

**The role of information management in environmental scanning and
competitive intelligence - an integrated process model**

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By

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DECLARATION

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I declare that this dissertation is my own, unaided work and that all sources have been accurately reported and acknowledged. It is being submitted for the Degree of Magister Artium (Information Science) at the University of Johannesburg. It was not submitted before for any degree or examination at any other university or institution in order to obtain an academic qualification.

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ABSTRACT

Managers have an important and prominent role in an organisation. As decision-makers they hold the authority and responsibility to act on the available information. As leaders, they set examples and promote a culture of information sharing and collaboration. As strategists, they ensure that information policies are well aligned with the organisation's mission.

One of the greatest challenges facing an organisation is to understand how the external environment is changing, what the changes mean, and how the organisation can best respond to the new provisos. The process of learning about the external environment is environmental scanning, i.e. the art of gathering and interpreting information about the environment enabling the organisation to have the knowledge to develop effective courses of action.

The goal of information management is thus to harness information resources and information capabilities to enable the organisation to learn and adapt in an ever-changing environment.

Key information processes will be assessed with reference to special problems of managing each process. At the same time the opportunity for change would be highlighted by combining an understanding of information use behaviours with a more flexible, user centred design of information services and systems.

Competitive intelligence on the other hand is the systematic process of gathering and analysing information about the activities of competitors and general business trends to further the organisation's goals. All definitions point toward creating knowledge from openly available information by use of a systematic process involving planning, collection, analysis, communication and management which result in decision-maker action. While competitive intelligence incorporates knowledge management processes of collecting and storing knowledge, competitive intelligence definitions discuss the actual analysis of the gathered information.

Key factors for success of information management in organisations reinforce the need for the integration of business strategy and information. The key factors are the relationships with customers and suppliers; flatter management structures and better use of resources; training and quality and environmental issues. Each of these factors rests on information, its use, creation, storage and dissemination.

A process approach to information management supports the integration of business strategy and information. The calls for integration come from at least three different communities: information management, information systems and management. Successful companies are those that adapt to and shape their environments. They do so by using and creating information in a process of continuous improvement and innovation.

Key factors for success in organisations reinforce the need for integration of business strategy and information. Managers in firms see their success as dependent on their organisation's ability to accommodate and manage change and to respond to changes in their environments.

The study concludes with a case study of Pyromet Technologies showing that it is possible to have an integrated strategic information management model incorporating all three variables successfully.

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CHAPTER 1

BACKGROUND AND PROBLEM STATEMENT

1.1 Introduction and background

Information is a strategic resource in an organisation that enables the effective combination and utilisation of the other factors of production – it is the resource that co-ordinates the mobilisation of the other assets in order for the organisation to perform. Outside of the organisation, the environment is a larger information arena in which people, objects and organisations create a constant flow of signals and messages. Competition is the consequence of the unequal distribution of information among organisations and their differential abilities to acquire, absorb and act on information. Competition has turned into an information race of discovery and learning.

Unfortunately much of the information received by an organisation is perceived more of a potential than a prescription for action. For information to become strategic, it has to be compounded into knowledge that can guide action. This transformation of information into knowledge is the goal of information management. Information management should thus not be perceived as the management of information technology, or the management of information resources, or the management of information policies and standards. Each of these functions are important, but a unifying perspective is needed that would bind the functions together.

Managers have an important and prominent role in an organisation. As decision-makers they hold the authority and responsibility to act on available information. As leaders, they often set examples and promote a culture of information sharing and collaboration. As strategists, they could ensure that information policies are well aligned with the organisation's mission. Unfortunately, providing relevant, actionable information has proved to be a formidable task, and managers are generally less than satisfied with the information they get from existing services and systems.

One of the greatest challenges facing an organisation is to understand how the external environment is changing, what the changes mean, and how the organisation can best respond to the new conditions. The process of learning about the external environment is often equated to environmental scanning, i.e. the art of gathering and interpreting information about the environment enabling the organisation to have the knowledge to develop effective courses of action. Finally, scanning should be supported by a coherent set of information management strategies that enables the organisation to systematically collect, co-ordinate, store, analyse and distribute information.

The goal of information management is thus to harness information resources and information capabilities to enable the organisation to learn and adapt in an ever-changing environment.

Key information processes will be assessed with reference to special problems of managing each process. At the same time the opportunity for change will be highlighted by combining an understanding of information use behaviours with a more flexible, user centred design of information services and systems.

Although organisations may be experiencing an information glut, there is often a lack of knowledge to elucidate their choices and actions. On the one hand a sufficient number and variety of information sources need to be activated in order to accurately reflect the span of external phenomena. On the other hand, access to specialised sources need to be identified and ways suggested of matching sources to information needs.

Business intelligence has been defined as the activity of monitoring the environment external to the firm for information that is relevant for the decision making process in the company (Gilad, 2000).

In practice, business intelligence often concentrates on current competitors as in competitive intelligence, but also includes topics such as analysis of potential acquisitions and mergers, and risk assessment for particular countries (Gilad & Herring, 1996: xviii).

Competitive intelligence on the other hand is the systematic process of gathering and analysing information about the activities of competitors and general business trends to further the organisation's goals (Calof, 2001). All definitions point toward creating knowledge from openly available information by use of a systematic process involving planning, collection, analysis, communication and management which results in decision making actions (Calof & Skinner, 1999). While competitive intelligence incorporates knowledge management processes of collecting and storing information, competitive intelligence definitions also talk more about the actual analysis and communication of the data.

A broader examination of the literature indicates that competitive intelligence is not only about monitoring the competition but also about monitoring the entire business environment (Gilad & Herring 1996; Olivier, Viviers & de la Harpe, 2003).

Key factors for success of information management in organisations reinforce the need for integration of business strategy and information. The key factors are the relationships with customers and suppliers; flatter management structures and better use of resources; training and quality of the information product or service and environmental issues. Each of these factors rests on information, its use, creation, storage and distribution.

As competitive intelligence and environmental scanning falls within the realm of knowledge management, information professionals (e.g. librarians and specialists who work in corporate information centres, records managers, archivists, and so on) are of the opinion that they have a right to claim responsibility on their own for knowledge management. By doing so they tend to neglect the more far-reaching importance of knowledge management. It shall be argued that information management and knowledge management is quite distinct concepts, but that information management can fulfil an important role within the broader concept of knowledge management.

The work of managers in organisations is very information intensive and the environment in which it is done is very information rich. The question of

whether managers are able to exploit the wealth of information which surrounds them will be answered. How can information be managed in organisations so that its potential for improving business performance and enhancing the competitiveness of these organisations can be realised? Answers to these questions lie in clarifying the context of the practice of information management by exploring aspects of organisations as managerial work and in exploring the nature of information at the level of the organisation and the individual manager. From these answers it is possible to suggest some guidelines for managing the integration of business strategy and information, the adoption of a broadly based definition of information and the development of information capabilities.

Successful companies are those that adapt to and shape their environments. They do so by using and creating information in a process of continuous improvement and innovation.

Although it may be impossible to predict the form and function of the future, it may safely be assumed that the dynamics of competition and organisational growth will become increasingly based on information and the knowledge to leverage this information with other physical and intellectual resources.

1.2 Defining the research problem

1.2.1 Background to the research problem

In knowledge-based organisations, information management aligns well with the organisational missions and goals. Similarly for organisational strategy and goals not to remain static, the information management function itself has to respond to change and new demands in the business environment.

The problem arises when information management is separated from the knowledge-based functions of business environmental scanning and competitive intelligence. As all three these processes are fairly similar the question can now be asked whether there is a role for information management in environmental scanning and competitive intelligence. Could a

process model be developed where all three the processes are integrated to supply strategic information to management?

1.2.2 Defining the sub-problems

1. Is information management a process based activity and can it be integrated with a business strategy?
 - a) Are managers information seekers and information users?
 - b) What are the criteria for a successful information management process?
 - c) Is integration between business strategy and information management possible?
2. In seeking information would the organisation have to attend selectively to a flood of signals created by a dynamic environment?
 - a) Do the known modes of scanning relate to information needs, information seeking and information use behaviours?
 - b) What criteria are prevalent to the environmental scanning process?
 - c) How does this process relate to the information management process?
3. Is the end product of competitive intelligence processed information of interest to management?
 - a) What does the competitive intelligence process look like?
 - b) How does the absence of management's stated intelligence needs hinder the successful execution of the process?
 - c) What are Key Intelligence Needs (KIN's) and where do they fit into the process?

- d) How does this process differ from, or correspond to that of the information management process?
4. What is the role of information management in environmental scanning and competitive intelligence?
- a) Is it possible to have an integrated process model for all three processes?

1.2.3 Aim of the study

The aim of this study is to:

- Develop some general guidelines for effective information management. There are three major topics of discussion relating to information and organisations, information and managers and information management in organisations.
- Portray the information management process as being extended to having a role to play in achieving the goals of an organisation. Information management shifts from service provision to strategy information.
- Develop an integrated strategic information process model.

1.2.4 Demarcation of the field of study

For the purpose of this study the sole focus has been on the different processes per se, i.e. information management, environmental scanning and competitive intelligence. The following has been excluded, i.e. organisational information processing, managerial traits, managing of information sources and the Internet and online databases. The reason for this being the focus on the use of strategic information by management.

1.3 Research methodology

A literature survey was undertaken firstly to determine relevant definitions and the scope of the study. Once the objectives were set a literature survey was undertaken to define and specify the make-up for the different processes.

In the context of the theoretical research presented in chapters two to four of this dissertation, the case study was considered appropriate for providing an empirical approach to the integration of the three process models into one process model within a small engineering concern operating in the metallurgical industry.

Case studies are usually the preferred strategy when “how” or “why” questions need to be answered; when the investigator has little control over events, and when the focus is on a contemporary phenomenon within a real-life context. (Yin, 2003:1).

The research design is that of an explanatory, single case study to indicate why the three theory based process models were implemented within Pyromet as an integrated model, and also how it was achieved and whether it was successful or not. This single case study is used to determine whether an organisation can manage its information processes more effectively in order to increase its capacity to learn and adapt to an ever-changing environment.

Structured interview and observation by the researcher were the main tools used for collecting the core data for this case study. Observation contributed to the consolidation of impressions or confirmed information based on documentary evidence or in the interviews.

Results from the structured interviews by the researcher will provide a comprehensive understanding of the integrated process. The methodology used was of major importance in obtaining data that are grounded largely in the personal experience of the managers, senior personnel and engineers, but also in direct observation by the researcher. The purpose of the interviews were to investigate whether and how managers and engineers within Pyromet scan their environment for information and, whether there are any contextual factors that affect this activity, and also how managers' perceptions of environmental change affect the strategic change they implement.

As regards competitive intelligence a needs assessment was undertaken through structured interviews to determine whether a competitive intelligence

process existed, and if not how it could be implemented as part of the overall information management process.

Sixteen interviews were carried out in total, eight for the environmental scanning needs assessment and the rest to determine the competitive intelligence key intelligence topics and key intelligence questions that needed to be answered. The demarcation for the competitive intelligence interviews is the development of new products, the reason being that the smelting industry in South Africa is well established and small. Most of the competitors are also clients of Pyromet. Due to the congenial environment within the smelting industry, intelligence is often passed on by the competitors. There is also a gentleman's agreement that smelting technology experts moving from one company to another (competitor) within the industry, will not be harassed as to determine what knowledge they have of the competitor.

Lastly the author developed an integrated process model which has been tested through observation as the model has only been in use for a short period of time.

1.3.1 Outline of the study

Chapter 2 presents, Information Management as a Process Model that would underpin an organisation's learning capability. The model traces six key information processes that form a continuous, regenerative loop; identifying information needs, acquiring information, organising and storing information, developing information products and services, distributing information and using information (Choo, 2002:24).

Special problems of managing each process are highlighted. These issues are often overlooked by other dominant interests. The opportunities for change are highlighted through combining an understanding of information use behaviours with a more flexible, user-centred design of information services and systems.

A process approach to information management supports the integration of business strategy and information. The calls for integration come from at least

three different communities: information management, information systems and management. Successful companies are those that adapt to and shape their environments. They do so by using and creating information in a process of continuous improvement and innovation.

Chapter 3, Environmental Scanning and Organisational Decision Making, examines the significant corpus of research on environmental scanning that seems to show broad agreement on a number of issues. Research shows that environmental scanning improves organisational performance, especially if the scanning is well integrated in the organisational strategic planning and learning cycles. Scanning increases with environmental uncertainty and it can be expected that the need for scanning will grow as the environment becomes more unstable. Managers use a range of sources to scan, but there is a heavy reliance on informal, personal sources.

Chapter 4, Competitive Intelligence, views competitive intelligence more as a process than a product. The intelligence process will be discussed in relation to the intelligence cycle which consists of: planning and focus, collection and processing, analysis, communication, process/structure, organisational awareness/culture.

An explicit description will be given of the competitive intelligence activity; suggestions on how competitive intelligence should be organised; as well as a review of some of the collection and analytical techniques that are available.

The most critical activity in the overall intelligence process is the identification of the organisation's real intelligence needs. At the heart of this process, known as Key Information Needs (KIN) is an active dialogue with key decision makers in the company (Muller, 2004). The outcome of KIN interviews provides the focus needed to conduct effective intelligence operations, while permitting CI professionals to determine the resources required to address the company's actual intelligence needs. The use of the KIN process should not only result in identifying the organisation's key intelligence needs, but also in creating the critical communication channels necessary to produce credible and actionable intelligence.

In chapter five, An Integrated Process Model at Pyromet Technologies, a single case study will illustrate how a small engineering company set about the implementation of an integrated process model. The reasoning behind an integrated process was the bringing together of all the bits and pieces of information scattered throughout the company that could contribute to an integrated whole and thus assist management regarding strategic choices.

The traditional information management process has been in existence for many years, driven by an information specialist. Over a period of time certain factors were identified as influencing information seeking, environmental scanning and competitive intelligence activities. These factors were identified as individual and organisational factors influencing the information related activities and will be discussed in the case study report.

The study will conclude showing that it is possible to have an integrated model incorporating all three processes successfully.



CHAPTER 2

INFORMATION MANAGEMENT – THE PROCESS

2.1 Introduction

One of the first researchers to view the environment as a source of information was Dill (1962:96) when he suggests that organisations “treat the environment as information which becomes available to the organisation, or to which the organisation, via search activity, may get access. It is not the supplier or the customer himself that counts, but the information that he makes accessible to the organisation being studied about his goals, the condition under which he will enter into the contract, or other aspects of his behaviour”.

The goal of this chapter is to indicate the development of some general guidelines for effective information management covering three major topics namely information and organisations; information and managers and information management in organisations.

2.2 Information and organisations

There are two parts to this discussion of organisations and information, i.e. an overview of organisations by examining a number of images used to describe them and then drawing some implications for information management. The second outlines a hierarchy of definitions of information which are appropriate for organisations and draws further implications for information management. This discussion concludes with a set of propositions about information management.

2.2.1 Images of organisations

Familiar and conventional images of organisations are defined as machines, organisms, political systems and cultures. Senge (1990:3) adds a fifth dimension namely that of learner. Each image represents a perspective on the nature of organisations. For example the machine image suggests that an organisation is a rational technical entity. Similar to a machine, an

organisation is designed to operate as a network of parts, which are further specified as networks of precisely defined jobs. Jobs are linked together in a chain of command, and the organisation operates in a “command and control” fashion.

The organism image implies that information from internal and external sources is required to keep the organisation in a state of equilibrium. Information management has a critical role in drawing in information about trends and developments in the external environment so that the organisation can respond to changes triggered by social, economic, technological and legislative forces.

As different groups in organisations have different interests they will need and use information differently in the exercise of power and influence, in the seeking of support and negotiating conflict. Thus the image of the political system is a reminder of the political and social context of information management and draws attention to the ethics of information management practice. The image of the organisation as culture is particularly powerful with its suggestions of shared beliefs, values, norms and meaning and its emphasis on ritual, myth, language and symbol. It suggests that the use of information in an organisation will have cultural aspects to it, in contrast to the assumption that the use of information is essentially a rational human activity. Information management has a clear role in making meaning and will embody through its practice, the beliefs and values of the organisations (Kirk, 1999).

The image of the “organisation as learner” suggests a community which regenerates itself through the creation of knowledge which is the outcome of learning. Information management needs to ensure that the organisation has the information and information capabilities necessary to continuously adapt to its changing internal and external environments. It does this by adopting a futuristic approach and by adapting itself to any uncertainties found in these environments (Spender, 1996:45-62).

A failure to attend to the learning of groups and individuals in the organisation spells disaster in this context. Leadbetter (2000:70) has argued that

companies need to invest not just in new machinery to make production more efficient, but in the flow of know-how that will sustain their business. Organisations need to be good at knowledge generation, appropriation and exploitation. This process is not that easy (Leadbetter, 2000:71):

“Knowledge that is visible tends to be explicit, teachable, independent, detachable, it also easy for competitors to imitate. Knowledge that is intangible, tacit, less teachable, less observable, is more complex but more difficult to detach from the person who created it or the context in which it is embedded. Knowledge carried by an individual only realises its commercial potential when it is replicated by an organisation and becomes organisational knowledge”.

The complexity of organisations and the processes which sustain them are highlighted by these images. It is this complexity which is part of the context of information management in organisations.

The image of organisations impact in the following ways on information management within them:

- Information management could contribute to the achievements of organisations.
- What information management does, and how it does it, is influenced by how information management is practised within the political, social and cultural context.
- The different purposes of information management in different organisations will be influenced by the organisation's goals as well as by its culture and its stance on information.
- Organisational learning concepts and theory are applicable to information management in some organisations. Not all organisations are ready for this development, nor is it an appropriate direction for all organisations.

- Information management practice has an ethical dimension through it being value laden. The ethics of information management practice are most often implicit (Kirk, 1999).

2.2.2 Information and information management defined

2.2.2.1 Information

Organisations are increasingly aware of the potential of information in providing competitive advantage and sustaining their success as evidenced in a number of published case studies by Owens and Wilson (1997:19-28) as well as Grimshaw (1995). The descriptions of information as an asset and a resource by authors such as Best, Burton and Horton, (in Kirk, 1999) are no longer unusual. However, the origin of these descriptions in classical economics ignores the place of information in the culture of an organisation. If information is to provide competitive advantage then its full potential needs to be considered (Kirk, 1999).

Braman's concepts of information developed in the area of information policy studies are summarised as follows:

- Information as a resource. "Information, its creators, processors and users are viewed as discrete and isolated entities. Information comes in pieces unrelated to bodies of knowledge or information flows into which it might be organised" (Braman, 1989: 236).
- Information as a commodity. Complementary to the definitions of information as a commodity is the concept of an information production chain through which information gains in economic value. The notion of information as a commodity incorporates "the exchange of information among people and related activities as well as its use" (Braman, 1989: 238) and implies buyers, sellers and a market. In contrast to the absence of power of information as a resource, information as a commodity has economic power.
- Information as perception of pattern. Here the concept of information is broadened by the addition of context. Information "has a past and a

future, is affected by motive and other environmental and casual factors, and itself has effects" (Braman, 1989: 238). The concept of information and its processes is broadened so much that information in this sense can be applied to a highly articulated social structure. Information has a power of its own although its effects are isolated. The example given is of information reducing uncertainty but only in regard to a single specific question.

- Information as a constitutive force in society. Information has a role in shaping context. "Information is not just affected by its environment, but is itself an actor affecting other elements in the environment" (Braman, 1989: 239). The definitions in this category "apply to the entire range of phenomena and processes in which information is involved, can be applied to a social structure of any degree of articulation and complexity, and grant information, its flow and use an enormous power in constructing our social (and ultimately physical) reality". (Kirk, 1999).

