Strategic Scanning and Interpretation: the Organization, Strategic Management and Information Processing Context

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Abstract

Scanning and interpretation of business environment has been a critical component of the strategy formulation process, formally or informally. This paper reviews perspectives on scanning and interpretation related organization characteristics: the environment, strategy, structure, culture and performance. It also reviews complementary approaches to strategic management, the information (processing) based view on scanning and interpretation, and research findings on executives' information behavior. The extensive literature review attempts to help to understand the complicatedly interrelated concepts and their contexts. It uncovers useful observations that are relevant to the construction of support systems for strategic scanning and interpretation activities of senior managers. And useful propositions are also formulated. Applying the strategic issue management concept, a scanning based strategic management framework is built up.

Keywords: strategic scanning and interpretation, strategic management, organization and environment, management support system

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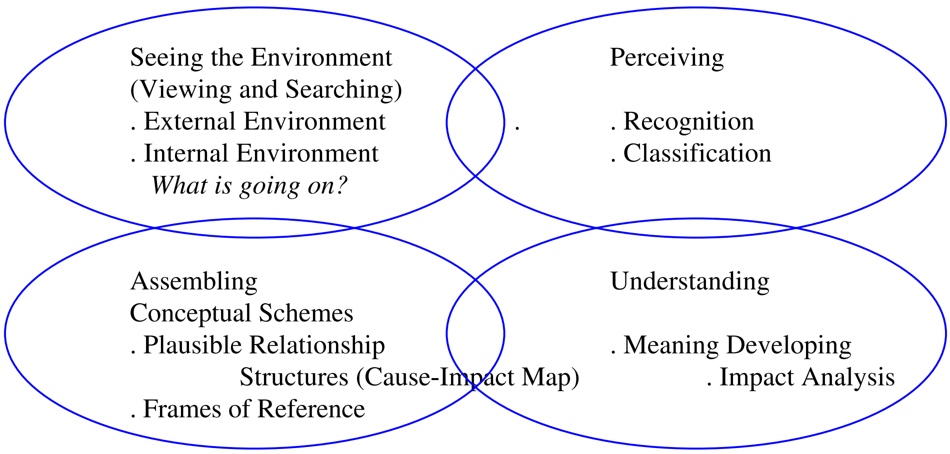
1. Introduction

Scanning and interpretation, in a general sense, concerns about seeing, perceiving and sense-making. Scanning is both looking at information (viewing) and looking for information (searching). And interpretation is the process of translating the viewed and searched events, of developing models for understanding, of bringing out of meaning, and of assembling conceptual schemes (Weick and Daft 1983). By strategic scanning and interpretation (SSI) we mean the searching, watching, and understanding of as well as value-adding to relevant strategic data[1], both internal and external. The scanning and interpretation of business environment constitutes the major part of SSI activities. It is defined by Aguilar (1967) as "the acquisition of information about events, trends, and relationships in an organization's environment, the knowledge of which will be of assistance to top executives in identifying and understanding strategic threats and opportunities". Lester and Waters (1989) extend the definition of environmental scanning to include also the analysis and interpretation, and the use of the analyzed intelligence in strategic decision making. This definition can be easily expanded to include also corresponding information inside the organization. This is in line with strategic management theory, where the analysis and diagnosis of environmental threats and opportunities as well as organizational strengths and weaknesses typically form the first phase of the strategic management process. It also conforms very well with the context and background of our research: *to build up the information basis for formulating corporate strategies through scanning and interpretation of the characteristics, change and development of important internal and external forces.*

The Scanning and Interpretation Concept



[1] where "strategic data" (or strategic information) is "anything that has potentially larger impact for the company" (El Sawy, 1985). Similarly, Lozada and Calantone (1996) defined that: "external information is strategic when it refers to information about events or relationships in the firm's outside environment that unveil opportunities to exploit the firms strengths, accentuate the firm's weaknesses or highlight potential threats facing the firm". What should be noted is that, as pointed out by Aguilar (1967), no type or class of information is intrinsically strategic. It is strategic only if it relates to a strategic opportunity or problem.

The importance of environment and environment information has long been recognized in general organization study and strategic management field. In managing the interaction of their company with the external world, it is first essential for top executives to grasp how the environment is changing and the ways these changes will have major impacts on their business. The critical dependencies between an organization and its environment requires the organization to be constantly alert of changes and shifts in its external relationships.

The globalization of markets, technology, and competition has increased both the scope and the dynamics of the management's relevant operating environment. Firm boundaries have become increasing fuzzy and permeable as companies create a complex network of relationships with suppliers, customers, governments and competitors that greatly complicate the ability to develop and deploy vital resources and capabilities (Bartlett and Ghoshal, 1991). Such increasingly dynamic and complex interconnection of business environments makes the interaction task increasingly demanding while speedier communications makes the time span of important changes critical. Managers must base their decisions on the most up-to-date information while not out-dated one.

Messages and signals about events and trends in the environment are invariably ambiguous and are subject to multiple interpretations. As a result, a crucial task of management is to discern the most significant changes, interpret their meaning, and develop appropriate responses. Through scanning and interpretation, it is expected for the organization members to make sense of what is happening in their organizational environments in order to develop a shared interpretation that can serve as a context for organizational action. So the central information activity is resolving the equivocality environment information into meaning and action. Lozada and Calantone (1996) see environmental scanning as a key step in the process of organization adaptation. We believe that a constant or continuous and systematic scanning and interpretation of business environment events and changes become very important and critical for the strategy process of organizations.

The studies of Newgrem et al (1984) and Smit (1991) have found positive relationship between information scanning and organizational performance (Lim et al, 1996). They concluded that successful firms differ from unsuccessful firms in that they do more scanning and they have a broader pattern of scanning[2] (also from Babbar and Tai, 1993; Daft et al, 1988; referred in Lim et al, 1996). An estimated percentage of 53% multinational companies have formal in-house scanning capabilities (Preble et al, 1988), though the pattern and categories of scanning may vary widely among firms operating in global markets.[3] The positive performance impact of a co-alignment[4] between the

[2] Daft et al (1988) argued that the unpredictable change or discontinuities increase environmental uncertainty and that both the general environment and the task environment must be scanned.

[3] The same study reveals that small firms tend to have underdeveloped environment scanning capabilities.

[4] Coalignment: the fit between strategy and its context - the external environment and the organization characteristics such as structure, and managerial characteristics. It means the organization aligns its strategic resource deployments to specific requirements of its environmental context (Venkatraman and Prescott , 1990).

environment and strategy of a firm is also an important proposition in strategic management field, which has got strong support from the study of Venkatraman and Prescott (1990).

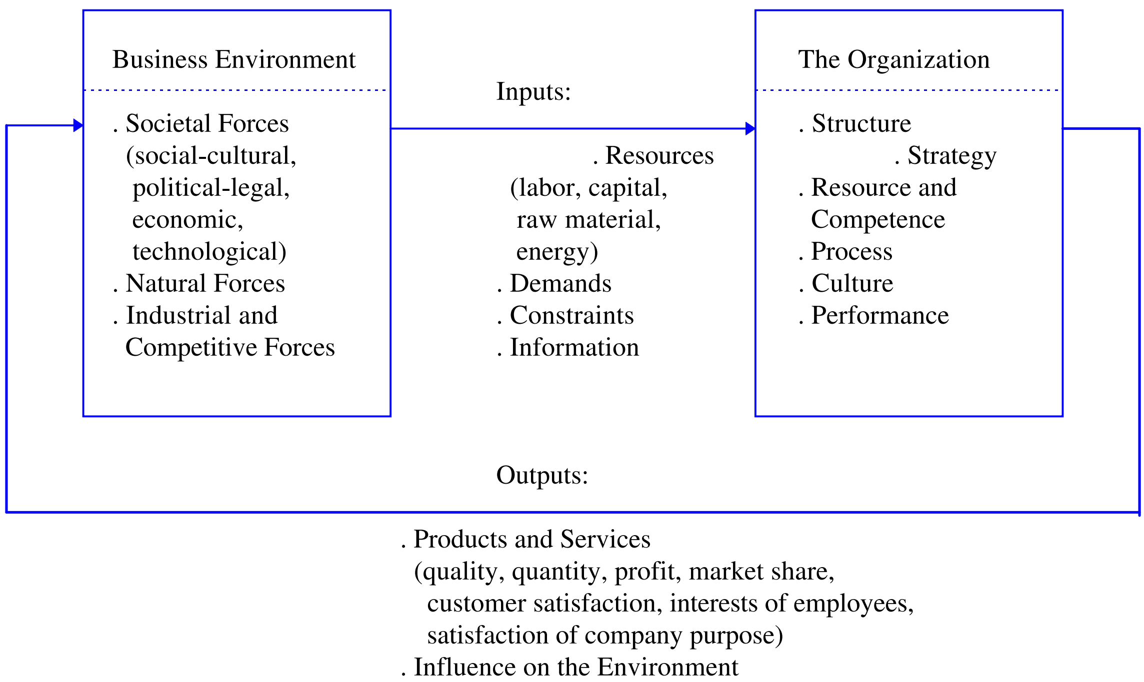
Environmental scanning has been a heavily researched area in the literature in strategic management related field. The integrative nature of the field and the development of the society and business world result in the existence of a wide variety of schools of thoughts and theories on strategy management, and they accommodate many complexly related concepts. So after all, *what are the implications of these theories for the study of strategic scanning and interpretation phenomenon?*

In this paper, a selection of complementary perspectives on organization, environment, strategic management, and information processing are collected and reviewed to create a deeper and more useful appreciation of the SSI context. A number of conceptual elements that could be used to construct a framework of strategic scanning and interpretation process are identified. A scanning and issues based strategic management model is presented. It is expected that we can broaden our perspectives on SSI while clarifying the central issues in constructing SSI support systems for senior managers.

