The outside in: questioning the use of electronic information services in organizations
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Out of Control?
The ins and outs of environmental scanning

Electronic information services provide organizations access to information about other organizations and individuals, and about events and developments taking place outside their own organization. Electronic information services can therefore, in theory, support organizations in the process of scanning and interpreting the external environment. This chapter provides a theoretical framework to describe and explain this process of environmental scanning. Together with the next chapter on characteristics of electronic information services we will be able to determine the role electronic information services can play in the acquisition and use of information concerning the organization's external environment. We will see whether the demands of the environmental scanning process fit with the opportunities that are provided by electronic information services.

First, the concepts of an organization's external environment and environmental scanning are defined, in which the latter is related to the more general concept of knowledge management. This is followed by an explanation of why environmental scanning is relevant for organizations and for whom.

2.1. The organizational environment: a pool of plenty

Organizations have long been conceptualized as closed-systems in which particular practices and structures determine the internal efficiency of organizations. Early closed-system theories such as scientific management, human relations theory and the study of bureaucratic forms took the environment of organizations for granted (Kreps, 1990; Daft, 1992). During the 1950s and 60s a paradigmatic shift occurred towards an open-system approach, in which the performance and the survival of organizations is directly linked to external pressures and demands. An organization must interact with its environment to survive:

"[an organization] both consumes resources and exports resources to the environment. It cannot seal itself off. It must continuously change and adapt to the environment. Open systems can be enormously complex. (...) The organization has to find and obtain needed resources, interpret and act on environmental changes, dispose of outputs, and control and coordinate internal activities in the face of environmental disturbance and uncertainty."

(Daft, 1992; p. 9)
Several theories have been developed to explain how environments influence organizations and vice versa (such as the Contingency theories (e.g. Galbraith, 1990; Mintzberg, 1983; Daft & Lengel, 1986), the resource dependency theory (e.g. Pfeffer & Salancik, 1978), institutionalism (e.g. Meyer & Rowan, 1970; Zucker, 1987), transaction cost approach (e.g. Williamson, 1981), network theories (Powell, 1990; Nohria, 1992), competitive sustainability (Porter, 1980) and the stakeholder approach (e.g. Connolly et al., 1980). Nowadays it is even argued that the internal structure of an organization has to be able to continuously adapt to environmental pressures (De Ridder, 1996), or that an organization has to integrate itself with the external environment, through value-added partnerships or network organizations (Nouwens & Bouwman, 1995).

Many organizations are becoming increasingly porous. They open up to external influences which will further blur the boundaries between organizations. Castell (1996) has distinguished several trends in organizational restructuring which all point in one direction: organizations try to restructure themselves to make them adaptable to environmental pressures. The industrial transition towards an information society and the capitalist restructuring towards global economies are said to be the main driving forces behind these different “organizational trajectories, namely specific arrangements of systems of means oriented towards increasing productivity and competitiveness” (Castell, 1996). Among the organizational trajectories he distinguishes, are:

- the transition from mass production to flexible production: standardized assembly-line-based mechanized processes of production are replaced by customized and flexible production systems;
- the resilience of small and medium-sized firms as sources for job creation and innovation, although large corporations remain at the center of economic power;
- new methods of management, both stressing worker’s involvement and flexibility towards customer needs; examples of these new methods are total quality control, just-in-time management, decentralized work units, multi-functional task descriptions, etc;
- an increasing amount of more or less formal interorganizational relationships, such as interfirn linkages between small and medium-sized organizations, subcontracting/outsourcing agreements between large buyers and small sellers and strategic alliances between large corporations;
- the shift from vertical bureaucracies to the horizontal corporation, characterized by organization around process instead of task, a flat hierarchy, market-orientation, an emphasis on customer satisfaction and the motivation and training of employees.
All these trends are directly aimed at guaranteeing close contact between the organization and its environment. All these trends point to the same solution; blurring the boundaries between internal organization and external environment in order to stay in touch.

Almost every organization will feel some form of pressure to expose itself to (information about) the external, organizational environment. Even more, the organizational environment will probably increase as a central point of attention in the years to come if the trends, as mentioned above, will continue. Organizations have to inform themselves on external matters in order to be able to interact with, adapt to or influence what's generally out of direct control: the external environment.