This hierarchy of definitions of information presents a broadly based view of information and one which reflects the images of organisations which have been discussed. The traditional view of information management has focussed very much on information as a resource and a commodity and as providing a service to the organisation. That service has taken the form of providing access to information in a range of sources including online commercial databases, archival collections, websites and in-house databases. The definition of information as perception of pattern extends information management as having a role to play in achieving the goals of an organisation. It is as an essential force that information is most potent as a basis for future action and innovation. Information management shifts from service provision to strategy formation.

2.2.2.2 Information Management

The content and scope of information management has been under close scrutiny by researchers and practitioners from several fields (business and management, organisation research, information systems, information and communication technology, public administration, communication, information

and librarianship) for a long time. Lately, authors trying to draw a line between information management and knowledge management renewed the discussions (Kirk, 1999). The change of the profession under the impact of new technology, globalisation of markets, and increasing social and economic pressures is evident in the writings of library and information science (LIS) professionals, but it is expressed practically in the same words by the representatives of business and computer fields. The LIS representatives advocate stronger orientation towards the perspective of management in new flexible organisations and use of technology in them (Dressang & Robbins, 1999). In the business field information management is seen as a higher management level function, especially when it is labelled as knowledge management. Mintzberg (1973) was the first researcher to describe the information roles of managers and sees management as an information intensive job. There is a growing understanding of information management significance for all kinds of senior executives in a vast range of business and management related literature. Information management programmes are found in business and management schools as well as in schools and departments of librarianship and information science. Moreover, computer professionals, information systems designers, and (IT) specialists for businesses are now more concerned about the "necessity to study how managers utilise information" (Bruns & McKinnon, 1993), "thinking about information" content, "organising and utilising data" (Lundberg, 1996), and adapting to the knowledge world by incorporating new responsibilities for strategic thinking. (The CIO Executive Research Center 2000).

There are numerous attempts to define the framework for information management. The concepts largely depend on the contents put into the words "Information Management". It is not only the concepts of "information" as such, but the multiple meanings of the phrase, emphasis of its elements, or the word order as well as the scientific perspective. The phrase is also used to mean something other than what the (LIS) field considers to be the management of information resources. For example, it is used as an abbreviation for: the management of IT, information systems management, management information systems, etc. The meaning of the phrase is even

more clouded by the emergence of new, related terms, such as "knowledge management", which in many cases has an identical meaning to information management (Rowley, 1998) or sometimes means just library and information studies in general (Martin, 1999). Many authors have noticed this. Reviewing the newest literature more than enough concepts of information management can still be found, but in fact some coherence can be traced through the variety of sources and authors' opinions, especially those who work outside IT and computer sciences and have LIS or managerial backgrounds.

Rowley (1998) proposes four different levels of information management: information retrieval, information systems, information contexts, and information environments. Effective information management needs to address issues at all of these levels. Choo (1998) defines "information management as a cycle of processes that support the organisation's learning activities: identifying information needs, acquiring information, organising and storing information, developing information products and services, distributing information, and using information".

This hierarchy of definitions of information presents a broadly based view of information and one which reflects the images of organisations which have been discussed. The traditional view of information management has focussed very much on information as a resource and a commodity and as providing a service to the organisation. That service has taken the form of providing access to information in a range of sources including online commercial databases, archival collections, websites and in-house databases. The definition of information as perception of pattern extends information management as having a role to play in achieving the goals of an organisation. It is as an essential force though that information is most potent as a basis for future action and innovation. Information management shifts from service provision to strategy formation.

This consideration of organisations and information has provided some implications for information management. The scope of information management in organisations is elaborated and a context is provided for information management. The implications have been drawn together in a

number of observations, namely that information and its management contribute to the achievement of organisational goals; to be as effective as possible information management assumes a broad view of information; if information can be value laden so too can be information management practice.

2.2.3 Information and managers

Having looked at the broad organisational context of information management, the focus now needs to be narrowed to individuals in organisations. Only managers in organisations will be considered, rather than individuals, because of the responsibilities of managers in strategy development and implementation and in enabling organisations to meet their goals. This discussion of managers and information is in two parts. The first part deals with the nature of managerial work as described in a number of research studies and draws a number of implications for information management. The second part considers the nature of information from the point of view of individual users of information and is based on work in information science and in management. Again, implications for information management are drawn. The discussion concludes with some observations about information management.

The classic view of managerial functions as planning, organising, communicating, co-ordinating and controlling suggest a rational and ordered approach to management activities (Kirk, 1999). Yet studies of managers in their workplaces present a picture of an approach to managerial activities that is quite different. A brief overview of a number of studies highlight the seemingly active, informal, fragmented and sometimes chaotic nature of managerial work.

Mintzberg (1975:49-61) was the first person to identify ten different roles for managers. The roles were categorised into three groups to form an integrated view of what senior managers do. The interpersonal roles of figurehead, leader and liaison stem from the manager's formal authority. The informational roles of monitor, disseminator and spokesman derive from the manager's interpersonal contacts. In this role the manager emerges as the "nerve centre"

of the organisational unit (Mintzberg, 1975:55). The decisional roles of entrepreneur, disturbance handler, resource handler and negotiator arise from the manager as the formal authority of the organisational unit who can commit the unit to action. This approach to managing acknowledges the action-oriented, outward looking and ritualistic aspects of managerial work (Kirk, 1999).

Networking is a feature of another view of managerial work (Luthaus, Hodgetts, & Rosenkrantz, 1988). Three other categories of activity developed from the research of managers and their subordinates were routine communication, traditional management and human resources management. Networking includes interaction with outsiders and socialising/politicking inside and outside the organisation; routine communication activities include exchanging information and handling paperwork; traditional management activities consist of planning, decision making and controlling; and human resource management includes motivating/reinforcing, disciplining managing conflict, staffing and training/developing. This study distinguished between successful and effective managers, between those who are promoted and those who have "satisfied, committed subordinates and produce organisational results" (Luthaus, et al., 1988:62). Managers have their own career interests as well as interests in the organisations in which they work. The categories of activity contribute differently to success and effectiveness. Networking had the strongest relationship with success, whereas routine communication had the strongest with effectiveness. The type of activity with the weakest relationship with success is human resource management and with effectiveness the weakest is networking (Kirk, 1999).

Floyd and Wooldridge (1996) suggest that managing relationships, finding innovation, creating a mindset and facilitating learning are integral to creating competitive advantage. The study of middle managers focussed on strategy formation, a process that moves away from the overly rational, command and control model of strategy as a two stage process of formulation and implementation and has "more to do with learning than planning" (Luthau, et al., 1988:39). Four distinct roles for middle managers in strategy were

identified: championing strategic alternatives; synthesising information; facilitating adaptability and implementing deliberate strategy. By engaging in these roles, middle managers link strategic purpose and organisational action.

These studies of managerial work range across managers at different levels in organisations from senior management to middle management. They also span different kinds of organisational structures from the more traditional hierarchies to post-entrepreneurial organisations (Kanter, 1989:85-92) with leaner, flatter structures and participative, team based business units.

The overview of managerial work highlights the following implications for information management (Kirk, 1999).

- Information management must recognise informal and formal information sources and information flows both internal and external to the organisation.
- Information management needs to enable managers to integrate business strategy and information.
- Information management has the potential to contribute to the effectiveness of managers in their diverse organisational roles.
- Information management should seek to meet the information needs of managers and enhance their information capabilities.

2.2.4 Information management in organisations

The observations about information management referred to previously are based on an overview of organisations, managers' work and information. These proposals are tentative but are based on a range of perspectives, the central one being information which has the potential to sustain an organisation's competitive position if it is used effectively by the members of that organisation. The links among the perspectives on information are shown in Figure 2.1.

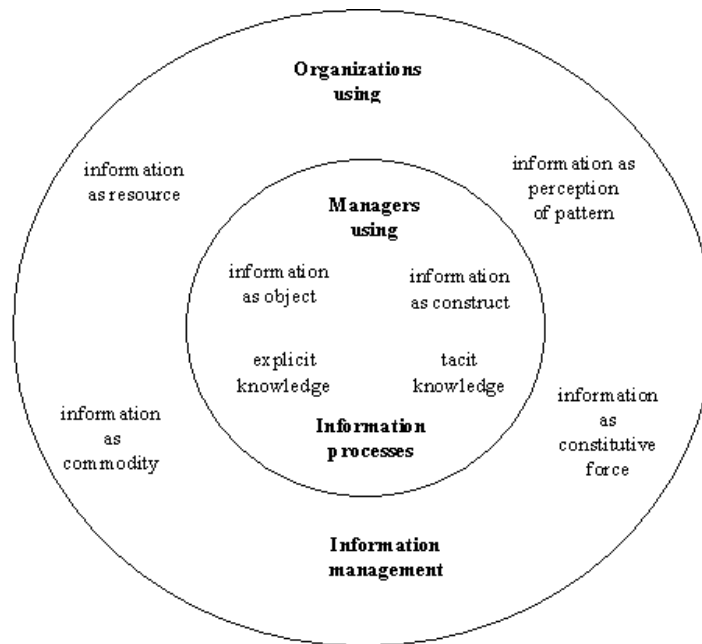


Figure 2-1 The information environment in organisations (Kirk, 1999).

2.2.4.1 Information management categories

Categories for information management have been developed from the observations as set out in 2.2.3. These categories of purpose, scope and the implementation of information management is set out in Table 2.1 (Kirk, 1999) and discussed thereafter.

Table 2.1 Categories for information management

Purpose of information management	Scope of information management	Implementation of information management
<ul style="list-style-type: none"> • Information and its management contribute to the achievement of organisational goals. • A process approach to information management supports the integration of information and strategy. 	<ul style="list-style-type: none"> • Information management is contextualised by the organisation and is value laden. • Information management must adopt a broadly-based approach to information and encompasses: <ul style="list-style-type: none"> ◊ Formal and informal flows of information inside and outside an organisation. ◊ Sources of information internal and external to organisations enhances the information capabilities of individuals in organisations. 	<ul style="list-style-type: none"> • Managers are in a unique position to integrate information and business strategy. • The effectiveness of information management can be measured by the extent of knowledge creation, or innovation, in organisations.

(Kirk, 1999)

2.2.4.1.1 Purpose of information management

Whether information is regarded as a resource or a force for change and development it is clear that information can contribute to the achievement of organisational goals and that it can contribute to the success of an organisation. The assumptions are made that the goals of an organisation are explicit, thus are known throughout the organisation and there is some way determining the extent to which the goals have been met.

A survey of high performing companies in the UK (Owens & Wilson, 1997:19-28) found almost universal acceptance of the view that information is a valuable asset. The more successful companies were concerned with information management issues and some were working towards the creation of an information culture as a way of ensuring continued success. In the words of one manager interviewed in the study:

It is recognised that information is an asset and, thereby, the value from that asset should be maximised. Organisations are working on the devolution of the decision making responsibility. A certain amount of progress has been achieved in flattening organisational structures. The more enlightened managers understand that a facultative management style is the right style for modern business practice. Staff working within the particular business process are better placed in making these processes effective, resulting in them really needing the information (Owens, et al., 1997:25).

Managers in other countries in the western world (Broadbent, Lloyd, Hansell, & Dampney, 1992:21-38) share this managers' concern regarding the need to link business strategy and information (Broadbent, et al. 1992:21-38). A key factor in linking or aligning business strategy and information has been information technology; a tool essential for business success is a global economy. The potential for information technology and information to transform organisations is evident in those companies which have redesigned their business processes. Information and information technology have acted as enabling and integrating tools for survival and growth in rapidly changing environments (Johannessen & Olaisen, 1993:341-354; Moreton, 1995:149-163).

2.2.4.1.2 Scope of information management

The earlier discussion of images of organisations suggests different approaches to information management in organisations. While the objectives of information management will be linked to the effectiveness of organisations, information management practice will vary across organisations. For example, in the organisation operating as a machine, the information management function might be centrally located in a unit established to control internally generated information. This unit would have links to an IT unit. There might also be a library in the organisation which provides an information service based on externally generated information. Depending on the industry sector, the market place, the culture and the nature of work in the organisation, such a structural arrangement for information management might be appropriate. The objectives and priorities for information management will be framed within this context.

By contrast, in the organisation which is like a learner, the information management might be decentralised in a structure which supports teams but locates some information management functions centrally. Each team will be responsible for providing information to know-how databases accessible through the organisation's intranet. Compared to the previous example, the objectives for information management and priorities for services will be quite different. Some differences will be seen in (Kirk, 1999):

- distinctions made between internally and externally generated information
- measures of success used by the organisation and by information management
- the applications of IT
- the information ethos
- the relationship among library, information management and IT staff
- the reuse and sharing of information arising from activities in each organisation
- the value attributed to information.

The development of the organisation can be influenced through information management by recognising as many categories of information as possible, as broad a range of sources and media as possible, and as broad a range of uses of information as possible. The information provided by the information expert in work teams should be seamless and all information created by the team which is likely to be of value should be organised and stored by the information expert. The information will no doubt be stored on many different media including discs, maps, photographs, brochures, samples, diagrams, videos, reports, printouts, all of which are part of the organisation's memory and history and have the potential to be reused in later projects. The tacit knowledge of the team becomes explicit knowledge for the next team or task force working on a similar project.

Information experts have a role in enhancing the information capabilities of individuals in organisations. Efforts to adapt human behaviour to the information systems have not been successful. IT offers some potential for developing interactive systems which should be capable of adapting to human behaviour. Systems are needed for identifying information need by supporting IT experts and managers in articulating their information needs, capturing information or tacit knowledge for storage in databases and adding value to information (Taylor, 1986:34).

2.2.4.1.3 Implementing information management

The integration of information and business strategy presupposes a learning organisation which is team based. Managers as domain experts are able to use and create information and knowledge so that both information and business strategy are embedded in the innovations, products, processes or services developed by the team (Kirk, 1999).

It is in their daily work that managers have opportunities to integrate business strategy and information. In the knowledge creating company (Nonaka, 1991:103) there is a continual shift in meaning as new knowledge is diffused through the organisation. At times the confusion created by this shift escalates to ambiguity and even chaos which can lead to fresh insights and a new sense of direction. The job of managers is then to "orient this chaos towards

purposeful knowledge creation" (Nonaka,1991:103). Most senior managers articulate metaphors, symbols and concepts about the company's future, middle managers orient the chaos with their co-workers on company teams. In the learning organisation, middle managers make explicit the tacit knowledge of senior managers and their co-workers and incorporate it into new technologies and products. In this sense, managers are knowledge engineers. In other words, middle managers and their teams create information as an object on the basis of the information constructs of others (Nonaka,1991:103).

The evaluation of information management needs to take into account different views on information and the evaluation process needs to include also information as a construct and information processes. One approach to the evaluation of information management could be based on the processes of information management discussed earlier. Another approach might be based on innovations in the organisation and might include consideration of the information capabilities of managers and their co-workers (Kirk,1999).

Information management has multiple meanings. Its meanings are shaped by different perspectives on information, on organisations and on the work of managers. Information management has the potential to transform organisations but only when information and business strategy are integrated. In the words of Drucker (1988:42):

“Knowledge is the only meaningful resource today. The traditional “factors of production” – land (i.e. natural resources) labour and capital – have not disappeared, but they have become secondary. They can be obtained and obtained easily, provided there is knowledge. And knowledge in this new sense means knowledge as a utility, knowledge as the means to obtain social and economic results. These developments, whether desirable or not, are responses to an irreversible change: knowledge is now being applied to knowledge”.

2.3 A process model of information management

The process model discussed in this chapter depicts information management as a continuous cycle of six closely related activities: identification of information needs; information acquisition; information organisation and storage; development of information products and services; information distribution; and information use (Choo, 2002).

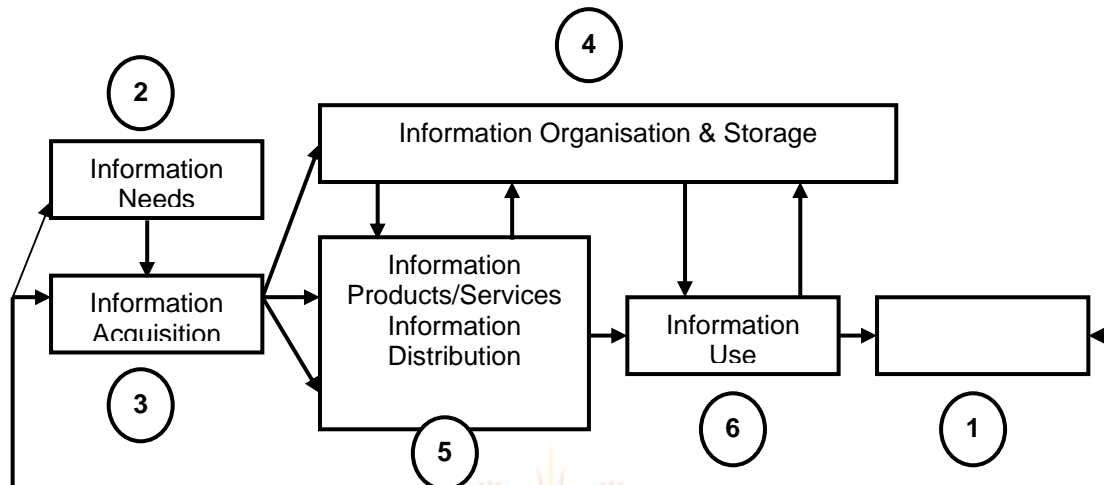


Figure 2-2 Information Management Cycle (Choo, 2002:24)

The process begins at the right-hand end of the cycle (see Figure 2-2 no.1) when information is created by the organisation's actions (adaptive behaviour). These actions interact with those of other organisations and systems to alter the environment, generating new messages and information.

2.3.1 Identification of information needs

In the identification of information needs, organisation members recognise the volatility of the environment. Members seek information about its salient features in order to make sense of the situation, and to have the necessary information to take decisions and solve problems. Information needs are defined by subject-matter requirements as well as situation-determined contingencies - some classes of problems are best handled with the help of certain types of information as illustrated in Table 2.2.

Table 2.2 Problem dimensions and information needs

Problem Dimensions	Information Needs (Examples)
Design Discovery	Options, alternatives, ranges Small, detailed sets of data
Well-structured Ill-structured	Hard, quantitative data Probabilistic data on how to proceed
Simple Complex	Path to goal state Ways to reduce problem to simpler tasks
Specific goals Amorphous goals	Goal operationalisation and measurement Preferences and direction
Initial state understood Initial state not understood	Clarify unclear aspects of initial state Soft, qualitative data to define initial state
Assumptions agreed upon Assumptions not agreed upon	Information to help define problems Views of the world, definition of terms
Assumptions explicit Assumptions not explicit	Range of options, frames to analyse problems Information to make assumptions explicit
Familiar pattern New pattern	Procedural and historical information Substantive and future-oriented information
Magnitude of risk not great Magnitude of risk great	Cost-effective search "Best" available information: accurate, complete
Susceptible to empirical analysis Not susceptible to empirical analysis	Objective, aggregated data Experts' opinions, forecasts, scenarios
Internal imposition External imposition	Clarification of internal goals Information about external environment

(Choo, 2002, 27)

2.3.2 Information acquisition

Information acquisition is driven by information needs and must adequately address these needs. Planning for information acquisition has become a complex function. The fragmentation of human endeavour into pockets of

specialisation has led to a proliferation of information sources and services that cater to these niche markets. At the same time, organisations increasingly require in-depth treatments of selected issues that are strategic to their growth and survival. Existing sources have to be constantly evaluated, new sources have to be assessed, and the matching of sources to needs has to be regularly re-examined (Orna, 1990; Stanat, 1990; Choo, 2002:30).