2. The Organization and Environment

Simply speaking, an organization and the environment exchange with input and output. Organizations depend on the environment for resources and for the justification of their continued existence. At a systems level, an organization is composed of activities and processes that transform the raw materials, labor, capital, energy, and information taken in from the environment into goods and services of economic or social worth, which are in turn consumed by the environment, and once more energizing the system with important resources. Each component process takes in a package of informational as well as physical inputs, works on it and brings it a few steps closer to its final form by adding more resources (Katz and Kahn, 1966; Stoner and Wankel, 1986; Choo, 1996). This is illustrated in Figure 1.

Figure 1. Organization and Environment



2.1. The Organization

The organization is characterized by its strategy, structure, culture, process, performance resource and competence. According to Chandler (1962), organization structure, whether formally or informally defined, has two aspects. It includes first, the lines of authority and communication between the different administrative offices and officers; and second, the information and data flow through these lines of communication and authority (Hall and Saias, 1980). In reality structure is the result of a complex play of variables such as culture, values, past and functioning of the organization (Hall and Saias, 1980). Direct links from strategy to structure can be explained by the nature and diversity of the products and markets of the organization. Indirect links are where structure is determined by the characteristics of the technology employed, and the nature and variations in the environment (Hall and Saias, 1980). Structural characteristics act like filters of information and limit what the organization can see (Weick, 1969; Miles, Snow and Pfeffer, 1974; Leifere and Huber, 1977), and strategic perceptions as well as choices are conditioned and constrained by structure (Hall and Saias, 1980).

Just as an organization environment has two sides: the internal and the external environments, the organization performance is also always assessed from two sides. Internally, it indicates how successfully the company has achieves its objectives; and externally, it tells how successful it is in meeting the needs of the society (Stoner and Wankel, 1986:8-9). The quality and quantity of product and service, profit, market share, customer satisfaction, satisfaction of company purpose, interests of employees, company image and reputation, are examples of performance indicators.

Culture is a distinguished feature of organizations. It refers to shared or institutionalized beliefs, values and norms, conventions, customs, habits, traditions (Peters and Waterman, 1982; Hofstede et al, 1990). It is historically determined, socially constructed, soft, and difficult to change (Hofstede et al, 1990).

Organizational/corporate culture or climate, as described in Hofstede et al (1990), has acquired a status similar to structure, strategy, and control. Many have argued that strongly shared cultures can block firm's ability to innovate and develop, while contradictory counter-cultures foster different perspectives and provoke inquiry and learning (Stacey,1992; Porter, 1990; Choo, 1995). Porter's (1990) comments on organization culture stress the significance of an organization culture that can favor its innovating and learning activity:

> "Innovation and change is an unnatural act, particularly in successful companies. Powerful forces are at work to avoid and defeat it. Past approaches become institutionalized in standard operating procedures and management controls. ... the existing strategy becomes rooted in the company culture". "Successful companies tend to develop a bias for predictability and stability. They work on defending what they have. Change is tempered by the fear that there is too much to lose. The organization at all levels filters out information that would suggest new approaches, modifications or departures from the norm. ...innovation ceases, it is only a matter of time before aggressive competitors overtake it."

Obviously, a balance should be kept between shared culture which hold the company as a whole and the contradictory culture which encourages frame-breaking perspectives.

Concerning scanning and interpretation, Choo (1996) noted that the shared assumptions and experiences can constrain the ways that people in an organization perceive their world. It is claimed that the most important consideration in the planning and design of scanning practices is perhaps to take into account the existing culture of the organization, particularly the people's attitudes and beliefs about information creation, access, and sharing. In some cases, it may need to change the organization's information culture and politics before scanning can become effective.

2.2 The Environment

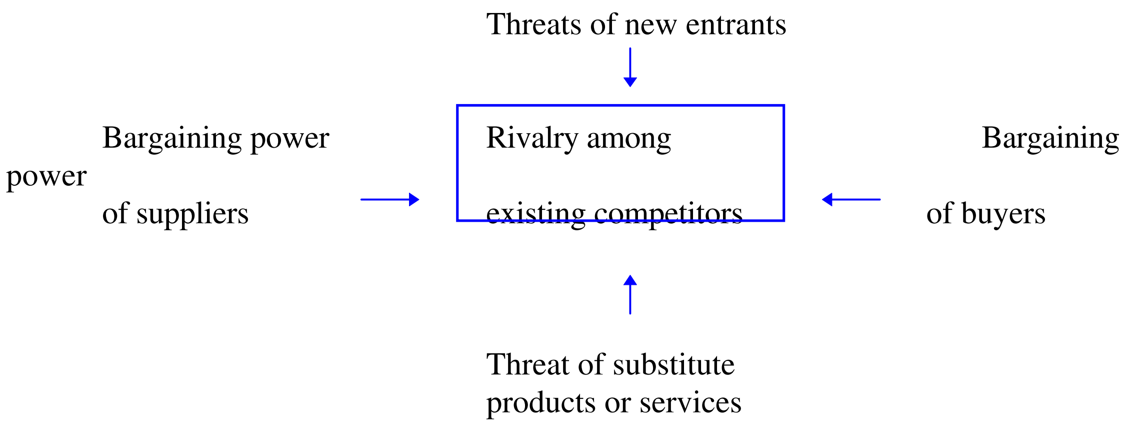
Today's organizations are no longer circumscribed by walls and boundaries, they behave as complex open systems, and engages actively in exchanging with the environment to improve performance and increase the chances of survival. As can be seen obviously, the very notion of strategic management suggests the significance of the firm's environment. The following features outline clearly the all-round roles of business environment (Benson, 1975; Aharoni et al, 1981; Penrose, 1985; Porter, 1991):

(1) environment defines the input markets of a firm (labor, capital, raw material, energy)
(2) environment defines the output markets of a firm (demands)
(3) environment offers incentives to and exerts regulations on a firm
(4) environment provides information for strategy process
(5) environment acts as a source and activator of organizational learning and innovation.

The environment has been conceptualized in two ways (Smart and Vertinsky, 1984): *stability and complexity,* where stability indicates the change and rate of change of environment and complexity symbolizes the number of factors and the heterogeneity in the environment that must be taken into account.

The external environment forces can be grouped as *societal* environment (governmental and social, political, legal, economic, technological influences), *natural* environment (air, water, energy), and *industrial and competitive* environment (action of other firms, customer needs and preferences) (Evered, 1983). Stoner and Wankel (1986) group them into *direction-action* and *indirect-action* elements, and an *international dimension.* Examples of direction-action elements are consumers, government agencies, competitors, labor unions, suppliers, shareholders, financial institutions. They are all outside stakeholders of the organization.[5] The indirect-action components of the environment include technological variables, economic variables, social-cultural variables, and political-legal variables. They are actually those elements that constitute the "societal environment".

In characterizing and operating the business environment, strategy research over the past decade has been deeply influenced by Porter's industrial organization theory (Porter, 1980, 1985, 1990). Porter's framework of five competitive forces that determine industry structure offer a powerful tool for examining the firm's competitive environment, however it presents also limitations (Bartlett and Ghoshal, 1991).



In emphasizing that "the key aspect of the firm's environment is the industry or industries in which it competes", the broader economic, technological, social and political forces of the environment was regarded by Porter as affecting all firms more or less equally and were therefore "significant primarily in a relative sense". Bartlett and Ghoshal (1991) argue that, in a global business context firms are also very sensitive to the environment factors that lie beyond the boundaries of specific industries. Many studies have emphasized that deregulation, global competition, technological discontinuities have caused fundamental structural transition of a wide variety of industries, relocation of their boundaries and change of the base for competition

[5] More about stakeholders will be discussed later.

(Meyer, Brooks and Goes, 1990; Prahalad and Hamel, 1994). So while acknowledging the importance of industry structure as a driver of firm strategy, it is important to return to the broader and encompassing definition of environment, to include not just the economic and competitive attributes of the industry but also social, cultural, political characteristics that so clearly influence company strategy, organization, and management in the global arena (Bartlett and Ghoshal, 1991). We think that the weak signals symbolizing strategic surprises or discontinuities might just come from these only relatively significant sectors. All these call for an examination of the general environment forces that act on the entire industry, sometimes related industries, while not only the forces inside a specific industry.

