and business experience, and they analyzed information collected to develop and recommend alternative courses of action. Strong emphasis was placed on foreign intelligence. At that time, Motorola was one of the few US companies that systematically monitored technology developments in Japan, making large investments in obtaining technical literature, learning the language, and developing long-term relationships with Japanese researchers and organizations. (Sutton 1988, Gilad 1994, Penenberg and Barry 2000)

During searching, sensemaking is based on formal, systematic scanning that is aimed at determining the verifiable facts of what is happening in the external environment. This systematic scanning can be both action- and belief-driven. Data gathering about the environment is relatively intense and may involve intrusive actions such as polls, surveys, focus groups, and so on. Following data collection, interpretation is likely to be belief-driven, where the organization would extrapolate from past experience and construct meanings from current beliefs. Developing and working with explicit knowledge is the essence of searching.

Measurement, modeling, forecasting, trends analysis, and other formal, quantitative methods are utilized to discover the true condition of the external environment. The organization believes that there is a stock of knowledge about the environment that it can draw upon for analysis and planning. Because the organization is actively searching for information about an environment that it believes to be knowable, decision making is likely to follow the process mode described earlier. In this mode, the organization takes the time and resources to look for or develop alternatives, and choosing a course of action is based on a diagnosis of the situation giving rise to the decision need. Decision making is based on logical, rational procedures, often involving the use of analytical, quantitative techniques.

Overall, the modus of learning in searching is for the organization to invest resources in collecting information and *analyzing the environment*, and then to adjust its actions in the light of this new knowledge. The main difference between searching and conditioned viewing is that searching requires significant resources for entering the environment to create new features and/or to collect information. Another difference is that searching scans broadly and comprehensively in order to determine the state of affairs, whereas conditioned viewing concentrates on selected areas or issues.

The different modes of scanning are compared in Figure 4 and 5. Research suggests that the model proposed by Daft and Weick is consistent with the empirical knowledge about organizational scanning (Choo 2001). As indicated by the model, the amount of information seeking or scanning is related to the perceived analyzability of the environment. Moreover, when the environment is perceived to be difficult to analyze, there is a tendency to use people sources more heavily in order to help reduce the higher levels of equivocality. The concept of organizational intrusiveness underlines the relationship between the ability to maneuver actively in the environment and the gathering of useful information. This action-learning perspective is increasingly evident in the strategy literature that emphasizes improvisation, discovery-based planning, and emergent strategy making (Mintzberg et al, 1998). In summary, the scanning model appears a viable framework for analyzing the primary environmental and organizational contingencies that influence environmental scanning as cycles of information seeking and information use.

6 Implications for Practice and Research

Implications for Practice

The model presented in this paper is essentially a contingency framework that specifies two conditions influencing organizational scanning: environmental analyzability and organizational intrusiveness. In today's highly volatile environment, organizations face a dilemma. On the one hand, the environment appears unanalyzable because of its dense complexity and rapid rate of change. On the other hand, organizations recognize that they need to be proactive in scanning and shaping their environments. Some organizations believe that precisely because the environment is in flux, there is an opportunity (or a necessity in some cases) for them to intervene and influence developments to their advantage. The model implies that for organizations wanting to encourage their members to scan more proactively, both the level of environmental analyzability and the level of organizational intrusiveness need to be raised. To increase environmental analyzability, the organization might keep in close touch with important actors in the environment; make information about customers, competitors, and the industry more widely available to employees; and encourage staff to be interested in and to discuss and collectively make sense of external developments. To increase organizational intrusiveness, the organization might create channels to communicate with and influence stakeholders; encourage managers and employees to probe or test their environments by allocating resources or providing organizational slack; and be tolerant about innovative enactment experiments that do not 'succeed' but increase the organization's understanding of a difficult problem.

Implications for Research

The model suggests a set of hypotheses that may be tested empirically. Although the model is consistent with the results of past studies, its specific predictions need to be investigated. As a metric for assessing environmental analyzability, we may look to the variable of perceived environmental uncertainty. Several scanning studies have operationalized perceived environmental uncertainty by measuring subjects' responses to questions about perceived complexity, rate of change, and importance of environmental sectors (e.g. Daft, Sormunen and Parks 1988, Boyd and Fulk 1996, Choo 2001). For organizational intrusiveness, possible metrics might include the amount of scanning, particularly the frequency and extent of use of external

sources; or the size of the budget for acquiring external information (market research, database subscriptions, travel) and building information resources (library, information center, records management). Other indicators might include the frequency and quality of communications and interactions with external stakeholders, and the use of enactments such as polls, surveys, seminars, and Web-based interventions. To identify modes of scanning predicted by the model, the characteristics of information seeking and use described in this chapter could guide data collection and analysis. Studying the scanning modes in terms of sense-, knowledge-, and decision-making might call for a more narrative, ethnographic approach. This could involve, for example, analyzing textual accounts of significant episodes of scanning and learning.

In summary, the model of environmental scanning presented here offers plausible explanations for the different levels and patterns of scanning that are observed in practice. We elaborated environmental scanning as information seeking and organizational learning processes, discussed implications for managerial action, and stressed that much more could be learned by testing the model in field research.

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