2.3.3 Information organisation and storage

In information organisation and storage, the objective is to create an organisational memory that is the active repository of much of the organisations knowledge and expertise. The volume of data produced and collected needs to be given structure in ways that reflect the interests and information use modes of the organisation and its members. Information technology can raise the efficiency and reliability of the organisation's operational activities. Integrated information management policies ensure that significant information concerning the organisation's past and present are preserved and made available for organisational learning (Schwartz and Herson, 1993; Mooney, 1993; Neal, 1993:12).

2.3.4 Information products and services

Information acquired and information from memory is packaged into different levels of information products and services targeted at the organisation's different user groups and information needs. This is not a passive repackaging of incoming data. Information products and services have to add value by enhancing the quality of the information and improving the fit between the information and the needs or preferences of the users (Taylor, 1986).

2.3.5 Information distribution

The goal of information distribution is to increase the sharing of information. Widespread information sharing catalyses organisational learning. Information sharing also creates new insight and knowledge about difficult problems or situations (Huber, 1991:88-115). End users should be given the best available

information to perform their work, and the information should be delivered through channels and modes that dovetail well with users' work patterns.

2.3.6 Information use

Information use is for the creation and application of knowledge through interpretative and decision making processes. Information use for interpretation involves the social construction of reality, and information representation and delivery should support the multilevel interaction of social discourse (Choo, 2001). Information use for decision making involves the selection of alternatives, and information provision and content should accommodate the kinetic and non-linear nature of the decision process.

The conceptualisation of information management as a cycle of interrelated information activities to be planned for, designed, and co-ordinated, provides a process-based perspective that complements the more conventional views of information management as information technology management or information resource management (Davenport, 1993; McGee & Prusak, 1993). The process model of information management should encompass the entire information value chain, beginning with the identification of information needs, moving on through information acquisition, organisation, and storage, products and services, distribution, and closing the cycle with information use (Davenport, 1993). Information management frameworks do not always include needs identification and information use.

Although needs analysis may be one of the most neglected processes of information management, the quality of the information that the user receives depends highly on how well the needs have been communicated. Similarly, information use is an essential component, because understanding how information is used (or not used) to make decisions, solve problems, or interpret situations, is essential to a continuous improvement of the other information management processes. In reality the processes depicted in Figure 2.2 are not as neatly compartmentalised as the activities overlap and their boundaries are porous.

2.4 Conclusion

The development of the organisation can be influenced through information management by recognising as many categories of information as possible, as broad a range of sources and media as possible, and as broad a range of uses of information as possible. The information provided by the information expert in work teams should be seamless and all information created by the team which is likely to be of value should be organised and stored by the information expert. The information will no doubt be stored on many different media including discs, maps, photographs, brochures, samples, diagrams, videos, reports, printouts, all of which are part of the organisation's memory and history and have the potential to be reused in later projects. The tacit knowledge of the team becomes explicit knowledge for the next team or task force working on a similar project.

Information experts have a role in enhancing the information capabilities of individuals in organisations. Efforts to adapt human behaviour to the information systems have not been successful. IT offers some potential for developing interactive systems which should be capable of adapting to human behaviour. Systems are needed for identifying information need by supporting IT experts and managers in articulating their information needs, capturing information or tacit knowledge for storage in databases and adding value to information.

There are a number of approaches to adding value to information already in use but there is room for further development. In organisations information experts might discuss with managers their media preferences, information use strategies and barriers they have encountered in using and applying knowledge. Information experts can then begin tailoring information products and services to enable managers to make decisions, solve problems, think strategically, scan the environment and carry out other aspects of their work roles. One approach adds value to information to help information users match the information provided by a system with their needs (Kirk, 1999). The added values include ease of use, noise reduction, quality, adaptability, timesaving and cost saving. Another approach is directed toward reducing

information overload for by increasing the quality of information. Some of the values are related to the scarcity of information and the degree of confidence a manager places in information.

From an information perspective, every change or development in the external environment creates signals and messages that an organisation may need to heed. In seeking information, the organisation would have to attend selectively to a flood of signals created by a dynamic environment, interpret often-confusing messages, and make sense of clues in relation to the organisation's goals and activities.

Information is the raw material of managerial work. A large part of the manager's information comes from, or concerns the environment external to the organisation. Learning about developments in the environment thus becomes a critical activity of senior managers who are responsible for the survival and performance of their organisations.



CHAPTER 3

ENVIRONMENTAL SCANNING AND ORGANISATIONAL DECISION MAKING

3.1 Introduction

To the extent that an organisation's ability to adapt to its outside environment depends on knowing and interpreting the external changes that are taking place, environmental scanning includes both looking at information and looking for information.

In chapter 1 it was stated that one of the greatest challenges facing an organisation is to understand how the external environment is changing, what the changes mean, and how the organisation can best respond to the new provisos. The process of learning about the external environment is environmental scanning, in other words, the art of gathering and interpreting information about the environment, thus enabling the organisation to have the knowledge to develop effective courses of action (Choo, 2002:84).

The ability of management to adapt to the rapidly changing external environment is a yardstick for successful management of organisations as traditional long range planning models, with their inward focus and reliance on historical data, do not encourage decision makers to anticipate environmental changes and assess their impact on the organisation (Morrison, 1992). The underlying assumption of such models is that any future change is a continuation of the direction and rate of present trends among a limited number of social, technological, economic, and political variables. The future for the organisation is assumed to reflect the past and present or, in essence, not to be caught unaware (Morrison, 1992). However, it is known that this is not true, and the further planning progresses into the future, the less it will be true.

A method is needed that enables managers both to understand the external environment and the inter association of its various sectors, as well as the ability to translate this understanding into the organisation's planning and

decision making processes. Environmental scanning is a method of accomplishing this.

Useful strategic intelligence for the determination of organisational strategies is provided through scanning. The consequences of this activity contributes to an understanding of the effects of change on organisations, and to aiding in forecasting and bringing expectations of change to bear on decision making.

Although being distinct from information gathering activities such as competitor analysis, competitive intelligence and business intelligence, environmental scanning also compliments these information-gathering activities.

Environmental scanning casts an even wider net and analyses information about every sector of the external environment that can help management to plan for the organisation's future. Scanning covers not only competitors, suppliers and customers, but also includes technology, economic conditions, and political and regulatory environment. Social and demographic trends are also included (Choo, 2002:84).

Environmental scanning is one of four activities comprising external analysis. As illustrated in Figure 3.1 (Morrison, 1992) external analysis is the broader activity of understanding the changing external environment that may impact the organisation. In describing external analysis, Fahey and Narayanan (in Morrison,1992) suggest that organisations scan the environment to identify changing trends and patterns, monitor specific trends and patterns, forecast the future direction of these changes and patterns, and assess their organisational impact. Merged with internal analysis of the organisation's vision, mission, strengths, and weaknesses, external analysis assists decision makers in formulating strategic directions and strategic plans.

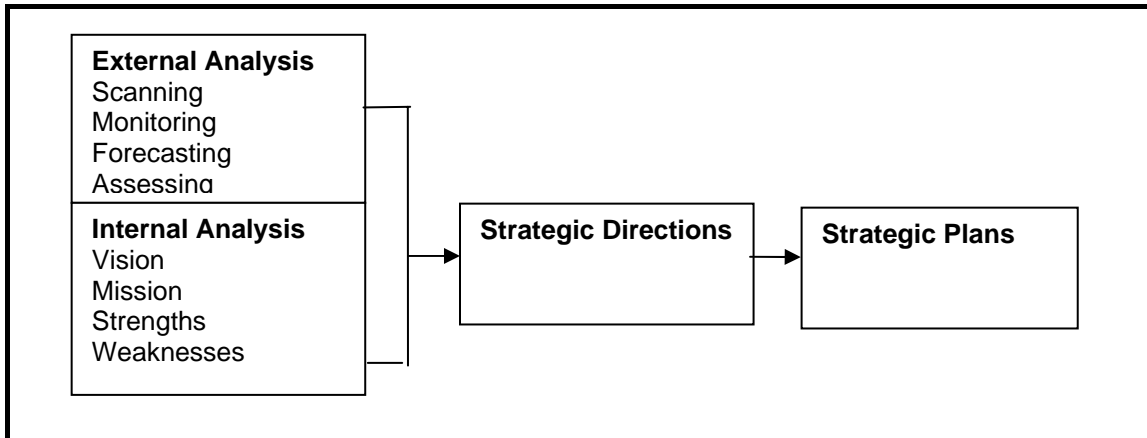


Figure 3-1 The role of external analysis in strategic planning (Morrison, 1992)

In this chapter the following questions will be answered:

- Do the known modes of scanning relate to information needs, information seeking and information use behaviours?
- What criteria are prevalent to the environmental scanning process?
- How does this process relate to the information management process?

3.2 Objectives of an environmental scanning system

Coates (in Morrison, 1992) identified the following objectives of an environmental scanning system

- defining the potential threats, opportunities, or changes for the institution implied by those trends and events,
- detecting scientific, technical, economic, social, and political trends and events important to the institution,
- alerting management and staff to trends that are converging, diverging, speeding up, slowing down, or interacting and
- promoting a future orientation in the thinking of management and staff.

3.3 Defining environmental scanning

Environmental scanning is a concept that has emerged from strategic planning literature. Aguilar (1967:1), pioneer in the development of the concept, used the term environmental scanning to denote the systematic collection of information external to an organisation. Its two purposes are: to organise the information flowing into an organisation, and to provide the organisation with early warnings of changing environmental conditions that could impact the organisation.

That environmental scanning is an "early warning" process for organisations is emphasised by Brown and Weiner (1985:ix) as "a kind of radar to scan the world systematically and signal the new, the unexpected, the major and the minor".

"Environmental scanning is the acquisition and use of information about events, trends and relationships in an organisation's external environment, the knowledge of which would assist management in planning the organisation's future course of action" (Aguilar in Choo, 2002:85). All outside factors that can affect the organisation's performance, even its survival, is included in the framework of the external environment. Although many factors exist, it is helpful to divide the external environment into a small number of sectors. A distinction may be made between a macro environment comprising social, economic, political and technological sectors and a task/industry environment comprising mainly the customer and competitor sectors.

Through scanning the environment, organisations are able to understand external forces of change to enable the development of effective responses. This action assists them in improving their future position.

3.4 Modes of organisational scanning

Despite its importance, the theoretical understanding of organisational scanning remains limited. Although all forms of scanning necessarily involve the seeking and use of information about the environment, different organisations operating in different environments may be expected to scan

quite differently. Aguilar identified four modes of managerial scanning based on his field research, namely undirected viewing, conditioned viewing, informal search, and formal search (Morrison, 1992). Daft and Weick (1984) and Weick and Daft (1983) build on Aguilar's work and develop a general model of organisational scanning based on the two dimensions of environmental analysability (can what is happening in the environment be analysed?) and organisational intrusiveness (does active intrusion into the environment take to collect information?). The model is further elaborated by detailing the information needs, information seeking, and information use patterns that characterise organisational scanning (Choo, 2001). Since the goal of scanning is the gaining of new knowledge that enables action the detailing of sensemaking, knowledge-creation, and decision making processes that constitute organisational scanning is also added (Choo, 2001).

Depending on the organisation's beliefs about environmental analysability and the extent that it intrudes into the environment to understand it, four modes of scanning may be differentiated: undirected viewing, conditioned viewing, enacting and searching as indicated in figure 3.2.

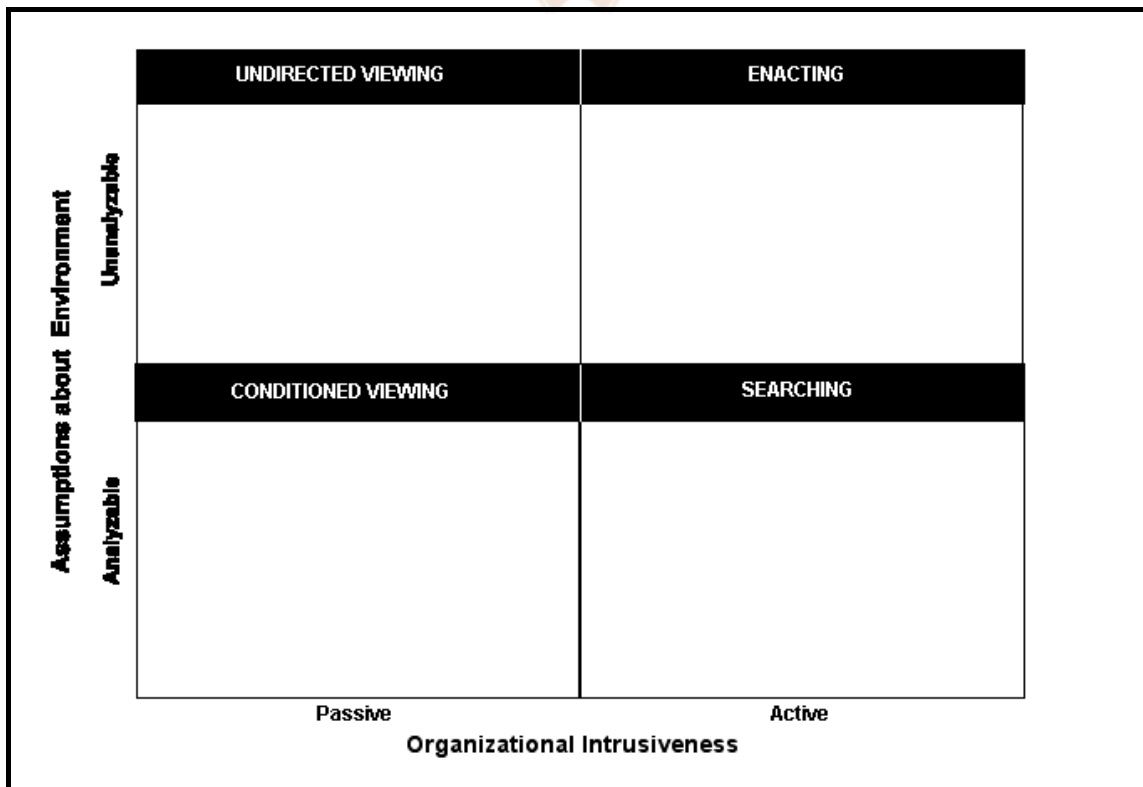


Figure 3-2 Modes of environmental scanning (Choo, 2001)

3.4.1 Undirected viewing

In undirected viewing the individual is exposed to information with no specific informational need in mind (Choo, 2002:94). The goal is to scan broadly in order to detect signals of change early. Many and varied sources of information are used, and large amounts of information are screened. The organisation perceives that the environment cannot be analysed and therefore does not intrude into the environment to understand it. Information needs are not clearly defined, and much of the information obtained is of an informal nature, usually gained through chance encounters or networking. Since it is assumed that the environment cannot be analysed the organisation does not seek hard data (Cyert & March, 1992). Information seeking is thus casual and opportunistic, relying more on irregular contacts and casual information from external, people sources. Information use is concerned primarily with reducing the high levels of environmental equivocality.

An example of undirected viewing might be a small firm that gathers information through pre-existing personal contacts with a limited number of buyers, suppliers, sales personnel, and associates in other companies. What information gets noticed and used depends on the frequency and intensity of cues that are entering the firm's awareness. Over time, a few of these signals build up in frequency and intensity, and so become "noticed." The organisation now reacts to changes in the environment which it cannot control (Miles & Snow, 1978). The advantage of undirected viewing is that the organisation need not expend resources on formalised scanning, but this saving incurs the risk of the organisation being surprised or caught off-guard.

3.4.2 Conditioned viewing

In conditioned viewing the individual directs viewing to information about selected topics or to certain types of information. The goal is to evaluate the significance of the information encountered in order to assess the general nature of the impact on the organisation (Preble, Rau, & Reichel, 1988). The individual wishes to do this assessment in a cost-effective manner, without having to dedicate substantial time and effort in a formal search. If the impact

is assessed to be sufficiently significant, the scanning mode changes from scanning to searching.

Information needs focus on a small number of relatively well-defined issues or areas of concern. These are often based on widely accepted industry assumptions and norms. Information seeking makes use of standard procedures, typically employing internal, non-people sources, with a significant amount of data coming from external reports, databases, and sources that are highly respected and widely used in the industry (Choo, 2002). Thus, viewing is conditioned in the sense that "it is limited to the routine documents, reports, publications, and information systems that have grown up through the years" (Daft & Weick, 1984:289).

During conditioned viewing, sense making is belief-driven with the result that there are fewer cycles of equivocality reduction. Over time, the organisation (or the industry it is in) has developed a set of assumptions and beliefs about the environment and uses them to define a number of areas of particular interest to structure or "condition" the scanning activity. Fewer cycles of sense making are required to reduce equivocality because the organisation is starting from an initial set of clear, accepted beliefs, and it is already sensitised to known issues that are deemed critical for the organisation. Cultural knowledge plays an important role in conditioned viewing by supplying the assumptions and beliefs about the business and the environment that the organisation is in: who are its customers, competitors, stakeholders; what environmental sectors to watch; as well as what information sources to use. Representation of the decision situation is simplified, search is "satisfying," and procedures are structured by rules and routines (March & Simon, 1991:95-117). These rules may be adopted from standard industry practice or developed from the firm's own experience.

Overall, the modus of learning in conditioned viewing is for the organisation to use its existing knowledge about what is important in the environment to focus its scanning and action taking.

3.4.3 Enacting

The organisation perceives to be unable to analyse the environment but it then proceeds to intrude actively into the environment in order to influence events and outcomes. Information needs are those required for experimentation and testing the environment. This could involve identifying areas for fruitful intervention. Information seeking is from external sources and channels that the organisation has created through its intervention and this may include feedback about the actions that the organisation has taken (Choo, 2002).

An example of enacting would be a firm that introduces and markets a new product based on what it thinks it can sell, rather than waiting for research to assess market demand, e.g. an electrode for D.C. arc furnaces. In today's network economy, organisations with an Internet presence have been using the World Wide Web as a channel for innovative ways of enacting their environment. For example, they have given away free products and services (browser software, open-source code, search engines) to test new products or increase market share; hosted online forums and communities to promote discussion and drum up support for issues; and created new Web sites to disseminate information as well as collect feedback on topics of interest (Choo, 2001).

During enacting, sensemaking is action-driven. The organisation intrudes actively into the environment to construct new features and to then concentrate sense making on these features. For example, an organisation may test-market a new product; organise a seminar or workshop; or produce a document for public comment. The information generated from these enactments then constitutes the new raw material for sensemaking. Thus equivocality is reduced by testing and probing the environment. Tacit knowledge is important in enacting since the kinds of enactments to be pursued depends on individual intuition and creativity (existing tacit knowledge), while the interpretation of enacted information depends on personal insight and instinct. New tacit knowledge may also be the outcome of

enacting, as the organisation acquires new ways of seeing the environment while it reflects on data returned by their enactments. Daft and Weick (1984) suggest that the organisation decides on a course of action, designs a custom solution, tries it, and recycles the process if the solution does not work. Actions are not goal-driven but are taken in order to discover goals. Decisions happen when solutions (enactments) appear to work and they become attached to problems.

Overall, the modus of learning in enacting is for the organisation to learn by doing and by trying out new actions in order to reveal new goals and methods.

3.4.4 Searching

The searching effort may be unstructured, or structured resulting in the search mode being informal or formal

- Informal search

The individual actively looks for information to deepen the knowledge and understanding of a specific issue. It is informal in that it involves a relatively limited and unstructured effort. The goal is to gather information to elaborate an issue so as to determine the need for action by the organisation. If a need for a decision or response is perceived, the individual dedicates more time and resources to the search.

- Formal search

The individual makes a deliberate or planned effort to obtain specific information or information about a specific issue. Search is formal because it is structured according to some pre-established procedure or methodology. The granularity of information is fine, as search is relatively focused to find detailed information. The goal is to systematically retrieve information relevant to an issue in order to provide a basis for developing a decision or course of action. Formal searches could be a part of for example, competitive intelligence gathering, patents searching, market analysis, or issues management. Formal searches prefer information from sources that are

perceived to be knowledgeable, or from information services that make efforts to ensure data quality and accuracy.