In this sense, Gibbons and Prescott (1996) adopt a more complete strategic analysis framework which encompasses both internal analysis and environment analysis. The environment is conceptualized as macro environmental, industry and competitive environment, and stakeholder values. They describe the macro environment as "comprises societal, political, economic, international, regulatory, ethical and technological issues affecting business". Industry analysis uses Porter's five-driving force framework. And stakeholder value analysis identifies the values, perspectives, and ideologies of individuals or groups which have an interest in the industry. Internal analysis assesses organizational skills, resources and capabilities, and organization's culture - the identification of values, aspirations, assumptions and visions.

The pervasive and complex interaction between organizations and their environments has been widely acknowledged (Dirsmith and Covaleski, 1983; Choo, 1996) and the main argument is that environment is influencing the organization and the organization is also defining, creating or influencing the environment. Organizations control and are controlled by the environment in a continuous interactive process. Zeitz (1980) reasoned that organization on one hand construct major portions of their environments through the production of scarce output resources and through their control of interaction networks. On the other hand, they adapt to the environment in the sense that their actions are constrained through externally controlled input resources and through established networks of relations and external expectancies that have arisen.

According to Benson (1975), at least three approaches to environment-organization relationship that have been used: ecological perspective, information perspective, and resource perspective.

So, the environment provides potential for competitive success, but firms must sense it, learn enough about the current and likely future conditions of the environment, and apply this knowledge to change their own behavior and positioning in a timely way. The study of Smart and Vertinsky (1984) tell us that simple environments free organizations from the necessities of sophisticated information scanning, while complex environments not only place greater demand on information scanning but also call for decision makers to account for diverse constituencies in the environment.

3. Strategy and Strategic Management

3.1 The Concept of Strategy and the Strategy Process

Generally, the definitions of business strategy concept fall into two categories. A *broad definition* of strategy includes defining the organization purpose, objective, and goals, the representative of which is given by Andrews (1980):

> *Corporate strategy is the pattern of decisions in a company that determines and reveals its objectives, purposes or goals, produces the principal policies and plans for achieving those goals, and determines the range of business the company is to pursue, the kind of economic and human organization it is or intends to be, and the nature of the economic and non-economic contribution it intends to make to its shareholders, employees, customers and communities.*

Andrews makes the development of purpose (purpose-defining) and attention to the future (future-attending) the core components of the conception of strategy. He emphasizes strategy as the determination of corporate purpose in economic, human and social terms, by consideration of the future character of the firm in relation to opportunities, threats and constraints (Evered, 1983). A narrow definition of strategy usually embraces only the means used to achieve given objectives, an integrated program of means by which a firm secures and sustains competitive advantage (Porter, 1980, 1985; Day, 1990).

More complete descriptions of the strategy concept have been given in the literature too (Quinn, 1980; Carlsson, 1995). As defined by Quinn (1980), strategy is a pattern or plan that integrates an organization's goals, policies and action sequences into a cohesive whole. A well formulated strategy pursues fitness between internal configuration and external changes. It helps to direct and allocate an organization's resources into a unique and viable posture based on its relative internal competencies and shortcomings, anticipated changes in the environment, and contingent moves by its opponents (Quinn, 1980). "By its strategy a company defines its operational context, outlines and decides upon its strategic goals and long-term objectives; explores and decides upon its strengths, weaknesses, opportunities and threats; formulates its sustainable competitive advantages and; develops a program of action, which exploit its competitive advantages and ensure profitability, financial balance, adaptability to sudden changes and a sound development of its capital structure" (Carlsson, 1995).

We believe that, the purpose of strategy is to provide a long-term guide for corporate actions; strategy means little without a clearly defined organization purpose or mission. However it is also very important to realize that strategy is a continuous process forever in motion. In a unpredictable world, we must seek dynamic business strategies (Porter, 1991; Stacey, 1992). At all stages of moving from present actions into the future, the societal and natural environment need to be scanned and the feedback from it be controlling in the unfolding and alteration of the future-oriented plans. In defining a broad strategy, more organization, human and social aspects need to be considered;

while in defining a more narrow strategy, more economic and analytical aspects will be involved.

Strategy can be operationally originated (emerging from acting) or managerial originated (created through thinking and managing). Strategy can be proactive or just reactive. Future research promotes a proactive strategy, which is viewed essentially as a task of appreciating a complex environmental, coping constructively with the challenge of the changing of other environment elements rather than with opponents (Michael, 1973; in Evered, 1983). The futurist is not content with elaborating on possibilities, alternatives and expectations but is committed to the strategic thinking that is necessary to realize a more desirable society. On the other hand, there are also arguments that in a chaotic world where the future is unknowable and unpredictable, strategic thinking should be anchored to the here and now and firms only need to focus on the anomalies in the current situation (Stacey, 1992), and a reactive approach to strategic management is advocated.

The strategy process or strategic management covers both strategy formulation and implementation activities that are intertwined with each others as complex interactive processes in which politics, values, organizational culture and management styles determine or constrain particular strategic decisions (Mintzberg and Quinn, 1996). Strategic management concerns very much the development of an organization's capacity to adapt nimbly to a changing environment by anticipating the future and developing a vision of its role in that future; to continuously innovate and be early in the market with new, high-quality products and services that customers want; and to act decisively to move the organization towards its goals (Choo, 1995, 1996).

3.2 Strategic Management: the Internal-Focused View and External-Focused View

In a very general term, the central task of strategic management is to ensure the organization "to do the right thing" (Drucker, 1964, 1967; in Stoner and Wankel, 1986). In the practice of strategic management, managers are dealing with balanced concerns of the internal forces and external environment (Stoner and Wankel, 1986). In the studies, numerous theories and approaches for strategic management has been developed to cope with different aspects and problems of the phenomenon. The respective approaches are equipped to address special concerns emerged at a given period. They certainly have limitations in their application. On the other hand, the different approaches, if applied appropriately, complement well to each others (Ansoff, 1980). The different thoughts and perspectives on strategy and strategic management contribute to form an integrative, systematic view of the field.

3.2.1 The Internal-Focused View: Resource Based and Competence Based Theory

In search of origins of competitive advantage, the resource based and competence based view emerged. Resource-based view describe firms as bundles of resources (Penrose, 1959, 1985; Barney, 1986; Wernerfelt, 1984; Dierickx and Cool, 1989; Mahoney and Pandian, 1989). It was first generated from the basic thought of Penrose that, “there seems to be no reason why a firm should see its prospect of growth, its productive opportunity, in terms of its existing products only; (however) there are many reasons why it should see it in terms of its existing resources and should search for opportunities of using them more efficiently”. This approach actually considers the limitations of diversified growth, analyzes motivations and directions of firm diversification.

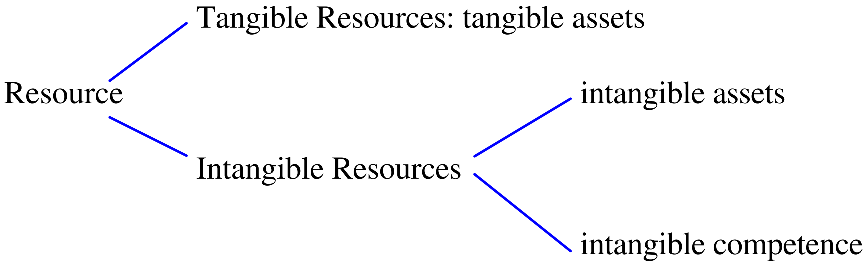
Closely related to resource based view is the notion of distinctive competence or core competence (Andrews, 1971; Prahalad and Hamel, 1989 1990, 1994). It is regarded as a variation of the resource based view. Competence based view see organization development as competence based competition. Competence is a variation or specification of the resource concept too. According to Penrose (1985), competence is a function of the resources. The ability of a firm to make unique use of resources, to learn, to innovate, to adapt to changes, and to cope with unexpected events are regarded as more important core competencies that can create and sustain competitive advantage.

Penrose (1959) distinguishes between two classes of resources: physical and human resources. *“The physical resources are tangible assets such as plants and equipment, land and natural resources, raw materials, semi-finished goods. The human resources are the managerial resources of the management team, skilled and unskilled labor including clerical, administrative, legal and technical staff”*. This concept has been developed and expanded since then. First it is extended to include both tangible assets described above and intangible resources such as skills, organizational routines, external reputation and relationship. Second, the know-how, the pool of experience, knowledge and systems needed to build the assets (skills) are also included (Williamson, 1975; Prahalad and Hamel, 1990; Markides and Williamson,1996). The scope of intangible resources is broadened and again it is distinguished further as “intangible assets - the having capabilities” and “intangible competencies - the doing capabilities” (Hall, 1992, 1993).[6] The term resource is now used to include both the

[6] In his study of the role of intangible resources in business strategy, Hall identified nine types of intangible resources:

1. The intellectual property rights of patents, trademarks, copyright and registered designs
2. Trade secrets
3. Contracts and licenses
4. Data bases
5. Information in the public domain
6. Personal and organizational networks
7. The know-how of employees, professional advisers, suppliers and distributors
8. The reputation of products and company
9. The culture of the organization, e.g., the ability of the organization to react to challenge, to cope with change, etc.