The outside world, however, is large, omnipresent and dynamic. The organization's external environment consists of everything that happens outside the organization, which makes it an elusive concept: “[i]n one sense, the environment includes every event in the world which has any effect on the activities or outcomes of the organization” (Pfeffer & Salancik, 1978; p. 12). The organizational environment needs to be defined more systematically to make it more meaningful and manageable. Daft (1992) defines the organizational environment as “all elements that exist outside the boundary of the organization and have the potential to affect all or part of the organization” (p. 71). In one sense, this is a very broad definition: the environment consists of all elements outside the organization. But in another manner, it fundamentally limits the organizational environment to only those elements that directly (can) affect the organization, or even to those elements that are considered to have a potential affect on the organization, as an earlier definition of Duncan (1972) expresses. He defines the organizational environment as:

The relevant physical and social factors outside the boundaries of the organization or specific decision unit that are taken directly into consideration in the decision-making behavior of individuals in that system.

Duncan's and Daft's definition share the presumption that clear boundaries exist between the organization and its environment. However, this is often not the case. For example, two separate and rather autonomous divisions under one corporate holding can see themselves as belonging to one organization or as two completely different entities with quite accidentally a shared power or capital structure. Or, to take one more example, are large shareholders part of the organization or are they considered to be part of the organization's environment. Conceptually, Perrow (1986) describes this idea of blurry boundaries as the nested box problem (see figure 2.1.): "Inside each box is a smaller box whose dimensions are constrained by the larger box. Each box is independent to some extent of the large boxes (and the smaller ones within it) and can be analyzed as such. But it is also quite dependent on the shape of those within and without it" (p. 192).
Even if one can determine the boundaries between the internal and the external, it is still difficult to see what takes place in the environment. For example, the individual perception of the environment is affected by the boxes the individual is in, such as the group, division, organization, etc. one is in. Both Daft and Duncan argue that an organization (and its decision-makers) can not take everything from the outside into consideration. Because of the omnipresence of organizational environments, one cannot just look outside and see what or who's passing by. There's too much that could be taken into account. A helpful strategy to grasp the organization's environment is to divide it into smaller sub-systems. One of the most comprehensive categorizations has been given by Daft (1992), who has distinguished several segments of an organization's external environment. These segments consist both of structures and processes, of actors and events (see figure 2.2). The specific contents and importance of the segments depends on the industry one is in, or the chosen field of action. The relevance of these segments can also be described by the distinction between a task environment and a general environment (Daft, 1992) or between a transactional and a contextual environment (Boonstra, 1992).

The transactional environment includes those segments with which the organization interacts directly and which have direct impact on the organization's ability to achieve goals. Typically, the segments "industry" (competitors), "market" (customers) and "raw materials" (suppliers) belong to the task environment. Depending on the organization's field of action other segments could be part of the transactional environment, such as "government" (which will be the case in, for example, the health care sector) or "financial resources" (in capital-intensive industries, such as for example telecommunications). The contextual environment includes those segments that may not have a direct impact on the daily operations of the firm but that influence the industry or the economy in general. It is obvious that organizations will pay closer attention to the (segments of the) transactional environment than to the contextual environment, since the transactional environment has a more direct impact on the organization's performance.
2.2. Environmental scanning: a way to get informed

The division of the organizational environment in segments, clustered in a task and a general environment and specified through an organization’s field of action is helpful in assessing what organizations look for when they gather information about the organizational environment. To stay informed about the structures and processes of the organization’s environment, organizations have to be engaged in some way of environmental scanning.

Environmental scanning is defined as the “activity of gaining information about events and relationships in the organization’s environment, the knowledge of which would assist management in planning future courses of action” (Choo & Auster, 1993). Four types of scanning, or ways to acquire information can be distinguished (based on: Choo & Auster, 1993):

- **Casually viewing** - the information user is exposed to information with no specific purpose or information need in mind, for example when one meets with business associates during a social gathering;

- **Selectively viewing** - the information user is exposed to information about selected areas or certain types of information and the user is ready to assess the significance of such information as it is encountered, such as the browsing of newspaper sections that report regularly on certain topics;

- **Selectively searching** - the information user actively looks for information to address a specific issue in a relatively limited and unstructured manner, such as
the monitoring of the financial market to check the minute-to-minute changes in stock prices;

- Systematically searching - the information user makes a deliberate or planned effort to obtain information about a specific issue, such as the systematic gathering of information to evaluate a prospective corporate acquisition.