During searching, sensemaking is based on the systematic scanning that is aimed at determining the objective facts of what is happening in the external environment. This systematic scanning can be both action- and belief-driven. Data gathering about the environment is relatively intense and may involve intrusive actions such as polls, surveys, focus groups, and so on. Following data collection, interpretation is likely to be belief-driven, where the organisation would extrapolate from past experience and construct meanings from current beliefs. Developing and working with explicit knowledge is the essence of searching. Measurement, modelling, forecasting, trends analysis, and other formal, quantitative methods are utilised to discover the true condition of the external environment. The organisation believes that there is a stock of knowledge about the environment that it can draw upon for analysis and planning.

Because the organisation is actively searching for information about an environment that it believes to be knowable, decision making is likely to follow the process mode described earlier. In this mode, the organisation takes the time and resources to look for or develop alternatives, and choosing a course of action is based on a diagnosis of the situation giving rise to the decision need. Decision making is based on logical, rational procedures, often including systems analysis and quantitative techniques.

Overall, the modus of learning in searching (Choo, 2001) is for the organisation to invest resources in collecting information about and analysing the environment, and then to adjust its actions in the light of this new knowledge. The main difference between searching and conditioned viewing is that searching requires significant resources for entering the environment to create new features and/or to collect information. Another difference is that searching scans broadly and comprehensively in order to determine the true state of affairs, whereas conditioned viewing concentrates on selected areas or issues.

As indicated by the model, the amount of information seeking or scanning is related to the perceived possibility to analyse the environment. Moreover, when the environment is perceived to be difficult to analyse, there is a tendency to use people sources more heavily in order to help reduce the higher levels of equivocality. The concept of organisational intrusiveness underlines the relationship between the ability to manoeuvre actively in the environment and the gathering of useful information. In summary, the scanning model appears a viable framework for analysing the primary environmental and organisational contingencies that influence environmental scanning as cycles of information seeking and information use.

The different modes of scanning are compared in Figures 3.3 and 3.4. Research suggests that the model proposed by Daft and Weick is consistent with the empirical knowledge about organisational scanning (Choo, 2001). As indicated by the model, the amount of information seeking or scanning is related to the perceived analysability of the environment. Moreover, when the environment is perceived to be difficult to analyse, there is a tendency to use people sources more heavily in order to help reduce the higher levels of equivocality. The concept of organisational intrusiveness underlines the relationship between the ability to manoeuvre actively in the environment and the gathering of useful information. This action-learning perspective is increasingly evident in the strategy literature that emphasizes improvisation, discovery-based planning, and emergent strategy making. In summary, the scanning model appears a viable framework for analysing the primary environmental and organisational contingencies that influence environmental scanning as cycled of information seeking and information use.

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

Figure 3-3 Environmental scanning as information seeking (Choo, 2001)

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

Figure 3-4 Environmental scanning as organisational learning

3.5 Scanning behaviour

Scanning is a form of organisational browsing, since environmental scanning includes both looking for information and looking at information. In this context browsing is defined as the process of exposing oneself to a resource by scanning its content or structure, possibly resulting in awareness of unexpected or new content in the resource (Chang & Rice, 1993).

External factors such as environmental inconsistency and resource dependency, organisational factors such as the nature of the business and the strategy pursued, information factors such as the availability and quality of information, and personal factors such as the scanner's knowledge or cognitive style has an influence on scanning behaviour (Choo, 2002: 97).

The positive outcomes of scanning are many, for example, finding the desired information, using the information for situational interpretation or decision making, modifying initial information requirements, and so on. Poorly managed scanning can however lead to information overload, confusion and disorientation, inaction and inertia.

In this section research studies (see paragraphs 3.5.1 to 3.5.6) that investigate the aspects of situational dimensions, organisational strategies, information needs and personal traits on scanning behaviour will be reviewed (see Figure 3.5) for an indication of the relationship between the various aspects).

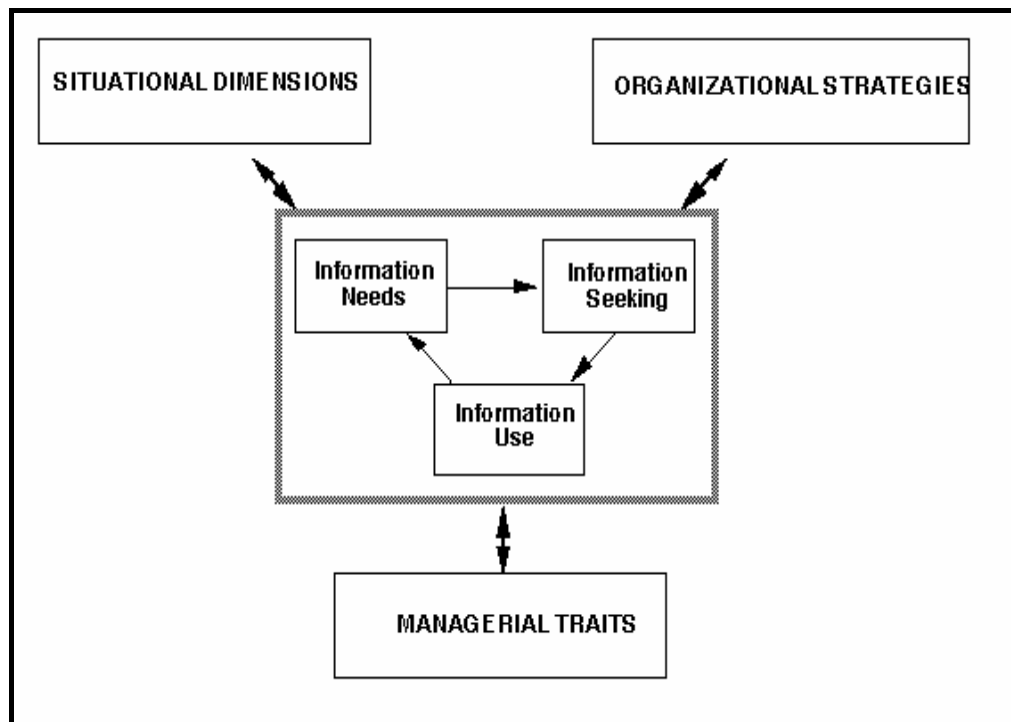


Figure 3-5 A conceptual framework for environmental scanning (Choo, 2002: 98)

3.5.1 Situational dimensions: perceived environmental uncertainty

Managers who perceive the environment to be more uncertain will tend to scan more (Sharfman & Dean, 1991:681-700). Perceived environmental uncertainty is indicated by the complexity, dynamism, and importance of the sectors comprising the external environment.

There is an even stronger association between environmental uncertainty and scanning if the perceived importance of the environment is included in a measure of perceived strategic uncertainty (Auster & Choo, 1993; Elenkov, 1997).

Boyd studied the scanning behaviour of executives in several industries and found a strong relationship between scanning of an environmental issue and the perceived importance of that issue and concluded that the “perceived importance is itself the most important predictor of scanning activity” (Boyd & Fuld, 1996:1-22).

Elenkov examined the relationship between perceived strategic uncertainty and environmental scanning behaviours in a sample of medium-sized Bulgarian companies. He proposed a refinement of the perceived strategic uncertainty to include “politically dominated environments” as political ideologies and social expectations (Elenkov,1997:290).

3.5.2 Organisational and scanning strategies

An organisation’s overall strategy is related to the sophistication and scope of its scanning activities. If a particular strategy is followed, such as a product differentiation or a focus strategy, then the organisation is likely to operate a scanning mode that provides the required information and information capabilities to pursue its desired strategy (Choo, 2002:101; Subramanian, Fernandes & Harper, 1993). Scanning must be able to provide the information and information processing needed to develop and pursue the elected strategy. There is also evidence to suggest that a balanced organisational culture is likely to encourage managers to scan more frequently and take on a more adaptive outlook (Miller, 1994:194).

Yasai-Ardekani and Nystrom (1996:187-204) compared the relationship between organisational context and the designs of effective and ineffective environmental scanning systems. It was found that organisations with effective scanning systems use a wider scope of scanning, scan more frequently and assign their top management teams more responsibility for scanning. Where more inflexible technologies are operated a wider scope of scanning is used to reduce technological vulnerability; those with a low cost orientation scan more broadly, frequently and intensively to protect against competitive erosion (Yasai-Ardekani & Nystrom, 1996:187-204).

Beal (2000) examined the environmental scanning behaviour of small manufacturing firms operating in a wide range of industries. Results suggest that seeking information on several environmental sectors facilitated alignment between some competitive strategies and industry life cycle stages. Specifically, information seeking across multiple sectors was strongly associated with several competitive strategies in the growth stage of industry

development, and several effective low cost leadership strategies in the maturity stage (Beal, 2000: 27-47).

3.5.3 Managerial traits

The expectation is that factors such as the manager's hierarchical level, functional specialisation and personality or cognitive style would affect the conduct of environmental scanning (Nishi, Schoderbeck & Schoderbek, 1982; Allen, 1991; Vandenbosch & Huff, 1997).

Unfortunately, no consistent pattern emerges from the studies that have investigated the relationship between managerial traits and scanning activity (Nishi et al. 1982; Boyd & Fuld, 1989; Vandenbosch & Huff, 1997).

The effect of a manager's job-related and cognitive traits on scanning is an area in need of further research especially relating to cognitive and personality factors (Choo, 2002:107). There is some evidence to suggest that managers scan widely, covering not just their functional specialisations but also other areas; and that upper-level managers scan more and more broadly than lower-level managers (Allen, 1991:3-37; Vandenbosch & Huff, 1997:81-108; Hamrefors, 1998:69).

3.5.4 Information needs

This is the focus of environmental scanning. Most studies look at scanning in various environmental sectors: customers, competition, suppliers, technological; socio-economic and governmental conditions (Auster & Choo, 1993; Olsen et al., 1994: 3-9; Sawyerr, Ebrahimi & Thibodeaux, 2000:95-115).

A distinction is also made between a macro-environment comprising social, economic, political and technological sectors but also including a task or industry environment comprising customers and competition (Fahey & Narayanan, 1986).

Although managers scan with a wide range of sources, they prefer personal sources to formal, impersonal sources, especially when seeking information about developments in the fluid market related sectors.

3.5.5 Information seeking: source usage and preferences.

Organisations scan in a variety of modes (see section 3.4), depending on the organisation's size, dependence and perception of the environment, experience with scanning and planning, and the industry that the organisation is in (Mayberry in Choo, 2000).

Although managers scan with a wide range of sources, they prefer live information from personal sources when seeking information about market-related environmental sectors which are highly fluid and equivocal. There is some evidence to indicate that source selection for scanning is influenced by the perceived quality of the source, and not just its perceived accessibility (Auster & Choo 1993).

A few studies have attempted to examine some of the factors that might explain the selection and use of certain types of information sources in environmental scanning (May, Stewart & Sweo, 2000:403-428; Sawyerr, et al., 2000:950-115).

In summary, the general pattern of source usage for scanning suggests that although managers use a wide variety of sources in scanning, they prefer personal sources that communicate information directly rather than impersonal sources where information is communicated to broad audiences. This preference is particularly strong when seeking information about market-related environmental sectors.


3.5.6 Information use: strategic planning and organisational learning.

According to the doctrine on strategic management, environmental scanning and analysis is a necessary early stage of the strategic planning process

(Choo, 2002:116). Information about the external environment is analysed and interpreted to reveal trends and illuminate potential threats and opportunities.

Information derived from environmental scanning is increasingly being used to drive the strategic planning process in organisations (Preble et al., 1988; Stanat, 1990; Hedin, 1993). Research suggests that environmental scanning is linked with improved organisational performance (Newgren, Rasher & La Roe, 1984; Subramanian et al., 1993; Subramanian, Kumar & Yauger, 1994). However, the practice of scanning by itself is insufficient to assure performance -- scanning must be integrated with strategy, and scanning information must be effectively employed in the planning process (Murphy in Choo, 2002). An important effect of scanning is to increase and enhance communication and discussion about future-oriented issues by people in the organisation. Coupled with the availability of information on external change, scanning can promote generative organisational learning (Subramaniam et al. 1993, 1994; Ahituv, Zif & Machlin, 1998:201-211).

Principal findings from the research discussed in 3.3.1 to 3.3.6 can be summarised as:

- 
- Perceived environmental scanning is a good predictor of the amount of scanning undertaken (situational dimensions).
 - Organisational strategy is linked to the sophistication and scope of organisational scanning (organisational strategies)
 - Scanning focuses on market related sectors of the environment (information needs).
 - A variety of sources are used although personal sources are preferred (information seeking).
 - Scanning information is used to drive strategic planning and organisational learning (information use).
 - Senior managers scan more and functional managers scan beyond their specialisation (managerial traits).

3.6 Factors influencing environmental scanning

Factors influencing environmental scanning are related to analysis of the external environment, management's interpretation experience, perceived environmental uncertainty and the level of knowledge and information available about the environment.

3.6.1 Analysis of the external environment

Daft and Weick (1984) suggest that organisations differ in their modes of scanning, depending on management's perception about how the external environment can be analysed, and also the extent to which the organisation intrudes into the environment to understand it. An organisation that believes the environment can be analysed, in which events and processes are determinable and measurable, might seek to discover the 'correct' interpretation through systematic information gathering and analysis. On the other hand, an organisation that perceives the environment to be difficult to analyse, if at all, might create what it believes to be a reasonable interpretation that can explain past behaviour and suggest future actions.

3.6.2 Management's interpretation experience

Differences in perceptions in the analyses of the environment are due to characteristics of the environment combined with management's previous interpretation experience (Daft & Weick, 1984). It may also be assumed that environmental analysis would be closely related to the concept of how environmental uncertainty is perceived.

3.6.3 Perceived environmental uncertainty

Perceived environmental uncertainty is the variable that measures the totality of the scanner's perception of the external environment's complexity and changeability. Decision-makers in environments that are dynamic and complex experience the greatest amount of perceived environmental uncertainty. Thus, perceived environmental uncertainty is determined by the perceived complexity (number of factors, opacity of causal relationships) and perceived dynamism (rate of change) of the external environment. The

combined effect of a large number of external factors and actors, unclear cause-and-effect linkages, and the rapid rate of change is the perception that the environment cannot be analysed. Empirical research on scanning suggests that managers who experience higher levels of perceived environmental uncertainty tend to do a larger amount of environmental scanning (Choo, 2001).

3.6.4 Available knowledge and information

Another important factor may be the level of knowledge and information available about the environment. Some industries regularly collect and analyse data about competitors, products and markets. In many cases automation and the use of information technology have made it possible to efficiently amass and analyse data and trends (e.g. the London Metals Exchange's computerised information on metal prices). Information that is available at an affordable price, and that is sufficiently detailed and timely to support decision making, may lead to the perception that the environment can be analysed.

3.6.5 Resource allocation

An organisation that intrudes actively into the environment is one that allocates substantial resources for information search and for testing or manipulating the environment. A passive organisation on the other hand will try to interpret the environment with whatever given information comes its way (Choo, 2001).

3.7 Information management as the core of environmental scanning

A substantial proportion of the information needed by an organisation for environmental scanning already exists within an organisation. Unfortunately, the information is scattered in bits and pieces, and the people who have the information are often unaware of its value to the organisation and the need to share it with others (Choo, 2002:235). Information skills and resources already exist within organisations' library and information centres, research and

development department, marketing department and other units. (Choo, 2002: 235). To bring these assets together into a viable environmental scanning system requires a unifying set of information management strategies that enables the organisation to collect, co-ordinate, store, analyse and disseminate information systematically.

The design of an environmental scanning should be base on the following principles, all of which in fact relate to the management of information resources and capabilities:

- One central location for convergence of bits and pieces of data from all over the organisation;
- A distributed force of collectors and analysts;
- A system capable of storing information so as to enable easy retrieval and communication (Gilad, 1994:170)

3.8 Conclusion

The model presented in this chapter specifies two conditions influencing organisational environmental scanning, namely whether the environment can be analysed as well as organisational intrusiveness. Organisations face a dilemma in that it appears to be impossible to analyse the environment because of its complexity and rapid rate of change. On the other hand, organisations recognise that they need to be proactive in environmental scanning and shaping their environments. Some organisations believe that precisely because the environment is in a state of change, there is an opportunity (or a necessity in some cases) for them to intervene and influence developments to their advantage. The model implies that for organisations wanting to encourage their members to scan more proactively, both the level of analysing the environment and the level of organisational intrusiveness need to be raised. To increase environmental analysis, the organisation might keep in close touch with important actors in the environment; make information about customers, competitors, and the industry more widely available to employees; and encourage staff to be interested in and to discuss

and collectively make sense of external developments. To increase organisational intrusiveness, the organisation might create channels to communicate with and influence stakeholders; encourage managers and employees to probe or test their environments by allocating resources or providing organisational slack; and be tolerant about innovative enactment and experiments that do not succeed.

The most important component of the environment is the industry in which an organisation competes, and the intensity and nature of the competition in an industry may be systematically analysed by examining competitive forces. Through the analyses of these forces, the organisation is enabled to position itself in the industry where it can best defend against these competitive forces or influence them in its favour.

For organisations to remain or become truly globally competitive, it is recognised that information is required to support decisions in various levels of the organisation. In a world of information overload, the emphasis is not on more information, but on actionable intelligence, capable of guiding decisions in organisations.

Organisations scan the external environment to understand the external forces of change so that effective responses can be developed which will secure or improve the organisations position in the future. Organisations therefore look beyond internal business activities and integrate events from the external environment into the information picture on an ongoing basis.

From an understanding of the external environment the organisation then again looks at the internal business activities, through the activity of competitive intelligence, in an attempt to make sense of internal information.

CHAPTER 4

COMPETITIVE INTELLIGENCE

4.1 Introduction

Managers have an important and prominent role in an organisation. As decision makers they hold the authority and responsibility to act on the available information.

Companies have no option but to look beyond internal business activities and to integrate events of the external environment into the information picture on an ongoing basis. The activity needs to be ongoing, comprehensive and dedicated. Different to information management tools, competitive intelligence provides focus to the information management activity in attempting to make sense of available information (Muller, 2003a). Information is interpreted to make it actionable for use in strategic decision making. Information is turned into intelligence through a process of human interpretation.

Competitive intelligence can assist business leaders to make better decisions than their competitors concerning competitive activities, marketing planning, regulatory issues and customer activities. (McGonagle & Vela: 1993).

Competitive intelligence starts with identifying the company's key intelligence needs or requirements and then collects and analysis information that would provide an answer to the intelligence need. Finally the intelligence is communicated to the decision maker.

4.2 Defining competitive intelligence

Competitive intelligence is becoming very important to organisations when considering the following quotes, one by Bill Gates, President of Microsoft, John Pepper, Chairman of Procter and Gamble.

“The most meaningful way to differentiate your company from your competition, the best way to put distance between you and the crowd, is to do

an outstanding job with information. How you gather, manage, and use information will determine whether you win or lose” (Gates in Calof, 2001).

“I can't imagine a more appropriate time to be talking about competitive intelligence than right now, for I can't imagine a time in history when the competencies, the skills, and the knowledge of the men and women in, or, as I'll be calling it, business intelligence, are more needed and more relevant to a company being able to design a winning strategy and act on it” (Pepper, 1999:4).

Competitor intelligence is comprised of many different types of information, i.e. competitor, customer, market, technological, product & environmental. It is an analytical process whereby raw data is transformed into relevant, accurate, and usable strategic knowledge” (Tyson, 1990:4). It is information about a competitor's current position, historical performance, capabilities and intentions; about the driving forces within the marketplace; about specific products and technology; information external to the marketplace, such as economic, political and demographic influences that may have an impact on the market.