Hall’s study suggests that, employee know-how and reputation (product reputation and company reputation) are perceived the most important intangible resources. Culture, Networks and Data bases are important factors too. Data base is the top ranked people-independent intangible resource. The study also suggests that chief executives may benefit from periodically carrying out audits of intangible resources with their senior management team. A more recent study by Mehra (1996) provide a list of key resources in banking industry which include management quality and depth, franchise, asset/credit strategic assets and competencies (Barney, 1986, 1991; Peteraf, 1993), as is outlined below. The traditional concept of strengths and weaknesses then can be represented as a firm's resource or competence position.



Organization skills, know-how, formulas, procedures, receipts, information, as well as human resources are termed knowledge based resources by some researchers. They are regarded as the primary enabling and constraining factors in the development of innovation and competitive advantage (Barney, 1991; Wright and Wijk).

The resource based and competence based view argue that the origins of competitive advantage are valuable resources or distinctive competencies of the firm and that they should guide the choice of strategy. Strategic management, then, concerns how to translate resources and competencies into sustainable competitive advantage. Both of them highlight the importance of inputs and specialized skills, put environment on one side in the first instance and concentrate on internal forces, and thus are introspective (Porter, 1991). Nevertheless, this does not imply that environment is not relevant to resources and that environment surveillance and analysis is not important. First, many resources are acquired from the outside; organization depends on environment for resources. Second, resources are not valuable in and of themselves, but because they allow firms to perform activities that create advantages in particular markets. Third, the competitive value of resources can be enhanced or eliminated by changes in environmental forces such as technology, competitor behavior, or buyer needs (Porter, 1991). Environmental change and learning from the change can cause the change and development of resource.

3.2.2 Industrial Organization Theory: the External-Focused View

Instead of solely within the firm, the true origin of competitive advantage may be found in the external environment. Many efforts have also been devoted to exploring the potential development from outside of a firm. As have been mentioned earlier, the industrial organization theory (Bain, 1968; Porter, 1980, 1985, 1990) stress that competitive advantage comes from the proximate or local environment in which a firm is based. What have been promoted are the concentration on external forces and a market-based strategy. So, while the resource and competence based view focuses internally on the firm and its resources, the industrial organization literature focuses

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quality, technological expertise, placing power, adequacy of the capital base, resource management/efficiency, innovation, risk management, and information asymmetries.

externally on the industry and product-market. These two views are “two sides of the same coin” just like the resource market and the product market themselves (Peteraf, 1990). By specifying the size of the firm’s activity in different product markets, it is possible to infer the minimum necessary resource commitments; on the other hand, by specifying a resource profile for a firm, it is possible to find the optimal product market activities too (Wernerfelt, 1984).

3.2.3 Stakeholder Framework

Stakeholder theory provides a framework for value issues, ethics and social responsibilities. It sees the company and its activities through stakehoder concepts and propositions with a basic thinking that “holders” who have “stakes” interacts with the firm and make its action possible (Näsi, 1995).

Stakeholders are representatives of both the internal and external forces of a firm. They are persons or groups with legitimate interests in procedural and substantive aspects of corporate activity. Just as stakeholders may be affected by the actions, decisions, policies or practices of the firm, these stakeholders also may affect the firm’s actions, decisions, policies or practices. Internal stakeholders include owners, managers, employees, shareholders. They constitutes part of the internal environment. External stakeholders are customers, suppliers, competitors, lenders, agencies, government, community, unions, media, special interest group, etc. They are part of the firm’s external environment. All stakeholders are actually direct-action components of a firm’s environment (Stoner and Wankel, 1986). It is possible to place stakeholders in their different environments such as in economic, technological, social, and political environments. In a general sense, then, the entire environment is also seen as a stakeholder of the firm (Starik, 1993).

Stakeholder theory emphasizes that the interests of stakeholders are of intrinsic value - each group of stakeholders merits consideration for its own sake and not merely because of its ability to further the interests of some other group, such as shareholders.

4. Strategic Scanning and Interpretation: the Practice and General Perspectives

4.1 Strategic Scanning and Interpretation as Organizational Intelligence Activity: An Information Based View

Recent years have witnessed a remarkable convergence of management attention on information (and information technology). As an organization resource, information is included in both the organization processes and outputs to create economic value, for example information applied in the form of efficient and flexible procedures, accurate knowledge about customer wants, ease of use of products, greater service responsiveness and so on.

As a firm’s resource, information is different from other kinds of resources. As Choo (1995, 1996) described: “*Information offers both risks and riches*”. Information offers riches because it is a regenerative resource while not depletable assets like labor, capital, raw material and energy; and it can be used over and over again in different contexts to create value in multiple ways; it is also a source of power. Information offers risks because it can be a source of confusion and misleading; and its oversupply can be especially a burden. Similarly, Katz and Kahn (1996) see information as having both passive and active characteristics. The reason for the dual roles of information is because that it is not only corporate resource, but also intelligence.

An information based view sees organizations as information processing systems: *organizations seek information; store, retrieve and transmit it; use it to interpret events, solve problems, and make decisions.* Strategic scanning and interpretation is certainly a very central part of it. Scanning is information gathering and interpretation is information processing and understanding. It differs from other information processing activity in that it is also an intelligence activity.

From business intelligence perspective, every change or development in the external environment creates signals and messages that an organization may need to heed (Dill 1962). Some of the signals would be weak (difficult to detect), many would be confusing (difficult to analyze), and others would be spurious (not indicative of a true change). Strategic scanning and interpretation serve as an organization's sensing, perceiving, and meaning-construction system. It serves to find information to support strategic activities, to detect changes in the environment and malfunctions in the organization, to develop a shared and valid understanding of these changes and help to translate early warning signals into early mover advantages.

In seeking information, the organization would have to attend selectively to a flood of signals created by a dynamic environment. It should deploy an array of information sensors with different ranges and resolutions (Choo, 1995). At one end of the spectrum, it should deploy organizational *"radar"* to sweep the horizon widely, looks at the total environment, develops a broad picture, sound early warning signals, and identifies areas that require closer attention. This is also called *general viewing.* At the other end, *"probes and detectors"* provide a microscopic view, search detailed information, focus on specific areas. This is called *purposeful searching.* Both kinds of information attending are necessary for the strategy process; and the combination is termed "mixed scanning" (Choo, 1995; Aguilar, 1967; Etzioni, 1967, 1986).

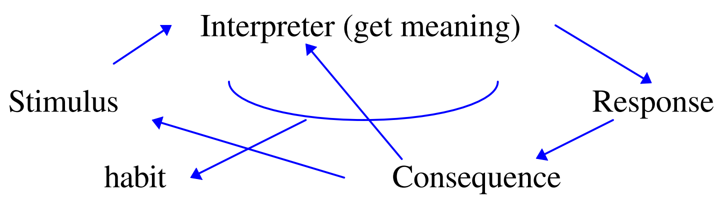
Organizational perception depends heavily on the norms, frames and rules that members use as lenses to view trends and developments. These norms and frames are formulated based on organizational knowledge and past experience. The interpretation needs to balance between interpreting data according to existing beliefs and interpreting data for the exploration of new alternatives. Frame-breaking interpretation leads to creative insight and innovation.

4.2 Strategic Scanning&Interpretation and Organizational Learning

4.2.1 Learning: A General Definition

According to Berlo (1960), learning, in a general sense, is a continuous cycles of stimulus-interpretation-response-consequence during which stimuli are received and interpreted continually, news responses are made, reinterpreted and so on, as is shown in Figure 3, where, *stimulus* is defined as "any event which an individual is capable of sensing" or "anything that a person can receive through one of his senses, anything that can produce sensation in the human organism". A *response* is "anything that the individual does as a result of perceiving the stimulus" (Berlo, 1960: Chapter 4). *Learning* is then "a change in the stable relationship between a stimulus that the individual organism perceives and a response the organism makes". Given an individual who responds to a stimulus, learning occurs if the individual either continues to make the same response, but to a different stimulus, or makes a different response to the same stimulus.

Figure 3 The Learning Concept



Berlo continues to argue that, for learning to occur, the stimulus has to be not only perceived, but interpreted. The organism often has to perceive a stimulus, interpret it, and respond to it. But how to decide whether the organism will continue to make a new response or just attach the old response to a new stimulus - this is where the *consequences* of the response need to be observed and perceived.

Another very important ingredient of the learning process is the development of a "stable" stimulus-response relationship: *habit.* It can not be said that a person has learned just because he makes a response once or twice. *"Learning does not occur until the response becomes habitual"* (Berlo, 1960). On the other hand, this very habit can become a barrier to further learning later on.

4.2.2 Strategic Scanning and Interpretation as Organization Learning

Comparing the strategic scanning and interpretation process and the learning model, it is very easy to notice their similarities. According to the learning concept described above, it is obvious that the scanning and interpretation process, the organization intelligence process (and the strategic model presented later) are very much processes of learning. Actually SSI constitutes very important parts of organizational learning process, as described in Choo (1995, 1996):

"The organizational learning process is a continuous cycle of activities that include sensing the environment, developing perceptions and generating meaning through interpretation, using memory about past experience to help perception and interpretation, and taking action based on the interpretations developed" (shown in Figure 4).