The underlying dimensions of these types of scanning seem to be whether one knows what to scan for or not, and whether one knows where to scan or not. Both dimensions result in the two-by-two table as displayed in table 2.1.

<table>
<thead>
<tr>
<th>where/what</th>
<th>Intentional (knowing what)</th>
<th>Non-intentional (not knowing what)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Limited amount of sources (knowing where)</td>
<td>Selectively Searching</td>
<td>Selectively Viewing</td>
</tr>
<tr>
<td>Various sources (not knowing where)</td>
<td>Systematic searching</td>
<td>Casually Viewing</td>
</tr>
</tbody>
</table>

Table 2.1. Types of scanning (based on Groen, 1996).

The desired output of environmental scanning is organizational intelligence. Huber (1990) has defined it as "the output or product of an organization's effort, to acquire, process and interpret information external to the organization. It is an input to the organization's decision makers." Organizational intelligence is a property of the collective and can result from the accumulated wisdom of its members as well as from interaction among its members, who will have varying levels of intelligence and various knowledge niches. The acquisition of knowledge doesn't turn automatically into organizational intelligence. The information gathered from outside scanning needs to be interpreted and used within the organization.

Organizations are interpretation systems, according to Daft & Weick (1984). "Organizations must make interpretations. Managers literally must wade into the ocean of events that surround the organization." Interpretation is the process of translating these events, of developing models for understanding, of bringing out meaning. Daft & Weick focus on the overall learning process of managers which can be broken down into three stages (see figure 2.3):
Environmental scanning thus turns into organizational intelligence when gathered information is shared within the organization or the management team, to lift individual intelligence to the level of organizational intelligence, and when the collected information about the environment is interpreted and acted upon. It is the challenging task of the organization to ensure that the information process does not stop with the acquisition of information, but is continued in interpretation and learning. The organizational information process is more than what occurs by individuals. "Individuals come and go, but organizations preserve knowledge, behaviors, mental maps and values over time. The distinctive feature of organization level information activity is sharing (...). Reaching convergence among members characterizes the act of organizing and enables the organization to interpret as a system" (Daft & Weick, 1984).

The use of information about the external, organizational environment begins with the acquisition by individuals, but it certainly doesn’t end there. For the integration of outside information into the organization, organizations need to share different forms of knowledge among different kind of people within and outside the organization.

**Knowledge management: a way to share**

Environmental scanning is a process to acquire and use information about the environment of organizations. It hopes to result in organizational intelligence. But in order to do so, the acquired information needs to be interpreted and shared by many different people within the organization. Environmental scanning can be embedded in general policies of knowledge management in order to integrate various forms of knowledge and to organize the sharing of these forms of knowledge.

Knowledge management has received much attention in recent years (e.g. Wiig, 1994; Weggeman, 1996, Nonaka & Takeuchi, 1995, Quinn, 1992, Choo, 1998). Information and the skills to use and interpret it, have become important assets in today’s business life. “The true value of a corporation is not in its physical assets, but in the human competencies, databases, organizational capabilities,
intangible images, systems and ongoing coalition relationships that it creates" (Quinn, 1992, p. 35).
Knowledge has been described as the most strategically important resource for organizations (Grant, 1996).

Knowledge is hard to define. It's more than information, which consists of "facts and data that are organized to describe a particular situation or condition" (Wiig, 1994), while knowledge – according to Wiig – consists of "facts, truths and beliefs, perspectives and concepts, judgements and expectations, methodologies and know-how." Grant (1996) makes a distinction between explicit knowledge (which can be written down) and tacit knowledge (which cannot be written down). Quinn, Anderson & Finkelstein (1996) use the term "professional intellect of an organization".