It is the systematic process of gathering and analysing information about the activities of competitors and general business trends to further the organisations goals (Kahaner, 1997:16).

At a simplistic level, competitive intelligence can be defined as information that makes the firm more competitive. One of the better definitions comes from the Business Intelligence Institute in the United States:

“Competitive/Business intelligence is the total knowledge a company possesses about the environment in which it competes. It is synthesised from the vast amount of bits and pieces of external information bombarding the firm every day. It paints a whole picture of the present and future competitive arena of management decisions” (Calof, 2001).

The more complete definition is:

“Competitive intelligence is the art and science of preparing companies for the future by way of a systematic knowledge management process. It is creating knowledge from openly available information by use of a systematic process involving planning, collection, analysis, communication and management, which results in decision maker action” (Calof & Skinner, 1998:38).

All competitive intelligence definitions point towards creating knowledge from openly available information by use of a systematic process involving planning, collection, analysis, communication and management, which results in decision-maker action. The intent of competitive intelligence is to better understand customers, regulator and competitors, to create new opportunities. In fact, the intent is to forecast changes in any of these forces and better position the firm to take advantage of these changes.

When people talk about competitive intelligence there tends to be confusion between competitive intelligence, spying/espionage and knowledge management. According to Patrick Bryant, the President of (SCIP) Society of Competitive Intelligence Professionals, "Espionage is the use of illegal means to gather information. On the other hand, CI is the process of gathering data using legal, ethical means and turning it into valuable intelligence through careful analysis" (Calof, 2001). Competitive intelligence therefore differs from spying in that it uses legal means and goes well beyond data collection.

Differentiating between competitive intelligence and knowledge management is more difficult as there are many different definitions of knowledge management. Knowledge management is defined in terms of gathering and storing the collected knowledge of the organisation.

- Competitive Intelligence tends to involve gathering information about the outside environment in order to plan for the future of your own company and products/ services (Calof, 2001).
- Knowledge Management tends to focus on the identification and integration of existing knowledge within the organisations as well as the

outside world, and sharing and using that effectively to improve what is done (Calof, 2001).

These definitions suggest that while competitive intelligence incorporates knowledge management processes of collecting and storing information, competitive intelligence definitions also talk more about the actual analysis of the data - a process rarely mentioned by knowledge management definitions. While there are various definitions, the easiest way to conceptualise the difference is to define knowledge management as the capturing, filing and categorisation of the knowledge and competitive intelligence as the focusing, analysing and actioning of the information. Without knowledge management competitive intelligence could not be done, as CI requires access to information and knowledge. However, without CI, knowledge management becomes a fruitless exercise of filing and categorising information.

The concept of intelligence as a process has long been proposed by various authors as an effort to increase the firm's competitiveness and its strategic planning process. In 1966 William Fair proposed the formation of a corporate "Central Intelligence Agency" within the firm whose function it would be to "collect, screen, collate, organise, record, retrieve and disseminate information". Since that time, this proposition has grown to become an emerging business construct with delineated job functions directly responsible for intelligence collection, analysis, and dissemination (Kahaner, 1997).

A review of the literature related to competitive intelligence suggests that according to various authors, competitive intelligence is a marketing discipline focused on gathering information on the competition (Schollhammer, 1994; Agarwal, 2001). However, a much broader examination of the literature shows that intelligence is not only about monitoring competition but the entire business environment. Mere environmental scanning does not always capture all of the multiple functions within the intelligence process. Gilad & Herring (1996) talks about the objective of intelligence as "being able to predict competitors' moves, customers' moves, government moves and so forth."

A more appropriate definition of intelligence is “actionable recommendations arising from a systematic process involving planning, gathering, analysing, and disseminating information on the external environment for opportunities, or developments that have the potential to affect a company’s or countries competitive situation” (Calof & Skinner, 1998). In the analyses of the varied applications of the intelligence terms in the literature, it may be more appropriate to define “competitive intelligence” as the above process which gathers, analyses, and disseminates any intelligence which makes the organisation more competitive.

4.3 The role and purpose of competitive intelligence in business

Competitive intelligence has become a necessary activity in business – compelling companies and institutions to look beyond internal business activities and to integrate events of the external environment into the information picture on an ongoing basis. Events like the impact of regulatory change, how a merger between two competitors changes the picture and the impact of the introduction of a new product on the market should be interpreted even before they occur (Muller, 2003a). Different to knowledge management and other information management tools, competitive intelligence provides focus to the information management activity in companies, attempts to make sense of available information and interprets information to make it actionable for use in strategic decision making (Muller, 2003a).

Intelligence is at once both a process (the intelligence cycle as in Figure 4.3) and a product. Competitive intelligence can therefore be defined as:

- an analytical process that transforms disaggregated competitor and market data into actionable strategic knowledge about competitors' capabilities, intentions, performance and position
- the end-product of that process.

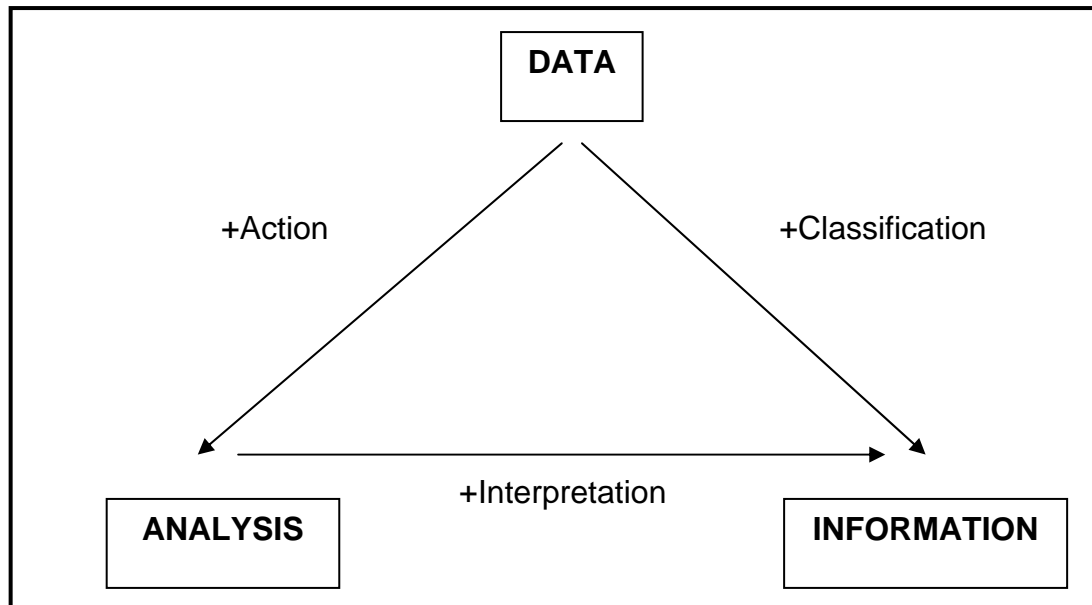


Figure 4.1 Business Intelligence (Bernhardt, 1993:18)

Competitive intelligence is not market research, nor is it always synonymous with market intelligence, although the activities are interrelated. Competitive intelligence managers often draw upon the resources of their firms' market research departments, but the perspectives and goals of competitive intelligence and market research units are quite different from those of competitive intelligence managers and co-ordinators.

The focus of market research tends to be on problems associated with the profitable marketing of the products and services of a company. The scope of competitive intelligence is broader. Competitive intelligence is a 'value added' concept that layers over the top of business development, market research and strategic planning (Bernhardt, 1993:19).

The research objectives of a competitive intelligence project will typically involve issues such as

- the manufacturing capability of the competitor
- analysis of alliances or joint ventures entered into by competitors
- the competitor's future plans and strategies for specific markets

- reasons behind a shift in the corporate strategy relating to the customer, supplier or competitor.

Competitive intelligence is at the heart of those strategic management activities which are anticipatory in nature, in particular those concerned with assessing business strengths, weaknesses and environmental opportunities or threats, in relation to competitors and formulating, evaluating and selecting strategic alternatives (Porter, 1987:15).

Competitive intelligence is driven by, and carried out for, policymakers. Although it is the task of the intelligence professional to deliver a useful - an actionable - intelligence product, it is the responsibility of the consumer of intelligence, the policymaker, to define and explicitly articulate the organisation's front-end intelligence requirements. At the same time it is the policymaker's responsibility to ensure that these requirements are indeed satisfied.

According to Porter (1987:15), "Corporate strategy concerns two different questions: what businesses the corporation should be in, and how the corporate office should manage the array of business units. But, also according to Porter (1987:15), "Competitive strategy concerns how to create competitive advantage in each of the businesses in which a company competes.

4.4 Intelligence and competitive strategy

A great deal of the management literature produced since the mid-1960's has been concerned with explaining the theoretical and practical complexities of strategic management and of strategic thinking. Various interpretations of the concept of competitive strategy in particular have captured the interests of scholars and managers alike over the period. Today no professional manager will dispute that firms must be able to integrate their vision, their objectives, and their key goals into a formal strategic process that accommodates the formulation and implementation of corporate, business and functional strategies (Bernhardt, 1993:25).

Whatever model, or models, of organisation companies choose to follow - global, international, multinational or transnational - the overriding strategic considerations remain broadly the same. Managers must continuously re-assess their strategic situation (where are we relative to our competitors?). Managers must make strategic choices (how should we compete? how do we gain competitive advantage?). Managers must act; at the end of the day they must implement strategy. Yip (1992:1) argues that "being able to develop and implement an effective global strategy is the acid test of a well managed company."

The 1990's has shown that no company, no industry, and no market would escape the shock waves of economic, political, social and technological change sweeping over the globe. The competitive environment had changed fundamentally, it had changed radically, and it had changed everywhere.

As the role and the structure of strategic planning have evolved, so too have the information needs of managers. Competitive intelligence has therefore become a central component of the strategic management process. It has become the means by which firms can gauge the competitor objectives and strategies which lie beneath the surface (Bernhardt, 1993:28).

Porter (1980:47) offers a penetrating look at competitor analysis and its role in the formulation of competitive strategy. Porter points out that 'sophisticated competitor analysis is needed to answer such questions as "Who should we pick a fight with in the industry, and with what sequence of moves?" "What is the meaning of that competitor's strategic move and how seriously should we take it?" and "What arenas should we avoid because the competitor's response will be emotional or desperate?" Put another way, how are our competitors trying to beat us and therefore how are we going to beat them?

"...intelligence is nothing less than the crucial second half of strategic planning. It is the mechanism which enables a company that has a good strategic plan to chart and pursue a course that will bring the company to its objectives in the shortest possible time, no matter how rapidly or radically external conditions may change. And when external conditions change so

radically that the plan itself needs to be altered, it is intelligence that sounds the first alert for the strategic planners themselves (Meyer, 1987:8).

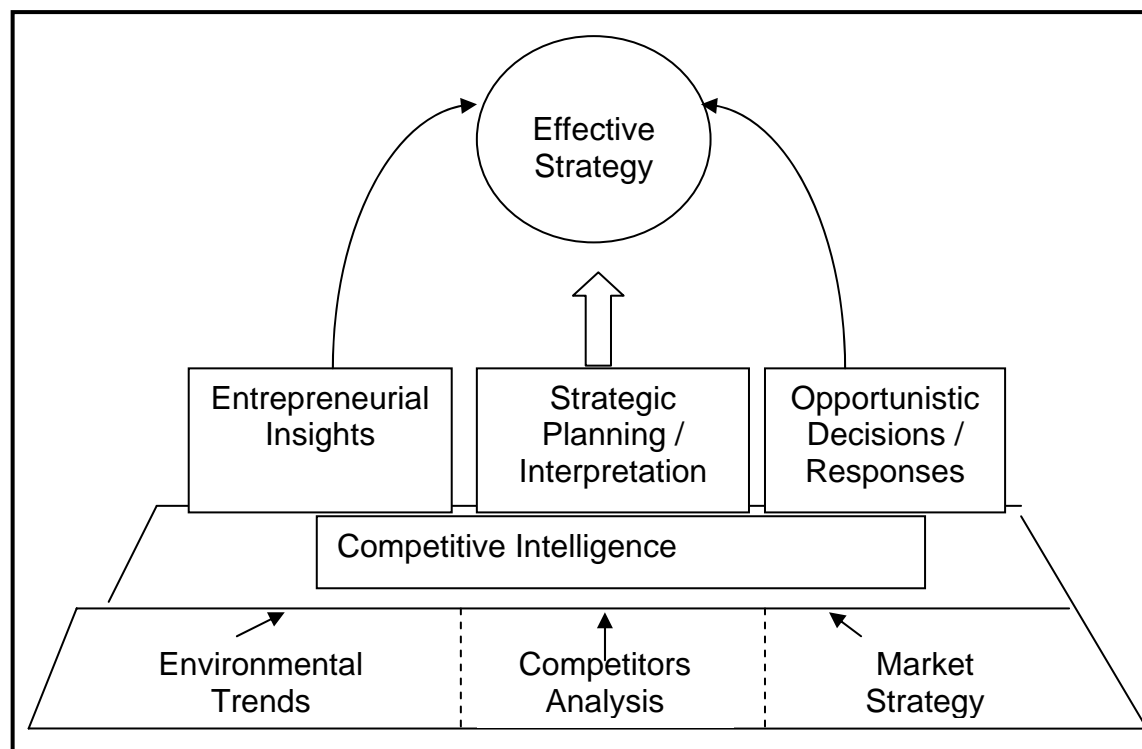


Figure 4-2 Effective strategy / competitive intelligence (Bernhardt, 1993:28)

Without competitive intelligence the formulation of strategy is impossible and a firm cannot be managed strategically.

Intelligence must be used. Managers must know what actions they can, should and will take when they acquire the intelligence they need. The 'shelf life' of intelligence is short, and its costs in absolute terms are high. The task of managers is to use intelligence in a timely manner to create or sustain competitive advantage - to make decisions, to take action. General Norman Schwarzkopf (1992:384) put it this way to his senior commanders before launching the Gulf War ground offensive:

“I cannot afford to have commanders who do not understand that it is attack, attack, attack, attack, and destroy every step of the way. If you have somebody who doesn't understand it, I would strongly recommend that you

consider removing him from command and putting in somebody that can do the job”.

In business, strategic intelligence is concerned mainly with competitor analysis, or more precisely, with gaining an understanding of a competitor's future goals, current strategy, assumption {held about itself and the industry} and capabilities.

Competitive intelligence facilitates the re-thinking and realignment of strategies, and the speed with which these are done.

Managers must continually re-assess their strategic situation (where are we relative to our competitors?). Managers must make strategic choices (how should we compete? How do we gain competitive advantage?) At the end of the day they must implement strategy.

Without competitive intelligence the formulation of strategy is impossible. Without competitive intelligence a firm cannot be managed strategically.

The five steps which constitute the intelligence cycle is “the process by which raw information is acquired, gathered, transmitted, evaluated, analysed and made available as finished intelligence for policymakers to use in decision making an action” (Bernhardt, 1993:21).

4.5 Competitive intelligence process

The key operational areas of competitive intelligence, namely planning and focus, collection, analysis, communication, awareness and culture, and process and structure will be discussed in relation to

Process and structure provide the basis for the CI process, which starts with identifying the company's key intelligence needs, then moves to collecting and analysing information that would provide an answer to the intelligence needs and finally communicating the intelligence to the decision maker (Muller, 2003).

The operational areas are all important and not one may be omitted. If the analysis task was left out, for example, this will lead to the delivery of un-integrated data summaries to management (Marceau and Sawka, 1999).

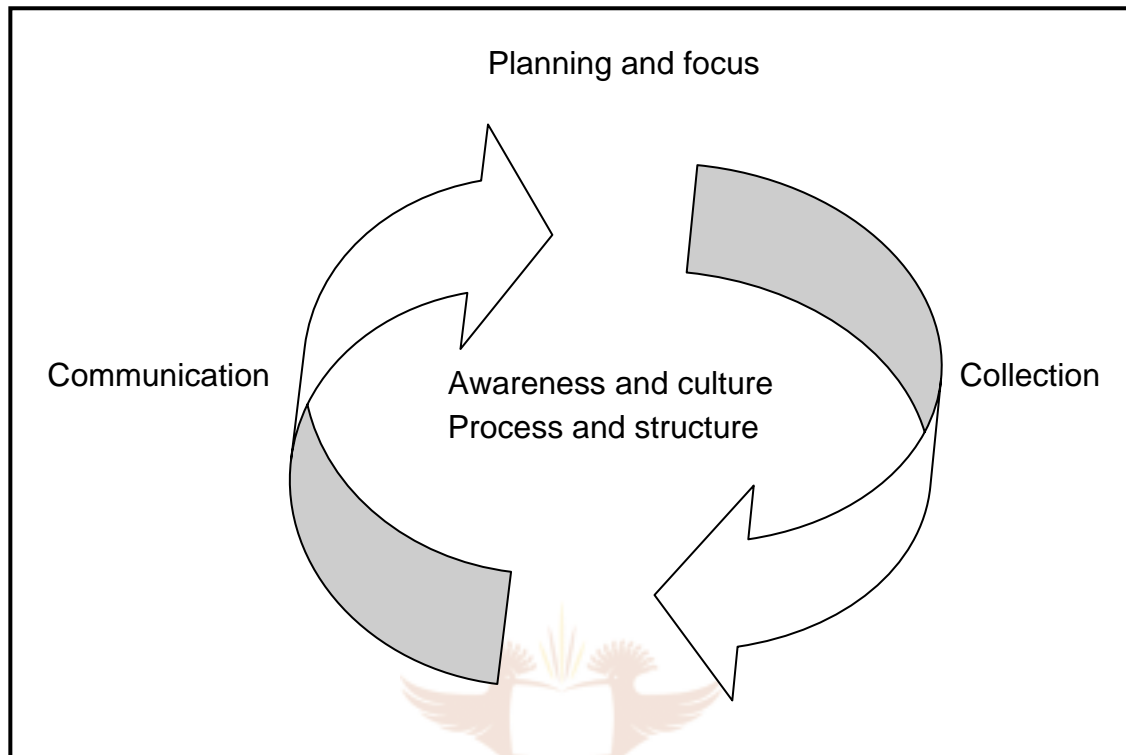


Figure 4.3 Intelligence cycle (Muller, 2003a)

4.5.1 Planning and focus

The planning and focus phase is the starting point of a continuous cycle and sets required resources for the CI process as well as to establish the purpose and result of the findings (Muller, 2003a). During this phase an assessment is done of what intelligence is required for the managerial decision which is under uncertainty and focuses on those issues of highest importance to senior management. This is not about collecting all information or researching everything.

The critical success factor in any intelligence operation is meeting the user's real needs – and doing it in such a way that the organisation acts on the resulting intelligence (and, as a consequence, succeeds in whatever business

endeavour it is involved in). These intelligence needs are the key to producing effective and actionable intelligence.

4.5.1.1 Key Information Needs (KINs)

4.5.1.1.1 Defining KINs

Needs identification is not an easy task with the result that few companies pay attention to this aspect of competitive intelligence. Identification of intelligence needs requires a co-operative effort by both management (users) and CI professionals to create the environment necessary to support the two-way communications required for identifying and defining the organisation's real intelligence needs.

Herring (1999) refers to the use of a systematised or formal 'management-needs identification process' to identify and prioritise both senior management's and the organisation's key intelligence needs (KINs). He found that individual business managers and executives expressed their specific intelligence needs about topics such as strategic alliances and acquisitions, technology planning and decisions, and specific competitors. Some business groups would combine individual manager's intelligence needs and submit their organisation's prioritised lists. In the case of individual needs overlapping they could be logically combined to properly co-ordinate the intelligence operations and tailoring the delivery of the resulting finished intelligence to each user group.