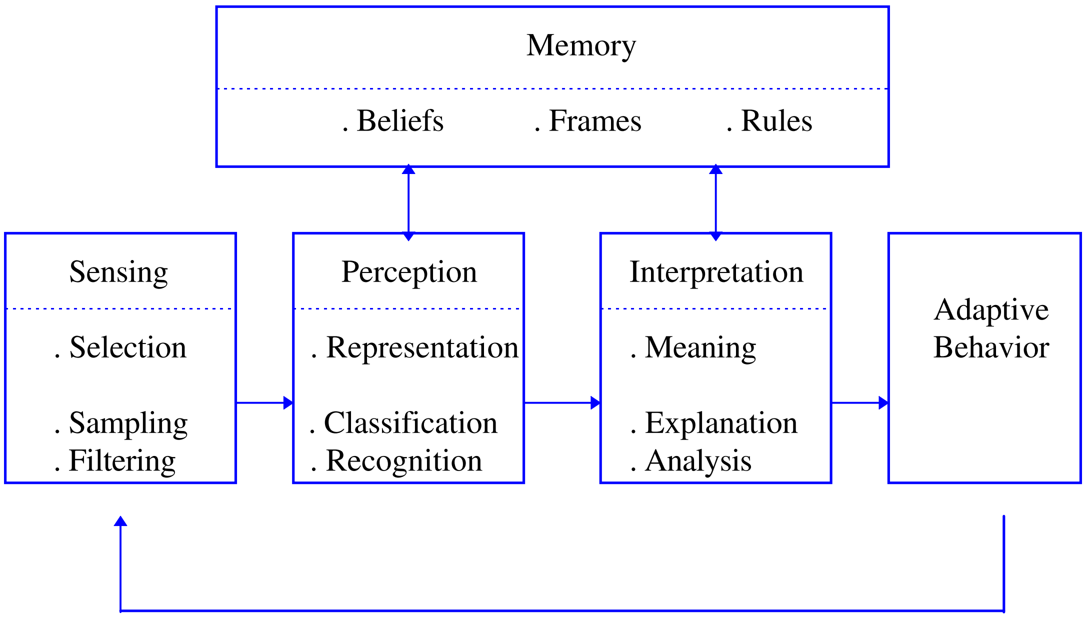
First, to make sense of its changing environment, an organization continually scans changes and development in its external environment. Because the organization cannot attend to every event or development, it must select areas of priority, filter incoming data according to its interests, and sample events for learning. Memory is derived from the experiences of the organization in interacting with the environment, and can be expressed formally (documents, procedures) or informally (beliefs, stories). Experience develops rules that are used to match situations with appropriate responses, and frames that are used to define problems and their salient dimensions.

Perception is the recognition and development of descriptions of external events and entities using the knowledge that is available in memory. Perceptual strategies include developing a representation of an external scene, classifying objects and events according to categories that are known or have been encountered before, and recognizing the identity and main attributes of interested objects.

Interpretation is sense-making with schemes and shared mental models. Through sense-making, people in an organization give meaning to the events and actions of the organization.

Figure 4 Strategic Scanning Related Learning Cycle

(Source: Choo, 1995)



In automatically using the frames of reference, the assumptions we have made when we use these models in previous occasions are not questioned. However models that have worked in previous situations may not work in the new ones thrown up by rapid change. To challenge the old norms, rules, frames and models is regarded the most important form of organizational learning.[7]

During the continuous learning process, organizational actions, strategies, assumptions or norms are expected to be modified when necessary. The altered strategies, assumptions or norms are then embedded into the organization's memory. Two kinds of learning occurs here, they are *termed single-loop learning and double-loop learning.* When the modification of organizational action is sufficient to correct the error between outcomes and expectations without challenging the validity of existing organizational norms, the learning is called single-loop learning. It attempts to increase organizational effectiveness within existing norms. When correction of the error requires the modification of the organizational norms themselves, which in turn necessitates a restructuring of strategies and assumptions associated with these norms, double-loop learning happens (Choo, 1995). Here learning naturally embraces its own opposites - to unlearn the inherited norms, beliefs, assumptions and assumptions and relearn new frames of reference and mental models in relation to the changing environments. It lays its basis on knowing of the environment first, which is again facilitated by the continuous scanning activities.[8] New frames of reference are formed in new situations using analogies drawn from past experience and adapt to the new situation. We are stimulated to new perspectives by paradoxes, anomalies, contradictions and conflicts. In this process we learn effectively.

So, two critical thing to organizational learning are: *(1) to realize that change and learning are needed; (2) to be able to step out of habitual mental models and frames of reference and reexamine the norms and assumptions (Hedberg 1981).*

Another important contribution of the environmental scanning and understanding is supposed to be to learn about the future and to be able to envision and shape the future to its own advantage. It is called “developing industry foresight” by Hamel and Pralahad (1994). Developing industry foresight starts by gaining a deep understanding of the forces that will draw the competitive space of the future: trends and discontinuities in technology, demographics, government regulation, and social lifestyles, etc..

Learning is intertwined with innovation, which is regarded as the most prominent result of an organization’s approach to its environment. Innovation is the process of creating new values and new satisfaction for its users (Lozada and Calantone, 1996). It promotes news ways of production, service, and management. It can be manifested in diversification, new product design, new product process, new resources, skills, new

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[7] The most important form of learning is not storing detail or step-by-step rules, but about developing new mental models, about changing the basic assumptions upon which the old mental models are built (Stacey, 1992).

[8] The study of Dirsmith and Covaleski (1983) suggest that organizational strategic norms are negotiated with the environment in an interactive fashion, which means that through environmental scanning the strategic norms can be changed through its act on the internal elements, learning, and further results in innovation.

marketing approach, new ways of conducting training, or new perspectives to another industry, etc. (Porter,1990). Continuous learning and constant innovation are regarded the true source of sustainable competitive edge.

Learning and innovation advocate being "nontraditional", however, firms usually value stable and tend to be so. While change is usually difficult, the environment influence is often essential in overcoming these tendencies.

The study of Levinthal and March (1993) emphasizes three forms of myopia of organizational learning: *the tendency to overlook distant times, distant places, and failures.* Such imperfections of learning suggest certain conservatism in expectations of learning and also proposes a question of how to avoid them. It warns us that the scope and base of the learning should be paid great attention. Learning should be based on a broad context, large picture over a long period, and attending to failure experiences.

4.3 The State of the Practice

As many scanning systems have been found in practice, corporate scanning studies revealed that, there has been less agreement concerning the way firms should organize their intelligence/scanning effort. The study of Gibbons and Prescott (1996) found that multiple intelligence nodes coexist in organizations. Some are formally charged the task while others are just informally personal sources.

In the seventies, systematized environmental scanning is virtually non-exist. The scanning activity is usually very primitive, ad hoc, and reactive effort (Fahey et al,1977; Reinhardt, 1984). Later on when more systematic scanning and monitoring came into being, they are better developed in the economic and technological field. Social environment has been rated last as far as a systematic scanning effort is concerned. The difficulty seems to be not so much the lack of corporate interest in social environment as the inability to make a systematic effort at it (Jain, 1984; Heikell, 1986).

While large scanning effort has originated from the need of a firm's strategic planning, in the early practice, the scanning units was criticized for being isolated from the real world of corporation, and unable to incorporate information they collected into the planning process and likely to vanish when the executives who had introduced the unit moved on (Russell and Prince, 1992). Even when scanning is more closely connected to strategic planning, it seems that it usually becomes a "once for all" effort, while not a continuous one. It becomes purely "scanning for planning" (Russell and Prince, 1992). Between the planning cycles there is almost no scanning.

Concerning the information collected and provided, it is reported that the environmental scanning had been highly directed to a single person's specific interests, selection of short-term and actual task specific interests, no concrete ideas on long term or company related trends, not strategy-oriented (Reinhardt, 1984). It was also found that data is too old, and too narrow band (Fuld, 1992). Much information provided is not really needed by the senior managers.

Other findings include: received information is not interpreted properly (Fuld, 1992). Little attention has been paid to information systems that are not instituted by the organization itself (Macdonald, 1996).

5. Scanning Based Strategic Management: A Strategic Issue Management Framework

Correct strategic decisions must necessarily take into account both the external forces and internal characteristics (Simon, 1993). Both market power based strategy and resource power based strategy are based on partial considerations, however they are complementary to each other (Mahoney and Pandian,1992). A systematic view should be both resource based and environment-oriented. To accommodate these different methods within one unified framework and to integrate them into a cohesive whole perspective, a strategic issue management model is applied.

The concept of a strategic issue management system was first put forward by Ansoff (1980), as a remedy of traditional strategic planning and strategic management systems. In traditional strategic management approaches, there is a basic assumptions that future is predictable somehow. However, in a turbulent environment firms easily fail to anticipate and forecast and suddenly discover that a fleeting opportunity has been missed, or unfamiliar and often threatening events comes up. While a periodical forecasting and planning approach works in a more stable environment, in determining the basic thrusts of an enterprise and assuring coherence and cooperation among different parts of a complex enterprise, it can not ensure against surprises and discontinuities.[9] Strategic issue management is proposed to address this very concern. Although there is a large volume of literature on the phases, organization processes, social-political behaviors and analytical complexity of strategic decision making in the field of strategy study, strategic issue management is one area which stands out as particularly fundamental and practical yet conspicuously neglected (Dutton, 1983).