Intellec resides mainly in the brains of professionals, but the explicit form of intellect can also exist in the organization's systems, databases or operating technologies. For an organization to fully profit from the professional intellect of individuals, it must ensure the sharing of information in order to achieve organizational intelligence. As Grant (1996) has put it:

*If knowledge is a critical input into all production processes, if efficiency requires that it is created and stored by individuals in specialized form, and if production requires the application of many types of specialized knowledge, then the primary role of the firm is the integration of knowledge.*

Knowledge has the unique characteristic that it is one of the few assets that grows most when shared (Quinn, 1992): "As one shares knowledge with colleagues and other internal organizations, not only do these units gain information – linear growth – they usually feed back questions, amplifications and modifications, which instantly add further value for the sender" (p. 254).

However, the sharing of knowledge does not occur automatically. First, because it is hard to fit external information with the information already in use within the organization. The production of the information is not coordinated by the organization itself and does not always directly relate to the specific questions the organizations have. Also, they are sometimes hard to integrate with common beliefs and frames of reference that already exist within the organization (see: Macdonald, 1995). Secondly, because for most professionals knowledge equals power. The more expert a professional becomes, the more he or she will feel part of an elite and the more he or she will feel the need to function alone (Quinn, 1992). This creates an interesting dilemma: in organizations who need the sharing of information the most, the threat of losing power may inhibit this sharing taking place (Davenport, Eccles & Prusak, 1992).

Organizations can increase organizational intelligence, by making members of the organization more intelligent (or hiring more intelligent members), by structural, technical and social or political mechanisms to encode individual intelligence in the organization's memory, routines, rituals, procedures and symbols, and by creating structured interaction patterns between organizational members. Increasing organizational intelligence also requires active commitment of management. Information policies are needed to guarantee commonality in vocabulary (that is, having a set of
terms, categories and data elements that carry the same meaning throughout the enterprise), clear access to information (who actually needs what information and who doesn’t), good quality of information (with detailed attention to its integrity, accuracy, currency, interpretability and overall value) and efficiency of information management (Davenport et al., 1992).

Thus, for an organization to fully profit from its intellectual resources, it needs to create tools and mechanisms for individual organizational members to share their knowledge. It is clear that the acquisition of knowledge is not enough; environmental scanning will not do the trick. It will allow individuals to acquire information and to build the first level of professional intellect or individual intelligence, but for environmental scanning to have success, knowledge about the external environment needs to be integrated into the organization. However, it requires a lot of organizational effort for individuals to be able and willing to share their knowledge. Furthermore, external information has to be integrated into internal frames of references: external information has to be interpreted and acted upon. Both sharing and integrating intelligence are essential characteristics of the organizational processing of external information which is often overlooked in present research on environmental scanning and the use of electronic information services. The use of information about the organization’s external environment begins with the acquisition by individuals, but it certainly doesn’t end there.

2.3. The relevance of environmental scanning for organizations and individuals

Although the relevance of environmental scanning will increase in coming years, not every organization and individual within those organizations will be equally pressured to engage themselves in the complex processes of environmental scanning. Organizations will differ in the degree of environmental scanning and the ways in which this will be done, because environments differ and because organizations differ. In the remaining parts of this chapter we will first discuss the environmental pressures which influence the degree and contents of environmental scanning and secondly try to explain which organizational characteristics influence the degree of environmental scanning and by whom this is done.

**Environmental characteristics: perceived uncertainty**

Not every environment demands close and continuous consideration from the organization. If nothing happens, if it is always business as usual, if a few organizations are dominating the scene and do so in a rather predictable manner, it is a relatively easy task to stay informed about the organization’s external environment. All things being equal, the more (people in) organizations perceive the environment as uncertain and unpredictable, the more an organization will search for information about the environment. Perceived environmental uncertainty is defined as

*the difference between the amount of information required to perform the task and the amount of information already possessed by the organization* (Galbraith, 1973).
This perceived uncertainty can be related to three different elements of decision-making (Duncan, 1972);

- the lack of information regarding the environmental factors associated with a given decision-making situation;
- an inability to predict how these environmental factors will affect the performance of the decision-making unit;
- no confidence on how to react to the environmental factors, based on a lack of knowledge about the outcomes of possible decisions.