After educating the company's senior management about intelligence production and their role in using it, the first step in the design process is to conduct key information needs interviews of the key decision makers and managers.

More importantly, it certainly makes a lot of sense to managers. They are aware of the fact that they need intelligence, i.e., business, competitive, technological, etc. Experience has shown that management soon become convinced that the better they could articulate their needs (KINs), the more likely they are to receive useful intelligence (Herring, 1999).

4.5.1.1.2 Interviews and intelligence uses

Needs identification interviews at the beginning of a CI program provide not only the focus and prioritisation needed to conduct effective intelligence operations and produce the appropriate intelligence, but also permit the program's designers and developers to determine the number of CI professionals, their skills, and the level of external resources needed to address the organisation's actual intelligence needs. In effect, an understanding of the nature and scope of the organisations' intelligence needs permits the program resources to be optimally matched to the expected demand.

KINs can be determined through a responsive and a pro-active method (Muller: 2004). For the responsive mode a set of cleared and categorised requests are developed and acted on. It is more reactive and focussed on what was expressed as KIN. In the pro-active mode, the intelligence worker should have the ability and skill to anticipate KIN through constant watch, tracking and scanning (Muller, 2004).

4.5.1.1.3 Categorise KIN

Once management's KINs are identified and organised by business and/or functional category, the related intelligence operations can be better planned to maximise success and produce the required intelligence. KINs can generally be assigned to one of three functional categories (Herring, 1999):

- Strategic decisions and actions. Typical strategic issues could include plans to enter a new market in China and the related market entry strategy; company growth; product development and investment decisions (Muller, 2004).
- Early warning intelligence, including competitor initiatives, monitoring specific technological issues to anticipate changes, profiling customers and their changing needs and governmental actions.
- Descriptions of the key players in the marketplace which will include competitors, customers, suppliers, regulators and potential partners.

Key Intelligence Needs (KINs) have traditionally dominated the competitive intelligence process as the pre-eminent list of priorities by which all intelligence activities will be judged. Customarily focused on understanding subtle changes in a few key measurements of competitor activity, the KIN becomes less important when thinking of competitive intelligence as an aggressive and opportunistic exercise rather than a defensive, status quo protection activity (Johnson, 2002). “While within the competitor perspective of information collection and analysis, KINs remain very important, this philosophical approach becomes just one of a dozen more diverse missions that the most advanced and well-developed intelligence teams are charged with” (Johnson, 2002).

Key intelligence information should track and scan the competitive environment in search of opportunities to capitalise on and threats to avoid (Muller, 2004). Successful competitive intelligence systems are needs driven and must provide specific answers to the questions being asked by the company decision makers.

4.5.2 Collection

During this phase of the CI process information on a company’s competitors and the competitive environment is collected from a variety of sources for examination and verification (Muller, 2003b). The aim is to find and develop information on competition, competitors and the competitive environment. Collection comes from a variety of different sources and acquisition methods including environmental scanning, with the literature focusing on primary source information. In other words, the information required is readily available and identified through legal means, which include open sources such as public documents, interviews, published sources and in-house expertise (Fleischer, 2001).

Companies engage in two kinds of collection procedures. Firstly, information is collected for a specific reason or in response to a request from management (either the answer to a problem or the first step in solving a problem).

Secondly, information that is saved and built into an ongoing data bank about one company or one industry. This information is updated regularly.

Collection also involves processing information so that it can be transmitted and stored electronically if desired. Once in electronic format it can be manipulated into a form which allows analyses.

Most texts on the subject of competitive intelligence deal at considerable length with the issue of secondary, mainly published data and information sources. The list of such 'open' sources is infinite - annual reports, government documents, directories of every description, newspapers, statistics, trade journals, 'on-line' database services, etc. and will typically account for 80 per cent or more of the data and information input (Bernhardt, 1994: 16). But the intelligence yield from secondary sources relative to that gained from primary-mainly human-sources is negligible. The intelligence product which serves as a springboard for managerial action i.e. it is actionable, is generated mainly from information collected from reliable primary sources (Bernhardt, 1994:16). If a number of well placed sources, independently of each other, and in different offices (and possibly countries) provide the same response to a particular question, the information is likely to be true (Bernhardt, 1993:171).

Using proven interviewing techniques` it is possible to learn from competitors, customers, and suppliers most of what the firm needs to know in order to complete the intelligence puzzle. Some "targets" are more difficult to access than others, but none are invulnerable. Although it often requires scores of interviews, at times on a global basis, experienced intelligence researchers can collect from external primary sources nearly every essential element of information they need regarding competitors.

Most of the intelligence that managers require already exists inside the firm. The problem, generally, is that no formal mechanism is in place to leverage internal information resources. Managers and staff from engineering, finance, human resources, manufacturing, marketing, Research & Development, and sales, all have something to contribute in terms of valuable competitive

information. In addition, they can all benefit from intelligence feedback. But someone must talk to and motivate them. It is a key function of the competitive intelligence activity to harness the power and add value to the capabilities of these “knowledge assets” (Bernhardt, 1994:19).

4.5.3 Analysis & production

Many practitioners believe that this is where “true” intelligence is created, that is converting information into “actionable intelligence” on which strategic and tactical decisions may be made (Kahaner, 1997; Calof & Miller, 1997; Herring, 1999).

Intelligence analysis is a step in the production of intelligence in which information is subjected to systematic examination in order to identify relevant facts, determine significant relationships and derive key findings and conclusions (Herring, 1998: 13-16).

Analysis is the process of taking information – often seemingly unconnected information – and turning it into intelligence.

Although perfect intelligence does not - cannot - exist, intelligence that alerts managers to information gaps, enables executives to develop better bases for financial and market forecasts, facilitates the assessment of market attractiveness, and helps managers anticipate the competitor's next move, does.

What managers analyse, and why, matters as much as how the information is analysed. For example, a comprehensive analysis of the competitor's 'knowledge assets' (institutional knowledge, management experience, and 'the way things are done here'), its investment decisions regarding these assets, and the effectiveness with which these assets are employed and integrated throughout the organisation will reveal far more about the competitor's capabilities and future direction than will a detailed assessment of the physical assets accounted for in the balance sheet (Bernhardt, 1993:51). Equally, to know how and where a competitor adds value in each of

its business activities will create more opportunities for gaining competitive advantage than will a cocktail of competitor financial ratios (Figure 4.4)..

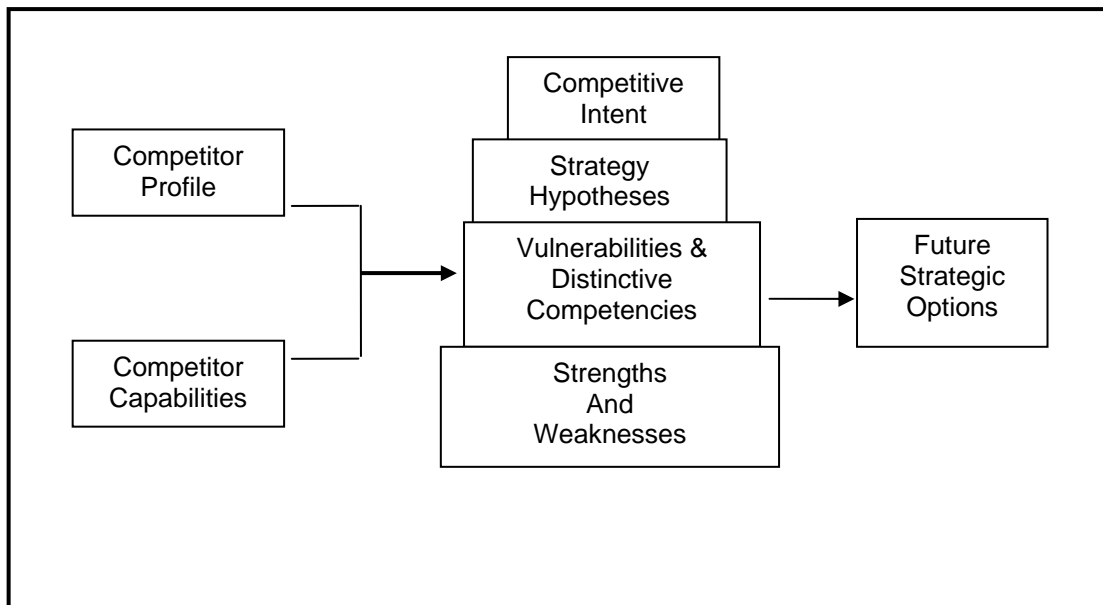


Figure 4.4 Inferring future strategies (Bernhardt, 1993:51)

Competitive intelligence analysis is similar to other analyses in terms of the process, although it may be argued that there is added importance to ensure that the correct intelligence is derived because of the potential damaging impact of inaccurate analyses and missed opportunities (Muller: 2003c). The CI analysis process comprises various steps as illustrated in figure 4.5.

Briefly, the analysis process starts when a key intelligence need arises, for example a new player in the industry. As focus is important, the request should be assessed to determine the time and resources that are required, as well as how the intelligence will be communicated to the person who needs it, for example a chief executive officer of an organisation. A project plan or framework is then designed followed by the collection of the right information.

The evaluation phase is the true analysis phase and has two aspects, namely integrating and assessing information and then interpreting the information. As information is collected it should be organised to ensure that the right information is gathered and to determine information gaps (Muller, 2003c). Information and sources should be tested to ascertain validity, reliability and credibility.

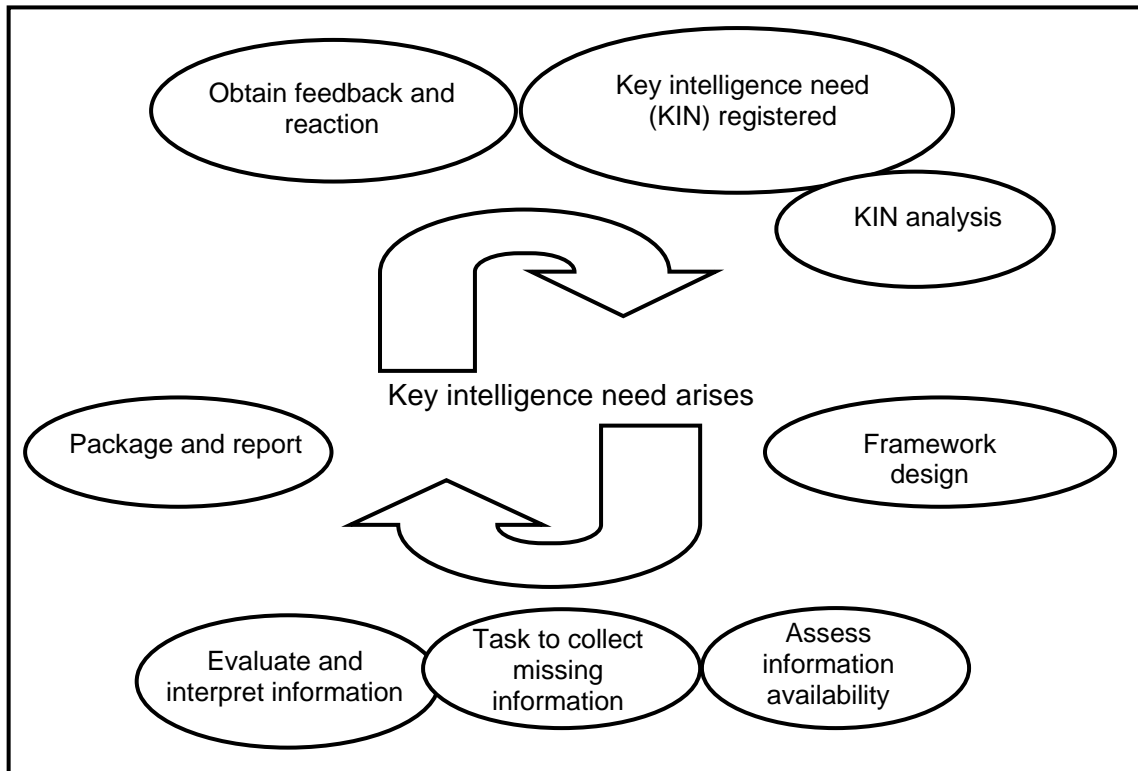


Figure 4.5 Steps of a CI analysis (Muller, 2003c)

Interpretation of information requires a highly skilled and experienced competitive intelligence analyst (Muller, 2003c). These skills should include a variety of business analysis tools.

Competitor analysis may under no circumstances become an end unto itself. It is a process designed to provide actionable intelligence that decision-makers can use to improve business performance. Actionable intelligence assessments:

- are future orientated
- help management develop better competitive strategies
- will identify current and future competitors, as well as their strategies and plans.

4.5.4 Dissemination

The results of the CI process or project need to be communicated to those with the authority and responsibility to act on the findings (Calof & Skinner, 1999).

Dissemination of CI consists of many aspects. It is about communicating intelligence to those who need to use it, is about communicating and sharing information in the company and it is about communicating the key focus areas (the key intelligence needs) to those people in the company who can constitute and should participate in the CI activity (Muller, 2003d).

Information cannot simply be gathered, analysed and disseminated in its raw form. Value needs to be added to the raw information. For dissemination to be successful, information should be identified which would impact on the current strategic plans of the organisation.

4.5.5 Process and structure

CI requires appropriate policies, procedures and a formal (or informal) infrastructure so that employees may contribute effectively to the CI system as well as gain the benefits from the CI process. There is much support for a formal structure and a systematic approach to CI (Porter, 1980; Gilad and Gilad, 1985; Gilad & Gilad, 1986; Ghoshal & Kim, 1986). However, many firms CI efforts are short-term projects and do not have on-going CI processes in place, but still conduct CI activities (Prescott & Smith 1989).

4.5.6 Organisational awareness/culture

For a company to use its CI efforts successfully, an appropriate organisational awareness of CI and a culture of competitiveness are necessary (Olivier et al., 2003). A company must have an internal sense of competitiveness in order to gain the maximum effectiveness of the CI process. There has been support for this awareness/culture construct in the area of market orientation (Gelb, Saxton, Zinkhan & Albers, 1991; Ghoshal & Kim, 1986; Ghoshal & Westney, 1991; Madsen & Dishman, 2000). While decision makers should call the shots

on what intelligence is required, information gathering should be on everyone's mind (Kahaner, 1997).

The heightened awareness of a company's competitive environment is one of the bases for organisational learning theory. Imbedded in the organisational/awareness culture construct is also the application of ethical standards and behaviour (Hallaq & Steinhorst, 1994).

4.6 Conclusion

Intelligence must contain two key elements if it is to be made actionable (i.e. action can be taken on it). First, it must include likely and relevant future developments. Second, there must be a direct link between the intelligence product, or output, and managers' responsibilities.

Competitive intelligence should be positioned in the organisation to identify threats in the external environment capable of impacting negatively on the future of the organisation. A second and equally important function of competitive intelligence is to identify new opportunities for the organisation, leading to innovation and ultimately benefiting the competitive status of the organisation.

The competitive intelligence activity should not form part of the "nice to have or know" activities in the organisation, but should be focussed on the issues critical to the survival of the company.

In order to function in the age of head to head competition, company sensors have to be developed capable of triggering company reflexes for reaction to danger or need. This should provide a well-integrated flow of information to the right part of the organisation at the right time.

Organisations who have succeeded to implement an effective and structured competitive intelligence process focussing on critical issues, will have a competitive advantage over their rivals.

As information management does not focus purely on management activities, the organisation has to look beyond internal business activities and integrate

events from the external environment into the information management function through the activity of environmental scanning. Competitive intelligence in turn brings focus to the information management activity through attempting to make sense of the available information. Through integration of information management, environmental scanning and competitive intelligence a process model can be developed to make information actionable for use in strategic decision making.



CHAPTER 5

AN INTEGRATED INFORMATION MANAGEMENT PROCESS MODEL AT PYROMET TECHNOLOGIES

5.1 Introduction

Information is the strategic resource in an organisation that enables the effective combination and utilisation of the other assets in order for the organisation to perform. Outside of the organisation, the environment is a larger information arena in which people, objects and organisations create a constant flow of signals and messages. Competition is the result of the unequal distribution of information among organisations and their differential abilities to acquire, absorb and act on information.

Unfortunately much of the information received by an organisation is perceived more of a potential than a prescription for action. For information to become strategic, it has to be compounded into knowledge that can guide action. This transformation of information into knowledge is one of the goals of information management. Information management should thus not be perceived as the management of information technology, or the management of information resources, or the management of information policies and standards, but rather as a unifying perspective that would bind all the functions together.

Managers have an important and prominent role in an organisation. As decision-makers they hold the authority and responsibility to act on available information. As leaders, they set the example and promote a culture of information sharing and collaboration. As strategists, they ensure that information policies are well aligned with the organisation's mission.

One of the greatest challenges facing an organisation is to understand how the external environment is changing, what the changes mean, and how the organisation can best respond to the new provisos. The process of learning about the external environment is environmental scanning, i.e. the art of

gathering and interpreting information about the environment enabling the organisation to have the knowledge to develop effective courses of action.

The basic goal of information management is to harness the organisation's information resources and information capabilities to enable it to learn and adapt to its changing environment. Information creation, acquisition, storage, analysis and use therefore provide the intellectual framework that supports the growth and development of an organisation.

During the literature study three processes were defined, i.e. an information management process, a competitive intelligence process as well as an environmental scanning process. This chapter will now investigate how these can be integrated into one process model.

5.1.1 The defined theory based process models.

5.1.1.1 What is a Business Process?

Davenport and Short (1990) define a business process as "a set of logically related tasks performed to achieve a defined business outcome." A process is "a structured, measured set of activities designed to produce a specified output for a particular customer or market. It implies a strong emphasis on how work is done within an organisation" (Davenport, 1993). In their view processes have two important characteristics namely internal or external customers and processes cross-organisational boundaries, i.e., they occur across or between organisational subunits. One technique for identifying business processes in an organisation is the value chain method proposed by Porter and Millar (1985).

Processes are generally identified in terms of beginning and end points, interfaces, and organisation units involved, particularly the customer unit. High impact processes should have process owners. Examples of processes include new product development, purchasing, project management, plant commissioning, etc.

Processes may be defined based on three dimensions (Davenport & Short, 1990):

- Entities: Processes take place between organisational entities. They could be inter-organisational, inter-functional or interpersonal
- Objects: Processes result in manipulation of objects. These objects could be Physical or Informational.
- Activities: Processes could involve two types of activities: Managerial (e.g. develop a budget) and Operational (e.g. fill a customer order).

5.2 Pyromet Technologies – a case study

Pyromet Technologies is a small privately owned South African company started twenty years ago to provide smelting design and technology expertise to the metallurgical industry. The core of the business is the supply of electric arc furnaces and technology to the ferroalloy and base metals industries. Pyromet has extensive experience in the design and construction of smelting plant both in South Africa and abroad and remains closely involved in both new plant development and expansions. Close contact with the industry ensures that they are at the forefront of industry developments.

5.2.1 Organisational structure of Pyromet

The organisational structure of Pyromet (see Figure 5-1) is a conventional structure with defined and properly demarcated reporting structures. All activities are performed within the functional groups and are headed by a Director. Each section under a specific Director maintains a strong concentration of technical expertise. Since all projects must flow through the functional sections, each project can benefit from the most advanced technological expertise. Functional Directors can hire a wide variety of specialists and provide them with easily definable paths for career progression.

However, having said this, multi-tasking is important and encouraged by management, with the result that the structure tends to become flatter as specialist personnel are expected to move into areas outside of their primary fields of expertise. For example the Senior Mechanical Engineer takes on the responsibilities of a Project Manager if one is not available to take charge on a

new project. He may also be responsible for taking on design responsibilities in his field of expertise regarding gas-cleaning systems. As a result of this he becomes responsible for decision making and only refers to the specific Director if he cannot find a solution to a problem. Interesting though is that the staff member still only reports to one individual, making for well-structured communication channels.