A strategic issue is an event, change, or forthcoming development, inside or outside of the organization, that is likely to have an important impact on the organization's performance or long-term objectives (Ansoff, 1980). A strategic issue management process then involves: *(1) continuous surveillance of both inside and outside environment, (2) continuous sensing of issues and diagnosis of strategic issues, (3) periodic review and update of key strategic issue list or agenda, (4) gradually developing of strategic responses and countermeasures.*

Strategic issues are subject to a manager's perception and interpretation (Ansoff, 1980; Dutton, 1983). They are by their nature ill-defined and their potential impact is uncertain. The diagnosis of strategic issues is central to the whole issue management process. It is through this stage that data and stimuli are translated into focused issues, as is illustrated in Figure 5.

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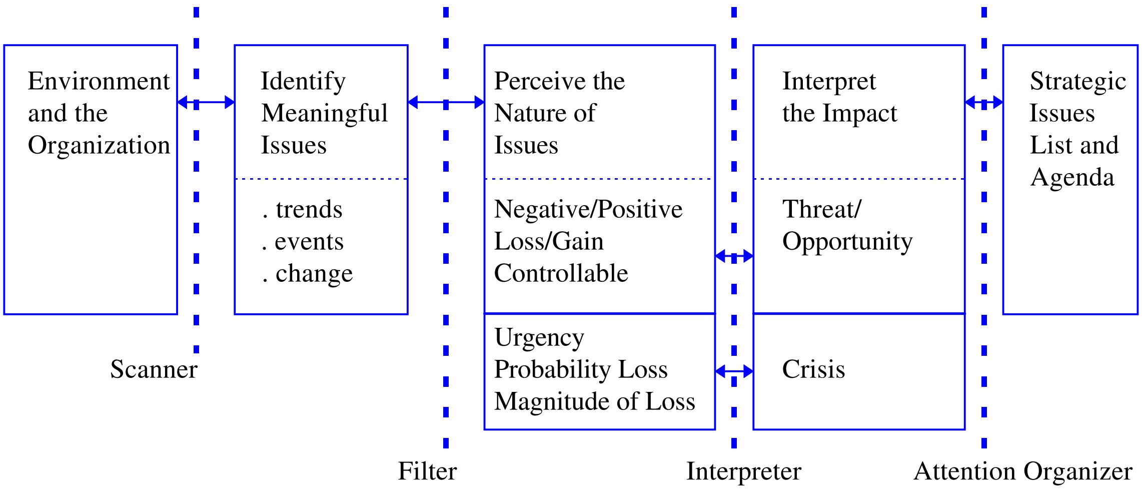
[9] Strategic surprises and discontinuities are sudden, urgent, unfamiliar changes which in the firm's perspective threaten either major profit or loss of a major opportunity (Ansoff, 1975, 1980; Stacey, 1992).

First, sensed trends, events and changes from inside and outside of the firm are identified as meaningful issues. Second, the nature of these issues are perceived according to whether they are negative or positive, controllable or uncontrollable, potential losses or gains; value of the possible loss, probability of loss and time press. Then it is interpreted as a threat or opportunity, or a crisis (Schneider and Meyer, 1991:308). The strategic agenda is the heart of an issue management system. It is a dynamic list of issues, aspirations and challenges that are on a list and need management attention. The strategic issue diagnosis process also creates a variety of issue specific outputs such as assumptions, cause effect understandings, predictive judgments and language and labels for describing an issue (Schneider and Meyer, 1991).

The strategic agenda is dynamic because it is always changing in a manner that reflects what is being detected, how the pattern of political interplay is developing and what managers are learning (Stacey, 1992). In addition, the available management time and attention is never sufficient to deal with all the contingencies that may arise, relative priorities for attention action need to be revised continually. Similarly, the strategic issue diagnosis is also characterized as a dynamic, fluid, emergent and open-ended process. Managers attention frequently change direction and focus during this process. It is the interpretation to comprehend an issue, drawing references and hypotheses rather than cementing conclusions that are more concentrated.

Figure 5. Strategic Issue Diagnosis



As has been mentioned earlier, strategic issue management was proposed as an effective means for organizations' change management. In fact, it is one of the two ways that Ansoff (1975) has pointed for firms to deal with strategic surprises:

> *(1) Surprise management system (or Crisis management system), which advises firms to develop fast and efficient, after the fact responsiveness to sudden discontinuities - like fire-fighting: when unable to predict or control, it*

prepares itself to respond quickly and effectively to a whole range of different alarms;

(2) Strategic issue management, which advises firms to treat the problem before the fact, to minimize the probability of strategic surprises - to prepare in such a way that by the time it strikes, a strategic discontinuity has lost its suddenness, urgency and unfamiliarity, and thus the strategic surprise is minimized.

So, the basic concern of strategic issue management is on the early warning information about impending discontinuities that is difficult to anticipate. The heart of it is the real-time recognition and use of “weak signals”. Besides, this early warning approach would also help to determine feasible (may not be desirable) responses in the light of available information. The response to weak signals is a graduated course which means that responses are formulated gradually (Ansoff, 1975). Early in the life of a threat when the information is vague and its future course is unclear, the responses will be unfocused, aims at increasing flexibility. Then as the information becomes more precise, the firm can respond in a direct attack on the threat or opportunity.

Compared with strategic planning or other traditional strategic management approaches -- which are function focused or capability focused; derive information needs from the decisions which are to be made and from the analytical methods to be used, and the information need is pre-articulated and pre-defined; based on strong signals; periodical conducted; and assume future is predictable -- strategic issue management is problem or issue focused; lets the available information determine the feasible decisions which can be made and methodology which are employable; a weak signal approach; and continuous real time response system to unpredictable discontinuities. So the strategic issue management approach forms a very good complement to other approaches. Although the strategic actions in strategic issue management are less precise and less focused than in strategic planning, it gains the advantage of earlier and more effective response to fast developing surprises (Ansoff, 1975).

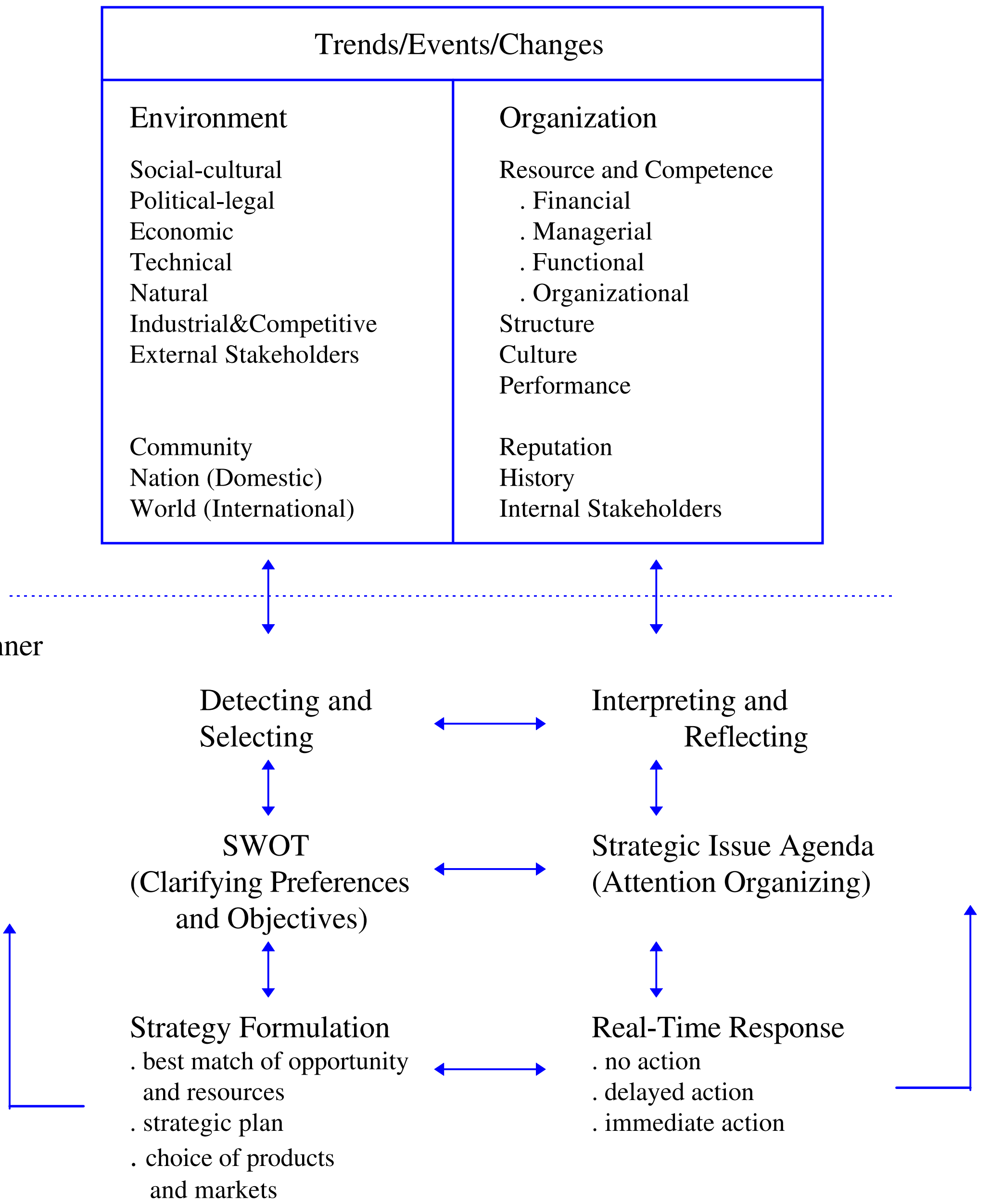
The stakeholder thinking also supports issue development and formation as well as issue management (Näsi, 1995). When an issue develops rapidly into what is, from the company’s perspective, a strategic problem, a stakeholder map is an invaluable tool when we try to understand the networks, motives and models of action of the interest groups involved.