Duncan (1972), who can be considered the founder of the concept of perceived environmental uncertainty, has found two major causes of perceived environmental uncertainty.

1) Environmental complexity, the amount of environmental factors that need to be taken into consideration and the degree to which these factors are dissimilar to one another. Complexity thus refers to heterogeneity (Daft, 1992). One can specify the relative vague term “factors” by using Daft’s segmentation of the organizational environment. Each segment represents a possible factor to take into account. Also, within each segment one can specify different amounts of elements. For example, in some organizations the segment “raw material” may be considered very important, but also relatively simple to analyze because one only needs to deal with one supplier, while other organizations may be able to choose from various alternatives with unique price/quality combinations. The more segments are of direct importance to the organization and the more elements within an important segment need to be considered, the more complex the environment is perceived to be.

2) Environmental change, the degree to which the factors of the external environment change over time. An environment is perceived to be more dynamic and unstable when important factors go through some changes during a certain time frame, and/or when new factors emerge over time while others fade away. Furthermore, it is not so much the change in itself that creates uncertainty, but the unpredictability of the change.

Daft (1992) has categorized different industries in their general perceived environmental uncertainty, based on these two causes of uncertainty (see table 2.2). Organizations within a dynamic but simple environment are considered to be more uncertain than organizations within a stable but complex environment. This is supported by the general finding that the environmental
dynamics are of more importance than the environmental complexity in producing uncertainty (Aldrich & Mindin, 1978).

<table>
<thead>
<tr>
<th>Environmental complexity &amp; change</th>
<th>Simple environments</th>
<th>Complex environments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stable environments</td>
<td>Soft drink bottlers, beer distributors, container manufacturers, food processors</td>
<td>Universities, appliance manufacturers, chemical companies, insurance companies</td>
</tr>
<tr>
<td>Unstable environments</td>
<td>Personal computers, fashion clothing, music industry, toy manufacturers</td>
<td>Electronic firms, aerospace firms, telecommunications, airlines</td>
</tr>
</tbody>
</table>

Table 2.2. Examples of industries and their environmental uncertainty (Daft, 1992)

Environmental uncertainty is not just a given fact for decision-makers in organizations; it is not just a fact of life one can only passively accept and respond to. The uncertainty of the environment is also (or perhaps mostly) caused by the way the organization positions itself in the organizational environment. Mintzberg (1983, p. 136) has therefore added two causes (besides complexity and dynamics) of perceived environmental uncertainty, that are directly related to the strategic behavior of organizations: market diversity and market hostility.

In general, the frequently tested hypothesis holds that the more uncertain the environment is perceived, the more one searches for information about the environment (Choo & Auster, 1993; see also the meta analysis in chapter 4). These consistent results show the importance of the concept of perceived environmental uncertainty and it does help explaining why organizations scan the environment. The concept of uncertainty is directly related to a perceived lack of information. If environments are perceived to be uncertain, because of complexity, instability, hostility and/or diversity, it is likely that organizations within those environments will engage more in environmental scanning. Daft's segmentation of the organizational environment can help to explicate the specific nature of the needed information. Uncertainty can relate to different segments of the organizational environment (for example, government behavior may be simply analyzable but technological developments may be very complex). Different segments can be of more or less immediate importance. The segments of the environment can also direct us to general content categories one needs to be informed about.

**Organizational characteristics size, age and strategic focus**

The strategic focus and performance criteria that managers define for their organizations determines the degree to which they are outward oriented. A well-known categorization of organizational performance criteria is the triad efficiency, effectiveness and innovativeness.