It should be noted that individuals report to the Directors, and not Departments or Divisions. The workflow in the company is related to processes and not to Departments or Divisions.

Since the establishment of a proper marketing function within Pyromet as well as the appointment of a Chief Executive Officer, it has become apparent that one of the greatest challenges facing the company is that of understanding changes in the external environment, what the changes mean and how Pyromet could respond to these changes. A need was expressed by management that the environment should be scanned in order to understand change in the external environment so that they may develop effective responses to secure or improve their future position in the market. Environmental scanning is recognised as part of the process of strategic decision making.

Through the nature of Pyromet's business and the size of the industry in which it operates Pyromet's competitors are well known and not many surprises are forthcoming regarding them. However, the need was expressed that the company's competitors should be actively analysed, as well as the competitive conditions in particular industries or regions. Through the establishment of a competitive intelligence function it should be possible to gain strategic knowledge about the competitor's capabilities, intentions, performance and position.

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ORGANOGRAM

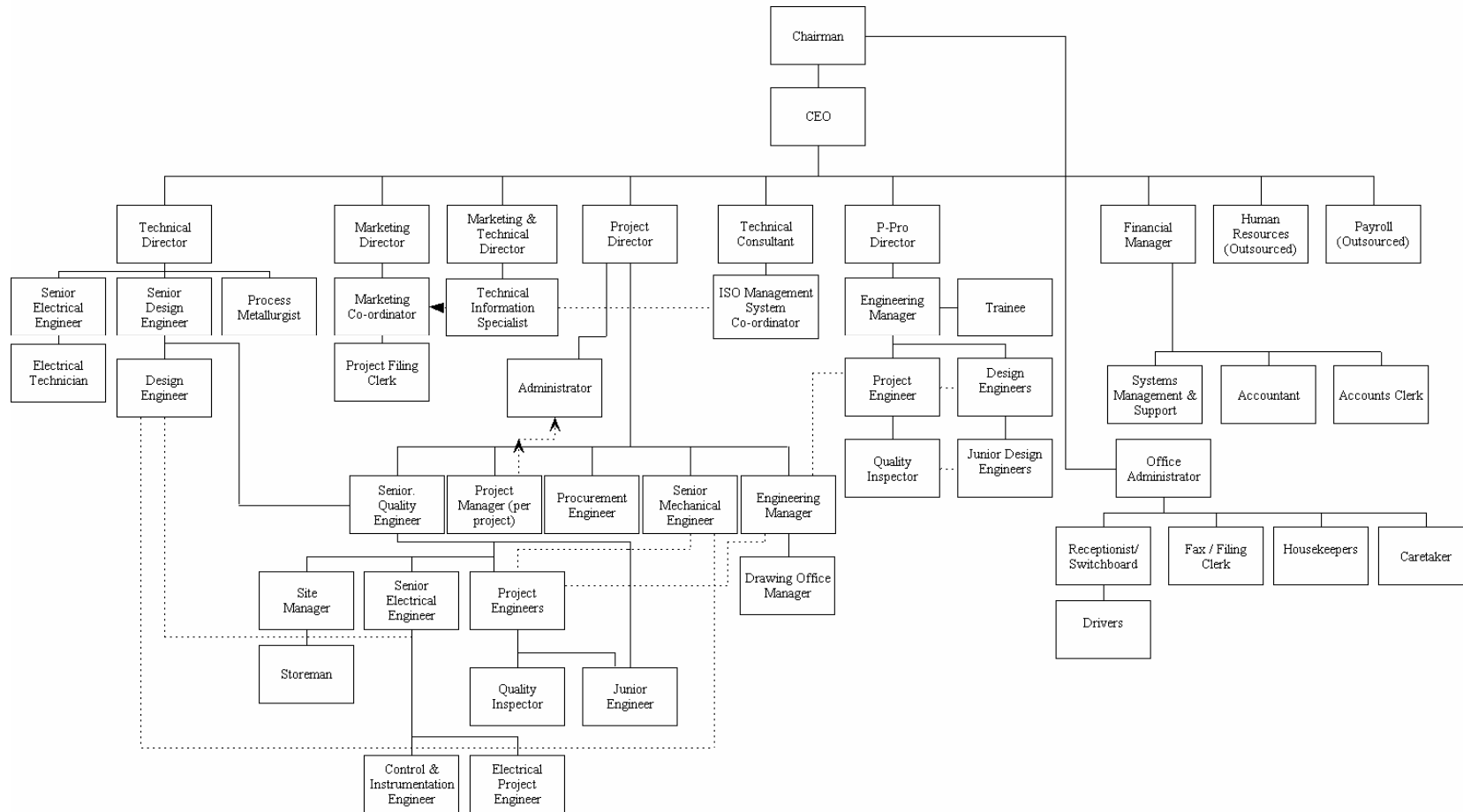


Figure 5-1 Pyromet Technologies - organogram

The most important component of the environment is the industry within which Pyromet competes, and the intensity and nature of the competition should be systematically analysed by examining threats of new entrants, rivalry amongst existing companies, the threat of substitute products or services, bargaining power of buyers and suppliers. The competitive intelligence function needs to develop a response profile of the competitor, i.e. what drives the competitor; what the competitor is doing and what the competitor can do.

5.2.2 Importance of competitive intelligence and environmental scanning to Pyromet's management

Competitive intelligence is the cornerstone of competitive strategy. Used effectively by management it becomes a prime source of power in Pyromet's bid to create competitive advantage.

Example: when the number one European manufacturer of electrode columns for submerged arc furnaces decided that this would no longer be an integral part of their core business, Pyromet decided to develop a more sophisticated product. Market intelligence was gathered through conversations with Pyromet's clients, competitors and fabricators to determine how the furnace electrodes could be changed to give Pyromet competitive advantage. Research and development was started, relying on clients' input as well as on knowledge from technical experts within Pyromet. An electrode column was developed proving that operating costs are reduced as a result of fewer component failures.

However this is not to say that other management functions and skill sets are of lesser importance,

Competitive intelligence serves to underpin decisions made by managers about the positioning of the business to maximise the value of the capabilities which sets Pyromet apart from its competitors.

It is not enough to rely upon internal factors alone as drivers of businesses, or of planning activities. While it is right to praise the virtues of customers or quality focus, competition has emerged as the key driver of strategic decision

making. As the role and the structure of strategic planning have evolved, so to have the information needs of managers. Competitive intelligence is seen as the means by which Pyromet can gauge the competitor objectives and strategies lying beneath the surface. This is illustrated through a noticeable increase in activity by Pyromet's competitors to penetrate the Asian market where Pyromet has already established a strong presence. Also through feedback from Pyromet's contacts in these areas indicating that Pyromet's competitors are finding it difficult to penetrate the market.

5.2.3 The need for an integrated strategic information management model

A decision was taken to investigate the implementation of an integrated information model to bring together all the bits and pieces of information throughout the company that could contribute to an integrated whole in order to assist management regarding strategic choices (How should we compete? Do we need to shift our paradigm to make it out there in an ever changing and competitive environment?).

It is not enough to rely upon internal factors alone as drivers of businesses, or of planning activities. Competition and the business environment have emerged as the key drivers of strategic decision making.

As the structure of strategic decision making changes, the information needs of managers also change. It has become the means by which the company can gauge the competitor end environmental objectives and strategies lying beneath the surface.

The traditional information management process has been in existence in Pyromet for many years driven by an information specialist. Over a period of time certain factors were identified as influencing information seeking activities, environmental scanning activities and competitive intelligence activities. These factors were identified as individual and organisational factors influencing the information related activities and will be discussed in the case study report.

The information specialist reports to the Director Business Development and is also an active member of the company's marketing team. The information specialist also wears the hat of ISO Management System Co-ordinator and is in this capacity responsible for the identification and mapping of the various business processes within Pyromet.

5.2.4 Methodology

In the context of this research, the case study was considered appropriate for providing a holistic approach to the study of environmental scanning and competitive intelligence in a medium-sized engineering concern operating in the pyrometallurgical industry. In creating the case study, several types of information were collected to contextualise and illuminate the core data regarding the environmental scanning and competitive intelligence phenomena within Pyromet

Little research has been done on the relationships between information management, environmental scanning and competitive intelligence. The net result of this is that the research that is available tends to be incomplete, reports are scarce and methods to study the subject(s) will vary. It was therefore decided to use the grounded theory research approach in the empirical survey, since grounded theory can be used where no general theory about the phenomenon exists (Correia, 1997). Grounded theory produces concepts which can be related / applied to the phenomenon and which in fact "intimately" describes the phenomenon being studied. In this case, grounded theory was used to highlight the processes associated with the environmental scanning phenomenon. The advantage of this is that a number of concepts can be identified and a clearer view be obtained on the factors per concept which play a role. The participants themselves also generate the factors, which places the responsibility of analysis on the researcher.

When considering the sample population to be used, applied resources from the following segments of contributors within Pyromet were considered:

- Pyromet resources employed in the actual day-to-day application of some of the functionality researched.

- Pyromet senior management, the interest of whom was directed at the potential results to be achieved.

A population of 8 employees (senior management and managers) were selected on the basis of their close involvement with the integrated information management model.

Personal structured interviews were held with all the respondents. Notes were taken and in response to the prepared questions were kept and typed up after the interviews.

After the interview, any additional information obtained during the interview was also included, as part of the original response from a respondent – giving a more complete picture of the respondent's observations.

5.2.5 Findings

5.2.5.1 Perceptions relating to the environment and information sources

The information that emerged from the sampled data (structured interviews with managers and observation by the researcher) provides an empirical basis for the articulation of an environmental scanning process (see addenda 1-3).

A questionnaire was used to first of all determine perceptions relating to the environment and information sources (addendum 1). It was explained to the respondents that environmental sectors included the customer sector, competition sector, technological sector, regulatory sector, economic sector and socio-cultural sector. A short definition of each sector was also given.

Information sources were categorised as business associates, information services, customers, competitors, trade associations, internal reports and studies, conferences, trips, internal memoranda, newspapers, periodicals, subordinate managers and staff.

Six respondents indicated that trends and events (addendum 1, question1) are of particular importance in the competition, technological and regulatory sectors. There has been an unexpected increase of new entrants in the

competition sector. The interesting fact here is that most of the owners of new entrants have been working in the industry for many years and have now decided to start-up new companies concentrating on one specific product relating to furnace building, i.e. electrode columns; closed furnaces compared to open furnaces due to increased environmental policies.

It was more difficult to pinpoint how regularly change takes place within each sector (addendum1, question 2). It was noted that regular change was more likely to happen within the regulatory and economic sectors.

All respondents were of the opinion that diverse factors (addendum 1, question 3) need to be taken into account when making decisions. Not everyone makes provision for this and are often caught unawares when factors outside of these sectors impact on the decision making process.

All respondents kept themselves informed about developments in the various environmental sectors (addendum 1, question 4) in so far as it would impact on their decision making ability. The marketing director keeps himself informed about developments within all the sectors, whereas the director projects are more concerned with development in the customer and technological sectors. None of the respondents were overly concerned with changes relating to the cultural sector.

Response to question 5 (addendum 1) varied from twenty minutes to two hours being spend on a daily basis doing environmental scanning.

Four respondents indicated that they used information about the environment on an ad hoc basis during the decision making process (addendum 1, question 6), while the others were not consciously aware that they did.

Information from customers, business associates, internal reports and studies, information services and sub-ordinate managers and staff are regularly used during the decision making process (addendum 1, question 7). Six of the respondents use information from reports and studies, the information service and sub-ordinate managers and staff on a daily basis.

The information sources used to scan the environment (addendum 1, question 8) were identified as newspapers (5 respondents); sub-ordinate managers and staff (6 respondents); internal reports and studies especially when putting together new tenders (6 respondents); business associates (5 respondents); conferences (3 respondents) and information services (4 respondents).

Information from business resources and customers (addendum 1, question 9) were identified by 5 respondents as being very useful and accurate. The same respondents also regarded these sources as being accurate and dependable (addendum 1, question 10).

Four respondents indicated that they did not spend much time on locating information sources (addendum 1, question 11) when concentrating on the sources relating to question nine and ten of addendum 1. Two respondents were of the opinion that it became more difficult to locate information resources when dealing with trade associations, conferences and competitors.

All respondents indicated that it was fairly easy to locate information from business associates, sub-ordinate managers and staff as well as from customers and the information service (addendum 1, question 12). Three respondents indicated that when difficulties are experienced in getting the desired information from the sources, the information specialist is asked for assistance.

5.2.5.2 Conceptual framework: the categories and the model for environmental scanning.

The information that emerged out of the sampled data (see addenda for structured interviews with managers) provides an empirical basis for the articulation of an environmental scanning process. The expression of this process implies the identification and description of a set of categories and relationships, which explain a significant part of the phenomenon under study. Those categories and relationships must be clearly defined and easily measurable, and the process itself should be meaningful for both the organisation and the information specialist.

5.2.5.2.1 Categories identification and factors influencing change within the environment.

Background information for the interviews was based on research done by Correia and Wilson (1997). The expression of the environmental scanning process implies the identification and description of a set of categories and relationships, which explain a significant part of the phenomenon under study (see addendum 2). These categories and relationships must be clearly defined and easily measurable, and the process itself should be meaningful for both the organisation and the information specialist.

Three main components are identified namely the categories (the core category and the subsidiary categories), the principal relationships among them, and the contextual factors that shape the categories and relationships. From an internal perspective, these factors include corporate history and culture. Contextual factors from an external perspective include political, cultural, economic and social conditions which characterise current South Africa, at least to a certain extent, and the smelting industry operating within that reality.

Environmental scanning was identified as the core category. To this was added a set of related subsidiary categories. This interrelated set of categories contributes to understanding how contextual factors - external and internal to Pyromet, would influence the environmental scanning activity, and also how perceived environmental change could affect strategic change within the organisation.

5.2.5.2.2 The external context

Perceived environmental change refers to the alteration in the pattern of events and relationships occurring in the company's outside environment, as perceived by managers, which may lead the company to adjust to the new conditions.

External factors perceived as causing change in the environment were identified as pertaining to two main categories: the regulatory framework and the business structure. The changes of a regulatory nature were linked to the

new Mining Charter, Black Economic Empowerment, bilateral trade agreements, government intervention, the economy, Nepad, African Union, international opportunities and joint ventures. The changes of a business nature were linked to the rand/dollar fluctuation influencing the price of ferrochrome as well as the impact of this phenomenon on the decommissioning of furnaces in South Africa., new entrants into the market and competition. In addendum 2, the numbers given in brackets identifies the issues raised by the respondents.

Analysis of the data of management's perceptions regarding environmental change, showed that the impact of co-operation with Black Economic Empowerment partners was evaluated mainly in terms of the changes in the regulatory framework, bringing in new rules and procedures to follow.

The government's intervention in the regulation of the market was not seen as a threat as the government currently have no say in the pricing of ferroalloys. A positive was seen in the involvement of the South African government in the African Union as up till now it has been difficult doing business in the rest of Africa due to economical and political change in these countries, even though there are great opportunities for doing business in these countries.

The opportunities of joint ventures with international companies and the possibilities of doing business on the Asian continents were also perceived as positive.

Changes in the business structure were described as varied, due to the acquisitions and mergers taking place, and also to the disappearance of smaller companies that sank under the pressure of competition, as a result of the trend for concentration that prevails in the ferroalloys industry.

Strategic change on the other hand refers to the alteration of the company's course of action in order to create new conditions or adapt to new conditions. The perceived environmental change-strategic change connection translates the decisive role of top managers' perceptions of environmental change upon their decisions to change their companies' course of action.

More than any other factor, the changeability of the environment proved to be determinant in the rejection of tight planning schemes, while the size of the company influences the adoption of planning (larger companies tend to engage in planning) but other factors interfere with that tendency, such as the form of the organisation and the management style or the dominant culture. There emerged no evidence that industrial segments or sub-sectors might influence the adoption of planning as a management tool.

Strategic change within Pyromet revolved mainly around increasing product quality, which involves continual improvement within all processes in line with the company's ISO certification. Measures for environmental protection is also becoming an issue and impacts on the design of the furnace roofs, i.e. moving away from open furnaces to closed furnaces.

Growth, diversification and internationalisation involve complex, risky and slow processes and are, therefore, more clearly associated with proactive behaviours.

5.2.5.2.3 The organisational context

Internal factors influencing the environmental scanning activity were identified as being of an individual nature and of an organisational nature. Internal factors of an individual nature refers to information awareness and individual exposure to information. Internal factors of an organisational nature refers to openness and information climate.

Information awareness was assessed through the attitude of top managers towards environmental scanning and through the communication pattern established among managers within Pyromet. All the interviewees agreed about the vital role of information related activities to Pyromet, but not everyone was sure who needed to take responsibility for the activity, and what needed to be done with the information once it was acquired. Environmental scanning is assumed as a personal responsibility and great importance is attributed to this activity, while the dissemination factor is irrelevant, because in most of the cases there is nobody else to pass the information to. Information awareness means the value attributed to information, and it is a

construct that emerged within the individual sphere but in the cross-section of the individual behaviour and the organisational way-of-doing things.

Communication is generally intense between the top manager and the various functional directors. Communication between the functional directors or marketing, technology and projects are very intense. Communication among managers is made up of a mix of oral information and written information. Oral communication has to do with the potential of the information for starting action. The Chief Executive Officer and the Chairman tend to use oral communication more than the functional directors, while these apparently use both forms, without favouring clearly one or the other. Sometimes both forms are used to convey the same information, the oral form being used for the first approach, followed by a memorandum or a report.

The information climate was assessed through the information infrastructure implemented, i.e. the processes, technologies and people used in information acquisition and handling. Pyromet has rich, centralised collections of scientific and technical information, managed by an information specialist, offering access to international online systems and providing selective dissemination of information and loan services.

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The information climate emerged within the organisational sphere as a set of conditions that determine access to and use of information. The information awareness - information climate connection translates the strong influence detected between the top manager's attitude towards information-related activities and the type of information climate established within Pyromet.

The openness of Pyromet was assessed through the company's links with research and development organisations for example Mintek, the collaboration with regulatory agencies (the National Electricity Regulator) and participation in development programmes. Research and design is carried out in-house while external laboratories are used for quality control purposes only.

Pyromet engages in collaborative actions with a view to influencing legislative and other regulatory initiatives, usually through the company's association with national and international bodies.

Managers' exposure to information was assessed through the development of their information networks. Training opportunities provided by Pyromet to other ranks of staff members was used as an additional way of assessing the exposure to information throughout the organisation. The performance of the liaison role by chief executives and other managers consists largely in the setting up of their external information system through participation within associations and at conferences.

Exposure to information emerged in this study as the individual face of the broader phenomenon of organisational openness, and proved to be difficult to detach and analyse on its own. This was determined, to a great extent, by the decision to target the organisation as the unit of analysis. Exposure to information refers to the frequency of opportunities of contact with well-informed people and information-rich contexts. It is rooted in the concept of boundary spanning personnel, as people establishing the connection between their organisations and the environment, as well as in the concept of gate keeping and information stars, and emerged as the individual face of the organisational phenomenon of openness. The openness exposure to information connection translates the determinant weight of the organisational capacity to relate to the environment, upon the degree of exposure to information of individuals.

Contrary to other small companies, all functional directors within Pyromet have a similar degree of exposure to information.

The organisational culture within Pyromet emerged as an important factor in the analysis of information issues within the company. The data available indicate that the type of information culture that prevails within Pyromet is that of an informal information culture (oral culture).