Finally, to deal with open-ended issues is in fact engaging in continuous learning (Stacey, 1992; Pettigrew, 1973; Pfeffer, 1981; Kanter, 1985). When managers deal with the issues on their strategic agenda, they are performing a real time learning activity, altering old mental models and coming up with new ways of doing things. In this sense strategic issue management is a frame-breaking approach emphasizing restructuring the frames of reference for new situations.

On the basis of the multiple approaches we have reviewed, a scanning based, issue centered strategic management framework is formulated in Figure 6. As the open-ended future and predictable future both exist in reality, maintaining the issue agenda and set long term organization goals are all needed and they benefit from each other.

The strategic management process is a continuous learning process based on continuous scanning, issue diagnosis and attending, real time response and objective clarifying, strategy formulation.

Figure 6. A Refined Strategic Management Framework



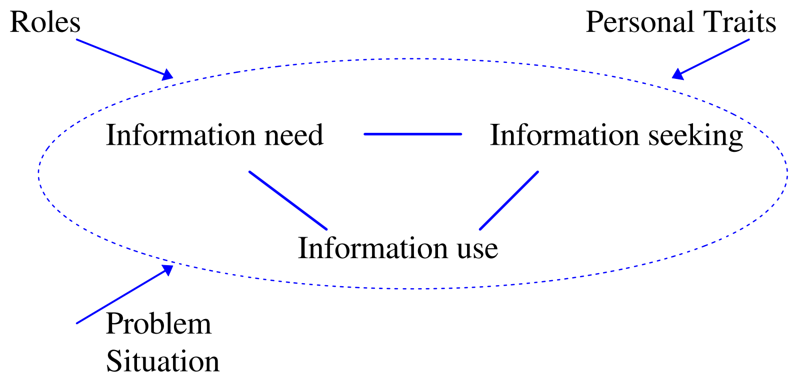
6. Micro Scanning Activity and Executive Information Behavior

Strategic scanning and interpretation is a practice that embraces both the perspective of the entire organization and the point of view of executives. The former is called a macro scanning approach and the latter a micro scanning approach. Our goal is to investigate how to construct an effective support system for senior managers (e.g. including executives, divisional presidents, and SBU managers). So we need to understand the information behavior of this special group of people.

The monitoring an disseminating of information have been recognized by Mintzberg (1973) as important roles of managers. Managers seek information to envision the future, support their decision making, or justify the intuition based decisions.

6.1 Managers as Information users

Three elements: information needs, information seeking preference and information use compose information behavior (Choo, 1995). Information seeking and use are driven by information needs and they in turn create new information needs. Information behavior as a whole is then seen to be influenced by the contingencies of managerial work: the problem situation, managers' organizational roles, and their personal traits. (MacMullin and Taylor 1984). They can be examined at three levels: situational level, cognitive level and affective level.



At the situational level, characteristics of the work or problem situation determine the ways that information is used and assessed to be useful or not. At the cognitive level information is needed, sought and used to bridge different kinds of cognitive gaps. At the affective level, emotions and psychological states influence the preferences and methods of information seeking (Choo, 1996). What is more important is that the information behavior of managers is also a very dynamic process that unfolds over time. The process interacts actively with the information environment. As new information is obtained and as the manager reflects and acts on the problematic situation, the perception of the situation changes, creating new uncertainties and priorities. This newly perceived problematic situation in turn leads to revised information behaviors[10] (Katzer and Fletcher; Choo, 1995, 1996).

[10] As described by Choo, "the relentless pace and inherent uncertainty of managerial work force managers to simplify and limit their information search based on experience and familiarity". "The information searching can be driven by information needs that may range from being impossible to articulate to the highly specific. They change direction frequently depending on what they find, they

The management and information studies also tell us that, managerial activities take place in an environment that is "informational overloaded, socially constrained, and politically laden" (Choo, 1995, 1996). When seeking information, managers do not have the energy, the time, nor the cognitive need to be comprehensive and systematic in their information search and to read long documents. Managers often deal with messy problems in fuzzy settings where particulars can make a crucial difference. So they prefer concrete information to abstract information. Concrete information about specific individuals, organizations or relationships, provides managers with the details and nuances that they need to evaluate the relevance and applicability of the information. (Auster and Choo, 1992-94; Choo, 1995, 1996).

The study of Lozada and Calantone (1996) inform us that managers are more likely to engage in or promote frequent scanning when they perceive their operating environment as highly uncertain, for example when the amount and unpredictability of change in customer tastes, production or service technologies and the modes of competition are perceived as high. However managers can only attend to a limited number of environmental cues given the limitations in resources, particularly time. An ongoing monitoring of environmental cues may help managers in deciding when an in-depth search is warranted thus helping them maximize limited resources.

Five types of paradox in executive information behavior have been reported in the literature (Aguilar, 1967; Lozada and Calantone, 1996):

> (1) some wanted information is not received and some information received is not wanted and is heavily overloaded;
>
> (2) some of the information needed is not received (insufficient) and is not even desired, and some information is already being received but is not even recognized as being related to strategic issues (uninterpreted or irrelevant);
>
> (3) of all the information a manager receives, only a portion can be linked to strategic issues (irrelevant)
>
> (4) managers scan in fragmented, informal and ad hoc ways.
>
> (5) there is incompatibility between formally acquired and informally acquired information - the formal mechanism seem likely to surpass and distort the informal, leaving managers deprived of the information they need (Macdonald, 1996).

6.2 Sources of Information for Executives

A study of scanning as information acquisition should naturally analyze the selection and use of alternative information sources. In management studies, under most occasions, a problem or information need is usually articulated or at least made relatively clear before-hand. Information is then sought to address the specific question or need. Contrasted with this, scanning not only includes searching for particular information but also simply being exposed to information. Scanning is often undirected

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choose items that have no apparent relevance, and they gather information that they subsequently do not use.

viewing without specific purpose or information need, and without awareness as to what issues might be raised.

6.2.1 Potential Information Sources

Information source has been a frequent topic in the literature. Many efforts have been devoted in this area (Aguilar, 1967; Auster and Choo, 1993, 1994; Collings, 1968). A summarization of potential information sources for executives is presented in Table 1, where information sources are categorized as: human sources, documentary sources, and combination sources which are mainly combination of various documentary sources in a company library or electronic on-line services.

To get an idea of what kind of information about business environment has been reached by managers, Table 2 displays the research result from Aguilar (1967): 16 types of information obtained by executives, which are organized in five categories: Broad Issues, Technical Tidings, Market Tidings, Acquisition Leads and Others.

Table 1. Information Sources and Channels: A General Picture

Human Sources ***(phone call, letters, personal memoranda)***
Subordinates ("line" or "dotted" relationship)
Superiors ("line" or "dotted" relationship)
Colleagues
Peers
Board members
Personal Experience
Librarians
Customers
Suppliers
Distributors
Competitors
Bankers,
Consultants
Lawyers
Public Accountants
Advertising agencies,
Public relation people
Government Officials
Business and Professional Associations
Chance encounters, neighbors
Friends
Others ("diagonal" relationship)

Documentary Sources ***(newspapers, publications, reports, meetings, memoranda)***
Regular and General Reports and Notices (salesman's call report, R&D department's monthly progress report,...) Memoranda Scheduled Meetings Newspapers Newswire Stock Exchange Market Trade publications Professional journals Professional newsletters Technical magazines Government publications Publications of industry groups Business periodicals Publications or newsletters issued by private organizations Academic Journals Information from professional associations Literary publications Patent analysis Universities and research institutes Information services companies Industrial or professional conferences Trade show, exhibitions Scheduled report from consultant Visual or other direct perception of an event or condition Legislation and jurisdiction at home and abroad Dissemination of information by TV, radio, etc.