Efficiency relates to the optimal allocation of resources to perform a certain task. The ratio of resources utilized to output produces is a standard of how well a task is being done (Pfeffer & Salancik, 1978). Effectiveness concerns the optimal achieving of pre-determined goals. The
difference between effectiveness and efficiency can be described as the difference between 'doing the right thing' (effectiveness) 'doing the thing right' (efficiency). Innovation relates to the generation and implementation of new ideas (van den Hooff, 1997), in other words innovation involves the changing of organizational goals, markets and products/services. These performance criteria are closely linked to the perceived relevance of organizational environments. Organizations (or, more precise, managers in organizations) who stress efficiency criteria are more inward oriented. Efficiency is an internal standard of performance; how well are tasks being executed. Effectiveness on the other hand is first and foremost an external standard of how well an organization is meeting the demands of various groups and organizations that are concerned with its activities (Pfeffer & Salancik, 1978). Effectiveness is thus ultimately judged by those outside the organization. Finally, managers who stress innovation are probably the most outward oriented. Organizational innovation is "the process of bringing new, problem solving ideas into use. An innovation is novel to the adopting organization, but it may imitate something that exists elsewhere. Innovation is intendedly adaptive, and it is undertaken typically in response to unfamiliar, unexpected, or nonroutine problems. (...) It involves changes in existing organizational competencies and cognitive paradigms, mental models and theories in use" (Glynn, 1996). Obviously, most of the information required for change will not exist within the boundaries of the organization; in fact, most information will probably exist only outside the organization (Macdonald, 1995). Directly related to the exchange of information, Kreps (1990, p. 23) has stated:

*Internal communication processes are directed toward establishment of organizational structure and stability in conducting organizational, while external communication channels are directed toward innovation by facilitating identification or directions for ongoing development.*

Besides personal preferences, the values of managers in organizations are partly based on contextual organizational characteristics, such as organizational size and age or the growth phase an organization is in. Many argue that young organizations generally have an external focus. Daft (1992), for example, states that the concepts of organizational environments are "especially relevant to new, emerging organizations (...) the appropriate role of management is to find a niche where products and services are desired by the environment." Stinchcombe (1969) has also argued why new organizations are more dependent upon their environments. He lists several arguments.

- New organizations generally involve new roles, which have to be learned. In old organizations former occupants of roles can teach their successors. New organizations have to get by with generalized skills produced outside the organization, or have to invest in education.
New organizations must rely heavily on social relations among strangers. This means that relations of trust are much more precarious in new than in old organizations.

One of the main resources of an old organization is a set of stable ties of those who use organizational services - e.g. customers.

For new organizations, every necessary link with their environment has to start from scratch.

Also, some argue that smaller organizations tend to need more information about the big world surrounding them. As Noordzij (1994) has put it:

Organizational structures are changing, in which smaller units will be allocated for core activities. A sense of the big, angry outside world will then be an essential requisite.

Furthermore, smaller organizations are often not able to produce the information internally (through self-conducted research or external consultancy). On the other hand, as Mintzberg (1991) has stated, the older and larger an organization, the more formalized its behavior and the more elaborate its structure. Older and larger organizations thus have the procedures and resources to formalize and structure its information. Large organizations can have support staff that exclusively devote their time to scanning the external environment - a luxury small businesses cannot afford. Large organizations can invest more in technical infrastructures and information and communication technologies. And large organizations are often more diversified and thus have more complex environments, needing to know more about different segments.

Organizational characteristics: the position of boundary spanners

Not everybody within the organization will feel a similar need to scan the environment to be able to perform their tasks. Some employees and/or departments are predominantly occupied by internal activities, such as internal logistics, administration, monitoring etc. Others are continuously in contact with customers, suppliers, governments, competitors, etc. etc. People who are primarily concerned with the exchange of information to (1) detect and bring into the organization information about changes in the environment, and (2) send information into the environment that presents the organization in a favorable light, are called boundary spanners (Daft, 1992, p. 80). Boundary spanners communicate the outside in, and the inside out (see also: Tushman & Scanlan, 1981).

By definition, external information will enter the organization via the boundary spanning units or personnel. Boundary spanners link and coordinate an organization with key elements in the external environment. It is the task of boundary spanners to fit new, external information into the scheme of organizational norms, values and languages, which gives them considerable discretion and influence (Perrow, 1986). Boundary spanners have to be well connected to the outside world as well as to the internal organization to be both able to acquire external information and integrate external information within the organization. Again, boundary spanning - in the form of
environmental scanning - concerns both the acquisition of information as well as the sharing of information.

The places in the organization where the boundaries between internal organization and external environment are crossed are called points of dependence (Galbraith, 1977). Boundary spanners can be influential:

As an organization's external environment becomes more turbulent and unstable, the information-processing function of the broker, the boundary spanning role should become central to an organization's ability to effectively gather and act on relevant information (Galaskiewicz, 1985).

To understand the relevance of environmental scanning in an organization, and to understand who is looking or searching for external information it is necessary to look at the position of boundary spanners in an organization. The position of boundary spanners in an organization is dependent on the kind of business processes and the kind of organizational structures in place. The organization's structure and processes determine how widespread environmental scanning will occur throughout the organization; will it be centralized at one specific point of dependence, or do boundary spanners exist throughout the organization?

The value chain (Porter, 1985) is probably the most familiar way to structure the production process into sub-activities. At various stages of the production process or value chain, information from the outside world will enter the organization. It is clear that the departments involved with the buying of inputs (such as raw materials, human resources, financial resources) and the selling of outputs (marketing & sales) need to have intensive contact with the outside world. Other boundary spanning positions may exist but this depends on the core business or production processes. It is especially important to determine its information intensity. A simple distinction is made by Bots & Jansen (1993). They categorize organizations according to two dimensions: the amount of information needed in the production process, and the amount of information needed in the final product or service (see table 2.3).

Organizations who produce a lot of information, as either a side-product alongside their main products (for example airline companies who produce flight schedules - information - but who mainly sell airline tickets) or as a main product (for example a newspaper publisher), generally have very information-intensive departments along the output-side of the organization (such as marketing & sales). These output-departments need to absorb a lot of information and they also need to produce a lot of information as well. Furthermore, within these organizations several specific departments will exist who have to produce these information products, for which information input is necessary. On the other side there are several organizations who need a lot of information during the process of creating their main products or services, but in which the information is only needed as raw material, or is used by the support staff.
Table 2.3. Information intensity of production processes (Bots & Jansen, 1993)

<table>
<thead>
<tr>
<th>Amount of information in production process</th>
<th>High</th>
<th>Low</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>Banks, newspapers, airline companies</td>
<td>Oil companies</td>
</tr>
<tr>
<td>Low</td>
<td>Cement industry</td>
<td></td>
</tr>
</tbody>
</table>

A more or less similar categorization is made by Weggeman (1996) to explain the extent to which industries are willing to invest in knowledge management. Weggeman distinguishes between companies that operate on a business-to-business market (and thus have close interaction with their customers, often on a regular basis) or on a business-to-consumer market (and thus have more or less invisible customers or have at least a volatile relationship with customers). Weggeman has related this dimension to one in which a distinction is made between organizations that are mainly labor intensive, and organizations that are knowledge intensive (see Table 2.4). Weggeman states that the knowledge intensive industries will feel more urge to invest in knowledge management (of which the use of electronic information services can be a part) than labor intensive organizations. Furthermore, organizations that operate on a business-to-business market will be more knowledge-intensive than organizations that operate on the consumer market.

Table 2.4. Market orientation and production factors (based on Weggeman, 1996)

<table>
<thead>
<tr>
<th>Dominant resources</th>
<th>Labor intensive</th>
<th>Knowledge intensive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Market orientation: the individual customer is invisible (consumer market)</td>
<td>Hotel and catering industry</td>
<td>Media industry</td>
</tr>
<tr>
<td>Client orientation: interaction with individual clients (business-to-business)</td>
<td>Garment and clothing industry</td>
<td>Professional services</td>
</tr>
</tbody>
</table>

The amount of boundary spanners in an organization and the position these boundary spanners occupy not only depend upon characteristics of the business processes but also on the organizational structures and the amount of decentralization.

Some contain that environmental scanning and interpretation occurs only at the top management level in an organization (e.g. see Daft & Weick, 1984). This does not seem to hold true anymore. First, not all strategic management takes place at the top of the organization. In some types of organizations, some parts of strategic management is done at lower echelons of the organizations.
This is especially true for adhocracies and professional organizations and in some cases also for diversified organizations. Furthermore, not all environmental scanning is for strategic purposes. Information about the external environment can be essential at different parts of the business processes or value chain and in different parts of the organization. Boundary spanning occurs at various levels of the organization and is no longer (if it ever were) the exclusive domain of top management. Management’s exclusive control over external information resources is steadily declining, “in part because of the downsizing of organizations and the decline of the number of layers in an organizational hierarchy” (Johnson, 1994, p.1):

The comfortable world where one’s supervisor provided authoritative directives concerning organizational activities has gradually changed to one where organizational members must make their own decisions about what goals should be emphasized and how they should be accomplished (idem).