Combination Sources

Company Library
Electronic Sources
    On-line databases
    Internet

Table 2 16 Types of Information Obtained by Executives (Aguilar, 1967)

Category	General Concept
Market Tidings	Market potential: Structural change: Competitors and industry: Pricing: Sales negotiation: Customers:
Acquisition Leads	Leads for mergers, joint ventures: information concerning possibilities for the manager's own company
Technical Tidings	New products, processes and technology: Product problems involves existing products: Costs: Licensing and patents: of products and processes
Broad Issues	General conditions: events of general nature such as political, demographic, national and so forth Government actions and policies: government decisions affecting the industry
Other Tidings	Suppliers and raw materials: purchasing considerations Resource available: personnel, land, ... Miscellaneous:

Information users choose sources by a number of criteria: their accessibility, their ability to offer trustworthy and relevant information, the richness of the information channel and so on. The studies of Choo's (1992) suggest that source quality is the most important factor in explaining managers' source choice and use in scanning activity, which runs contrary to earlier user studies, particularly those of engineers and scientists, which concluded that perceived source accessibility was the overwhelming factor in source selection. They found that managers perceive internal, personal sources to be of high quality. Typically, managers also prefer information sources and communication channels that can provide them with a sense of the hidden or informal dimensions of the situation, for example human information sources. And familiar, habitual information sources are tended to be used first.

It is generally agreed that executives use a variety of complementary, internal and external, personal and impersonal sources to scan their business environment. Researchers have also repeatedly found that the human sources (subordinate managers, staffs, customers) are among the most commonly and frequently used sources of information and among them boundary people such as salesman hold a privileged position (Aguilar, 1967; Thietart and Vivas, 1981; Auster and Choo, 1992, 1994; Palvia et al, 1996). Other frequently used sources are newspapers and periodicals, broadcast media, and internal documents (Auster and Choo, 1992). Personal sources are important for information on customers and competitors; while printed or formal sources are also important for information on technological and regulatory matters. Choo (1995) explained that, "because they have limited time and attention, CEOs appear to use printed sources as an efficient way of doing a broad scan of the environment. On the other hand, personal sources have high information richness that allow the executives to interpret ambiguous situations". Hambrick (1982) noted that, a common body of knowledge seems to exist within an industry, which is disseminated through media equally available to and used by executives within the industry. Executives in a specific industry tend to rely on common sources for environmental information and even share a common "recipe" for viewing the environment (Spender, 1981).

Choo's study found that few CEOs personally use the company library and very few use on-line database services. Nevertheless, when comparing the research findings in previous years and more recent years (Kefalas and Schoderbek, 1973; Choo, 1994; Palvia et al 1996), it can be noticed that the frequency of executives' use of online information service is increasing.[11]

Managers not only communicate regularly with superiors and subordinates, peer, but also interact extensively with individuals outside the formal chain of command. As leaders of the organization, senior managers are well connected with many outside information sources. The liaison role of managers is characterizing as making and maintaining contacts and interactions outside the formal organizational chain of command. Carroll and Teo (1996) distinguish two types of social networks of managers: the organizational membership network and core discussion networks. Organizational membership network consist of ties to those organizations to which people formally belong as members. Core discussion network consist of ties to individuals with whom people (can) discuss important personal matters. These networks serve to build bridges to the actors on which organization depends (Mintzberg, 1973; Carroll and Teo, 1996). Their study found that, compared with

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[11] Findings of a recent study by Palvia, Kumar, Kumar and Hendon (1996), concerning the frequency of executives' use of various information sources:

Publications: trade/general/government publication (92%)
Personal contacts (92%)
Media (radio/TV/newspaper) (84%)
Suppliers/Customers/Trade associatiosn (84%)
Conferences/Trade Shows (84%)
Chambers of Commerce (76%)
Business travels (73%)
Information brokers/Consultants (43%)
Online databases (22%)
Academic institution/Research labs (19%).

nonmanagers, managers show wider organizational membership networks and also larger core discussion networks.

6.2.2 Information Food Chain

In addition to the above observations and findings concerning sources of information for managers, the concept of information food chain in Choo (1995) is also very useful in analyzing and choosing the sources. The idea and principles are that, as in practice information sources do not exist in isolation, the various sources feed on and off one other while often overlap each other, forming several intertwining "information food chains". A source takes in and process information before re-transmitting it, sometimes adding value and sometimes introducing distortion. Information is often transferred through many intermediate consumers before arriving at the end user. A user may have obtained the information directly by speaking to the person concerned or reading the original document.

Sources high up on the information chain summarize and interpret data, while sources low down on the chain (close to the event) provide rich details and allow the user develop their own sense of the situation. Humans tend to be secondary or tertiary information consumers who are high up in the information chain. In scanning activities, extensive information networks which include both short and long information chains are necessary to ensure a sufficiently broad and thorough sweep of the external environment, so that important signals are not missed but are correctly read. This suggests us the need of balance between sources on a short information chain and sources on a long information chain.

7. Design, Construction, Implementation and Validation of An SSI Support System: A Research Action Plan

To put the idea of an SSI support system into effect, we need to realize it first and then validate the construction and the conceptual models behind it, through an interactive development process and its implementation in practice. An outline of such a research program is suggested as follows:

A. General System Design

As Fielden (1975) has put it, design is “the use of scientific principles, technical information and imagination in the definition of a structure, machine or system to perform pre-specified functions with the maximum economy and efficiency”. In this research, the high level system analysis we made in previous sections provides part of the basis on which system design can be carried out. Then, what would be the innovative methodologies and technologies that can be applied? Here we consider that the agent concept and technology could be an appropriate solution worth of exploration. So an investigation of the agent technology and its principles for applications needs to be conducted. A general system design can be created then.

In terms of the refined strategic management framework we have worked out, the system design will focus mainly on scanning and interpretation of business environment for the managing of a strategic issue agenda. Later it can be integrated with the process of formulating relatively long term strategic objectives and plans. The ultimate goal is to provide such a computer based platform where these two approaches for strategic management can interact and complement each other.

B. System Construction and Validation

System construction follows the system design and seeks to implement its structure. It can start with two kinds of task: *the construction of basic system elements using agent concept and tool; and the analysis of one or two specific case contexts* (their internal and external business environment, the information food chain, potential and current strategic issues, frames of reference through which particular issue domains will be conceived, the shift of these frames and triggers that cause the shift, etc.). Upon finishing these, the basic task-specific agents can be applied to the scanning and interpretation of one specific domain of business environment and the diagnosis of strategic issues. The system can then be expanded to encompass two or more domains. Once the agent properties and system consistence is verified through repeated simulation and experimentation, the interaction process with its user can begin, through which the system design, constructs and conceptual models are validated.

C. Implementation

When becoming reliable, more complete in its range of functionality, and most importantly, accepted by its user, the system can be implemented for managers of the case companies. The key issues in the implementation phase may involve decision on appropriate infrastructure, integration with companies' existing resources or applications. System validation continues at the early stage of its usage.

8. Conclusions

This extensive literature survey attempts to draw from existing theory and research findings some useful concepts, guidelines, propositions and requirements for the construction of computer based strategic scanning and interpretation support system. It does find some answers or hints concerning such very practical problems as what to scan, from where, how to scan, how to use the information, when and where it seems that support is needed and what kind of support would be more effective. The following are assertions and premises we obtained.

(1) Strategic management take searching for business intelligence as a basis. Systematic, formal and continuous strategic scanning and interpretation is very significant especially in a turbulent environment. Such a system need to be computer based or computer supported. The main task of the computer support system is to reduce information overload while not increase it. In this sense, less is more.

(2) Strategically important internal factors can be identified and assessed by resource based and competence based, as well as stakeholder theory. The environmental forces which need to be monitored can be identified as those that have critical impact on the critical resources. And they can be analyzed against resource elements by employing an industry organization framework and general environment framework.
(3) Stakeholder theory suggests the importance of stakeholder interests in assessing an organization's performance and determining strategic objectives. The stakeholder concept is useful also in the sense that many stakeholders are important sources of information to managers.

(4) A wide range and variety of sources provides a large scope for innovation in the gathering, correlation, and confirmation of information, and creative information acquisition can accelerate understanding. However the sources should be carefully maintained. From time to time the value and usefulness of information received and sources of information need to be evaluated to weed out the weak sources and to capture the true information needs, to maintain a match between information needs and sources. For a support system, the information gathering strategy would need to change with the sensed data overtime. Also, a computer based scanning system should be able to help to validate the formally and informally acquired information.

(5) Meta-information is more important than a specific element of information because the constant changing of managerial information needs. Meta-information is then defined by meta-meta-information. Such meta information should find an easy way (for example the design of a "question bank") to be collected and used.

(6) The reality tells us that that long-term future is not always knowable, cause and effect relationships in the strategic management field is in a constant change, the environment is not a given reality outside the business and independent of it. We need to be aware of that the business party creates the environment while it adapts to it. The scanning based, issue centered strategic management framework draws on several complementary strands of theory. It includes purpose-defining, future attending and issue handling. It forms a basis for both a proactive and a reactive approach.

(7) If an environmental trend has remained the same for some time, it is helpful to ask what will happen if the trend stops or reverses suddenly.

(8) An effective support system needs to be a learning system. Just as the assumptions, frames of reference or mental models of managers need to be revised frequently, the system is also required to be able to question its own models.

(9) Strategic issues can be organized in several dimensions: internal issues/external issues; resources issues/product-market issues; domestic issues/global issues. How to provide support for the strategic issue diagnosis and for the maintenance of a strategic issue agenda would be our focus.

(10) The information need, use and the strategic attention are affected by cognitive, situational, and psychological factors. For a support system, how managers' cognitive bias and situational needs should/could be balanced?

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