The present trend of decentralization is thus increasing the amount of boundary spanners and influencing the positions of boundary spanners (not all external information resides at the top). (De)centralization “refers to the hierarchical level that has authority to make a decision. When decision making is kept at the top level, the organization is centralized. When decisions are delegated to lower organizational levels, it is decentralized. Organizational decisions that might be centralized or decentralized include purchasing equipment, establishing goals, choosing suppliers, setting prices, hiring employees, and deciding marketing territories.” (Daft, 1992, p. 15). Thus, the more an organization decentralizes decision-making on external matters, the less environmental scanning and interpretation remains the exclusive task of top management. As outlined in the beginning of the chapter, decentralization is a clear trend in present organizational structuring (see: Castell, 1996). The general profile of the new organizational forms is “small, or located in small subunits of large organizations; its object is typically service or information, if not automated production; its technology is computerized; its division of labor is informal and flexible; and its managerial structure is functionally decentralized, eclectic and participative” (Heydebrand, 1989 quoted in: Fulk & DeSanctis, 1995).

The structure of the outside world determines to a large extent the degree to which an organization needs to scan this outside world. The structures and processes within the organization determine who the boundary spanners are in the organization, and thus how widespread this scanning occurs within the organization.
2.4. Conclusion: Out of control but not out of sight

There is a growing realization that organizations need to manage their intellectual resources as well as their physical assets. Parts of these intellectual resources will be allocated to the scanning of the external environment. Information about the external environment becomes increasingly relevant. Because of various different trends such as outsourcing, decentralization and global competitiveness organizations need external information to do their work. Primary goal of this chapter was to explain the processes of environmental scanning: what is it, how is it done and by whom?

Environmental scanning is a way to gather information about various segments of the external environment of organizations in order to be able to make the organization more responsive to outside developments. Environmental scanning should result in organizational intelligence. In order to achieve this, individual intelligence should be shared within an organization and integrated with internal frames of reference. Environmental scanning can thus be embedded in more general knowledge management practices. Especially boundary spanners are involved in environmental scanning. These boundary spanners can be located within a specific organization, based on the organizational processes and structure. The degree of environmental scanning within an organization depends partly on the way the environment is perceived (in terms of uncertainty and interdependence), organizational characteristics (e.g. size, age, and organizational growth patterns) and management values.

The use of electronic information services can be positioned within these processes of environmental scanning. In this chapter we have tried to set the preconditions under which electronic information services can be of use, based on the theoretical integration of various perspectives on the interaction between organizations and their environments. Electronic information services can provide information that is sought for in the processes of environmental scanning. They can provide information that can be integrated with internally existing knowledge. They can help not only in the gathering of information, but also in facilitating the integration of this external information with internally existing knowledge and the sharing of this information among various members of the organizations.

Environments are hard to manage: "Management exerts control over what happens within, but has almost no control over what happens without". The required information about the environment is almost quite literally "out of control" (Macdonald, 1995). Out of control does not mean out of sight:

From an organizational perspective, it seems axiomatic that the firm must have control over its own resources, including information, perhaps especially information inasmuch as the handling of information is the basic purpose of organization, and information is itself an instrument of control within its boundaries......From an information perspective, extending the boundary of control to encompass external information seems not only unnecessary, but likely to deny the firm the very information it requires for learning and change. From an
information perspective, it is clear that the firm can extend its boundaries - its information boundaries - without also extending organizational control. (Macdonald, 1995)

Publicly available electronic information services can help organizations in their environmental scanning activities, allowing this information to be out of control but within its boundaries.

In the next chapter we will take a closer look at characteristics of electronic information services to analyze to what extent these services are suited for external orientation, that is environmental scanning.