5.2.5.2.4 Strategies for managing environmental scanning

The segmentation of the external information environment used in this study includes competition (information concerning competitors, including their actions, decisions, strategies, plans, weak and strong points), market (all the information concerning markets, except competitor issues, clients' needs and

preferences, distribution channels, reaction to promotion, market potential, etc.), technology (all the information concerning present and potential product and process technologies), resources (information on financial, labour and raw material markets that affect goods, resources and services needed by the firm in order to carry out its operations), regulatory (all the information concerning regulations that can affect business operations, including information about regulatory agencies and personnel) and global issues (all the information regarding social, cultural, demographic, economic and political trends).

Managers consider competitive information very important, very difficult to obtain and use it very frequently; market information is also considered very important, it is used very frequently, and is found to be relatively difficult to obtain. Information on technology is considered relatively important, is used relatively frequently, and it is considered difficult to obtain. Information on resources are considered relatively important, is used relatively frequently, and it is not so difficult to obtain. Opinions regarding regulatory information were divided between not important and relatively important, easy or relatively difficult to find, and between rarely used and used with relative frequency. Global information is considered not important, easy to find, and it is used seldom.

The Chairman and the Chief Executive tend to make use of the company's information infrastructure in order to obtain the external information that they do not obtain by themselves, since the division of tasks is clear and the chief executive's time is precious.

Another factor that influences the preference given by managers to internal or external sources is the predominance of certain types of information culture, or the non-existence of an information culture. In Pyromet the informal and oral information culture leads to the establishment of direct contacts with external information sources.

Even though external information is collected by top management and the functional directors, the majority of information is collected by the information

specialist. Dissemination of the information is done by the information specialist, and can be in the form of reports, alerts, studies, graphs, presentations, etc. For example, the Chairman wants information on the worldwide pricing of industrial electricity for the last fifteen years in all the countries which produce ferrochromium. The information is presented to him as a graph, as this is the format that he prefers, and notes are added to indicate significant changes with reasons for the changes.

The functional role also influences the choice of internal or external sources. The Marketing and Project Directors usually give preference to external sources. On the other hand, the Financial Manager and Project Managers and other senior staff members such as the Engineering Manager, whose roles are mostly inward oriented, give more importance to internal sources.

Internal sources are viewed by most managers as filters of the information provided by external sources. The concept of internal sources as filters has a positive connotation, since internal sources are attributed an important role, that of selecting relevant information, thus saving the Chief Executive's time.

Some of the respondents stressed how the attributes between impersonal and personal sources complimented each other; impersonal sources meaning information that is in the public domain, or about factors which, in principle, evolve gradually, and also as means to feed an attitude of general awareness. While personal sources would convey specific information, meaning more or less secret information that cannot be found on printed sources and is transmitted only by word-of-mouth, or specific and detailed information that can help in clarifying ideas or implementing specific strategies.

Most of the managers interviewed manifested clear preference for personal sources. The arguments provided to justify this preference range from the greater reliability of the personal sources, to their role as the shortest way to the information needed or the last resource to get information that they could not find anywhere else. Finally, some comments seem to point to the role of

impersonal sources as a route to personal sources, which emerge as the desirable target.

Some managers established a relationship between the attitude of looking deliberately for information with the use of formal sources and the unexpected acquisition of information with the use of informal sources. Other managers established an important association between the notion of need - information need - and the starting of deliberate action to get the information needed.

Exposure to information refers to the frequency of opportunities of contact with well-informed people and information-rich contexts. It is rooted in the concept of boundary spanning personnel, as people establishing the connection between their organisations and the environment, as well as in the concept of gate keeping and information stars, and emerged as the individual face of the organisational phenomenon of openness. The openness-exposure to information connection translates the determinant weight of the organisational capacity to relate to the environment, upon the degree of exposure to information of individuals.

5.2.5.3 Requirements for an environmental scanning system

The most important findings from a survey to determine requirements for an environmental scanning system, (addendum 3) indicated that all respondents were in favour that a single analysis unit should not be responsible for environmental scanning and business intelligence (addendum 3, statement 5).

Six respondents indicated that analysis should be linked to the various functional units (addendum 3, statement 6) and that project teams with specific expertise should be formed to focus on specific environmental and competitive issues (addendum 3, statement 7).

Interesting to note that seven respondents disagreed with the statement that scanning is the responsibility of dedicated personnel (addendum 3, statement 11).

Five respondents disagreed that intelligence is equated to information (addendum 3, statement 17) while six respondents indicated that they preferred obtaining information from human sources.

5.3 The integrated information management process model

To start off the process an information audit was undertaken to determine what strategic and environmental information was held and in what format. It was found that at least 75% of what was needed was stored somewhere electronically. This was scattered through a number of databases and personal computers throughout the company.

At the initial stage the employees were not interested in answering specific strategic questions, but agreeable to determine how a system should be designed able to cater to their specific needs. It was decided to do an information needs analysis covering a broad range of topics.

Items that were included for the information needs analysis were: major customers, sales, market share, financial information, process information, product information, advertising, R&D expenditures, organisation and strategic plans. It was known that not all information will be available but this was not regarded as a big issue.

Information that could be collected was filed in appropriate existing systems and catalogued in databases where necessary. Areas that were particularly lacking - very little information about pricing strategies and strategic plans – were added to a new list of information that needed to be collected. An ongoing program has been initiated to pick up these items.

To start off the process for an integrated model, answers had to be found to the following questions: How is information, competitive intelligence and environmental scanning used within Pyromet? How should it be used?

Two key elements must be contained regarding the model to make it actionable (i.e. for action to be taken on it). First, information should include

likely and relevant future developments and secondly there must be a direct link between the information product and manager's responsibilities.

The integrated model (adapted from Pyromet's competitive intelligence strategy) of information management (Figure 5.2) outlines six information processes that bootstrap the intelligent organisation's capacity to learn and adapt.

A set of critical information needs may be defined, i.e. the information required by management to plan and decide about organisational strategies, projects and programs, These critical needs as set out in tables 5.1 to 5.3 were identified.

Initially table 5.1 was compiled to indicate information needs relating to environmental scanning, but was later also utilised for determining critical information needs. The horizontal axis indicates the different products for which smelting solutions can be supplied, while the vertical axis indicates all the processes involved. The numbers indicates how many people identified that specific area as a critical information need. When this survey was used to determine critical information needs, senior engineers and project managers were also included as they need the information when compiling client contracts, putting together client proposals or doing feasibility studies.

A competitive needs assessment was done relating to competitive intelligence and new products. Key intelligence needs (KIN's) were identified as SWOT analysis, market forecasting, market scanning, market definition, strategic development or positioning, competitive analysis, market foresight and internal company learning assessment (see table 5.2). From these key intelligence needs, key intelligence questions were identified for the various KIN's.

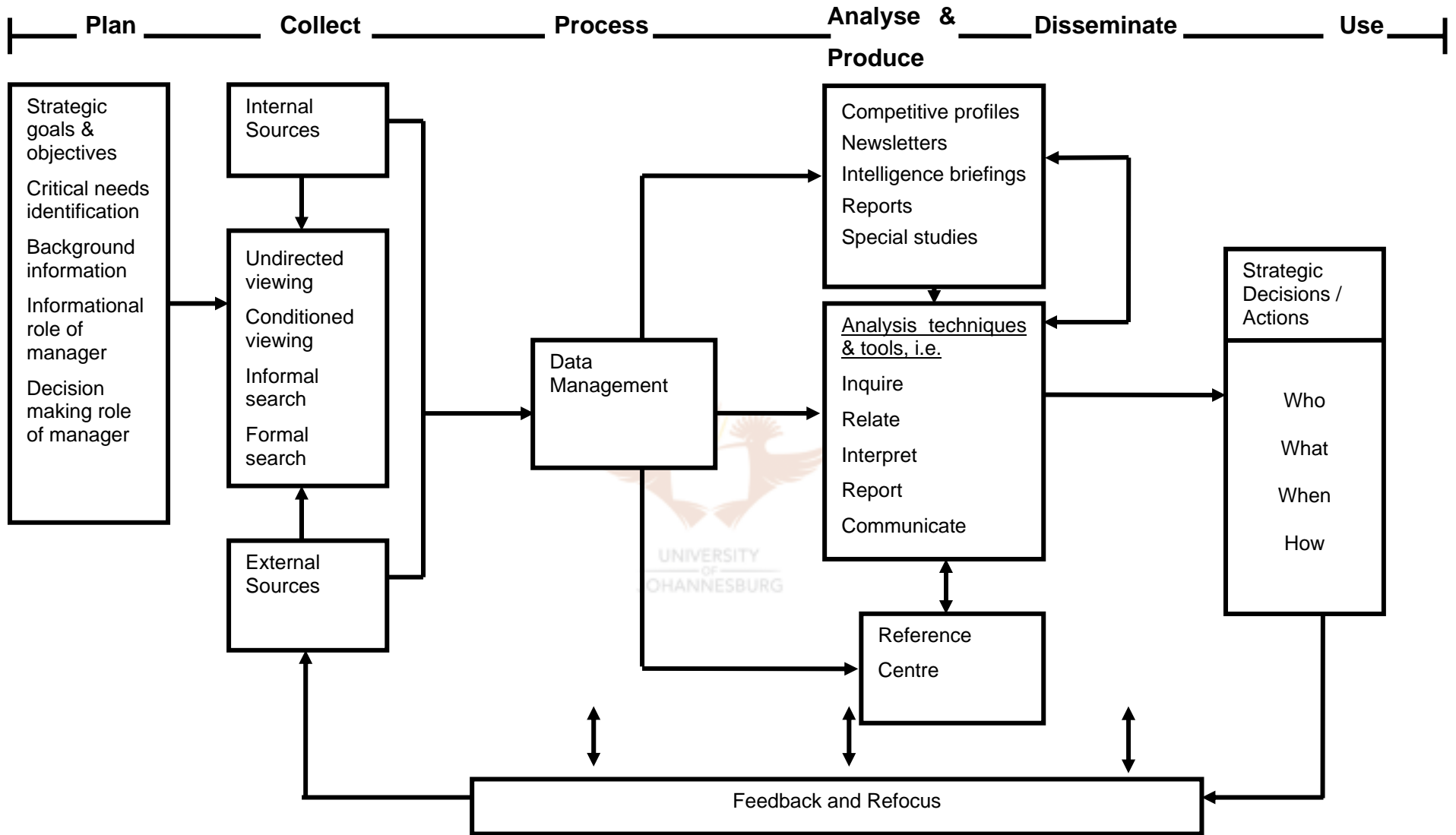


Figure 5-2 Pyromet's integrated information management process model

Table 5.1 Environmental scanning needs assessment

		PYROMET TECHNOLOGIES - ENVIRONMENTAL SCANNING NEEDS ASSESSMENT																
		PRODUCTS																
PROCESSES	General	FeCR	FeMn	FeSi	SiMn	Ni	Cu	Pt	FeNi	Co	Steel	Iron - EF	Iron - BF	Zn	Al2O3	Al	TiO2	SiC
Furnace Sizing	3	4	2	3	2	1	1	1	1			1					1	
Transformer Sizing	3	4	3	3	3	1	1	1	1			2		1	2		2	2
Electrode and Secondary Power sizing	2	3	3	3	3	1	1	2	1	1		1					1	1
AC Furnaces	2	5	3	3	3	1	1	2	1	1	1	2		1	1		2	
DC Furnaces	2	3	1	1	1									1	1		2	1
Process design	3	1	1	1	1	1	1		1			1						2
Mass & heat balance calcs.	3	1	1	1	1	1	1	1	1			1					1	
PYROSIM models	3	1	1	1	1									1	1		1	
General furnace design	6	3	1	2	1													1
Mechanical design	9	2	1	2	1													1
Roof design	3					1		1										
Electrode equipment design	4																	
Gas plant design	4	1	1	1	1													
Baghouse design	4	1	2	1	2													
Venturi scrubber design	1																	
Cyclone design	4																	
Fan sizing	4																	
Furnace extraction hood design	2							1										
Furnace hood design	2	1	1		1			1										
Ducting design	2																	
Gas combustion calculations	5		1															
Trombone cooler design	2		1		1													
Water cooled ducting design	2																	
Electrical design	4																	
Furnace transformer design	2																	1
Electrical protection design	2																	1
Bustube layout	1	1		1														1
Bustube sizing	3																	
Refractories design	1	2		1		1		1				1	1		1			
Refractories installation		1																
Taphole design	3					1		1				1	1					
Copper cooling	4	1	1	1	1	1		1				1	1		1			1
Cooling water system	2	1				1	1	1				1	1		1			1
Pump sizing	4					1	1											
Valve selection	4					1	1											
Flexible selection	3					1	1											
Pipe networks	5					1	1											1
Slag granulation	3							1										
Matte granulation	2																	
Metal granulation	2	1																
Materials handling	3	1																1
Conveyor design	2	1																1
Silo design	2																	
Chute & feed chute design	2																	1
Gearbox sizing	3																	
Motor sizing	4																	
Instrumentation	5																	1
SCADA system	5																	
Furnace load control	3																	1
PLC	4																	1
Batch mix calculation and control	2	1																
Structural engineering	2																	1
Materials & welding	2																	
CFD	1																	
FEA - Mechanical	2																	
FEA - Electrical	2																	
FEA - Structural	1																	
Project Management	7	1	1	1	1													
Cost Engineering	5	1	1	1	1													
Procurement	3	1	1	1	1													
Exporting & shipping	1																	
Contracts setup	1																	
Contracts admin	1																	
Knowledge management	1																	
Quality control specification	1																	
Quality control	4																	
Design Control (Hazop studies)	1																	

Table 5.2 Competitive Intelligence needs survey – existing competitors

COMPETITIVE INTELLIGENCE NEEDS SURVEY – EXISTING COMPETITORS	
<p>Purpose:</p> <ul style="list-style-type: none"> • To identify Competitive Intelligence (CI) needs • To obtain ideas and suggestions on how to best develop an intelligence capability for Pyromet 	
I. Intelligence Needs: Your Key Intelligence Needs (KINs)	
A. Decision making / Operational Responsibilities	<ul style="list-style-type: none"> • Planned / future decisions or actions • Strategic plans and related actions • Strategy formulation and implementation
B. Early-warning intelligence	<ul style="list-style-type: none"> • Examples of “past” surprises • Concerns about company; industry; government; etc. • Competitors: their actions and intent
C. Players: Competitors, Customers, Suppliers, Others	<ul style="list-style-type: none"> • Which players are you most concerned about? • What types of information and intelligence do you need? • How would the information and intelligence be used?
II. Intelligence Capabilities and Uses	
<ul style="list-style-type: none"> • What experience/familiarity do you have with intelligence? • What types of intelligence do you currently receive? • What intelligence capabilities does Pyromet have? • Who in Pyromet do you expect to be regular users? • Any barriers to sharing intelligence? • What types of intelligence products would you like to receive? (e.g., field reports, analytical alerts, competitor and competitor product assessments, intelligence briefings, etc.) • How should Pyromet’s intelligence system be organised? • How will you evaluate the intelligence that you receive? 	

(Pyromet Technologies, 2004)

Another competitive needs assessment was carried out for existing competitors as indicated in table 5.3. The purpose of this survey was to identify competitive intelligence needs and to obtain ideas and suggestions on how to develop an intelligence capability for Pyromet. Key intelligence topics were identified relating to decision making, operational responsibilities, early-warning intelligence and competitors, customers and suppliers. Questions were asked to indicate the users' exposure to and familiarity with the process of competitive intelligence.

The system's information collection component gathers information from a wide range of internal and external sources. Every employee and functional department is a potential collector and source of information. These efforts were to focus directly on management's needs. Each functional area was surveyed to determine what categories of information, competitive intelligence and environmental information was already gathered. A centralised function was then set up to co-ordinate the compiling and cataloguing of this information. During this process all incoming information is evaluated for urgency, usefulness and reliability. Urgent information is routed directly to the right users.

On information collection, it is urged that the selection and use of sources be planned systematically and purposefully, just as one would do with any other vital organisational resource. New sources proliferate and existing sources evolve so rapidly that continuous monitoring and evaluation become necessary. A general planning premise is that sources should have sufficient variety to reflect the range and diversity of external phenomena. Information acquisition planning could consider the creation of an organisation-wide information-gathering network and a database directory of experts that includes people and specialists from all levels and functional areas. Where information needs to be filtered this may best be done by humans; filtering is an intellectual activity that requires detailed knowledge of the organisation's business.

Table 5.3 Competitive intelligence needs assessment -
new product development

KEY INTELLIGENCE TOPICS	KEY INTELLIGENCE QUESTIONS
SWOT ANALYSIS	<p>If we were to develop a new product market, which of our competitors will wish to compete in this new market? What are their strengths and or weaknesses? How long will it take them to enter the market? How would we need to compare for this competitive market? Which competitors are quietly positioning themselves as real or potential competitive threats? How can we identify competitors who may enter from alternate markets? Which alternate markets may have players capable of entering this growing market? How long might it take them to enter this market?</p>
MARKET FORECASTING	<p>Is there a possibility that future competition could come from another industry? From overseas? In what form? Have we developed a clear marketing forecast? Are we now preparing for the future by seeking the next market (looking for market indicators)?</p>
MARKET SCANNING	<p>During the growth stage of a new product is the form, quantity or intensity of competition going to change? Is there still scope for growth in the existing market? If we introduce new products, how quickly is the market going to grow? For how long? Are alternate products going to appear on the market – possibly taking market share?</p>
MARKET DEFINITION	<p>Have we clearly identified our market? Have we developed a long-term market view?</p>
STRATEGIC DEVELOPMENT OR POSITIONING	<p>What measures have our strongest competition used to position themselves in this established market? What new competitive strategies could be most profitable to us and most surprising to our competitors? What types of product modifications might help us to gain market share against our competitors? If we were to introduce a new product, how can we maintain our competitive market edge? Can we also be the first company to introduce the next product? Why? If we did not introduce a new product how can we compete in this market? How can Pyromet protect itself against premature market decline?</p>
COMPETITIVE ANALYSIS	<p>How is industry and individual corporate growth going to affect competition? What competitive strategies are our competitors going to use to gain market share?</p>
MARKET FORESIGHT	<p>How can Pyromet develop foresight to identify future markets? Are we positioning ourselves to compete in tomorrow's market? Likewise, are our competitors moving out of the current market? Why or why not? Are our competitors moving into the next market? Why? Which firms are taking a leadership role in defining future markets? How?</p>
INTERNAL CORPORATE LEARNING ASSESSMENT	<p>What competitive insight has our firm acquired about the market environment? How can we use this in future markets or other product divisions?</p>

(Pyromet Technologies, 2004).

Computer-based systems for information processing should not only be efficient in terms of resource utilisation and response times, but could also provide greater flexibility and information relevance. Users should be able to mine for the insights they need to make decisions from the accumulated operational data. Textual and other unstructured data are key information resources and should be stored and structured so that users can search for them using multiple representations and criteria. Text information management and text retrieval applications are likely to become as important as data management. An integrated records management and archival policy should enable the organisation to create, preserve and learn from its corporate memory and organisational history.

During the analysis and production stage, information is compared and collated, interpretations are made, implications are studied and alternative responses are considered. Internal and external experts contribute to the analysis process. The goal is shifted from answering questions to assisting users in solving their problems. To do so the analysis and the end product should provide information which content, format and orientation address the contingencies that affect the resolution of each problem or class of problems.

The dissemination component packages the analysed information into information products that are distributed to management and others. The new information may change strategies and plans, resulting in a continual cycle of setting information needs, collecting and analysing information.

Information dissemination and sharing is the precondition for perception and learning. A wider distribution of information promotes more widespread and frequent learning, makes the retrieval of information more likely, and allows new information to be created by combining or relating disparate items. Information dissemination should integrate well with the work habits and preferences of the users. Users themselves could be encouraged to become active partners of the distribution system - it should be easy for them to evaluate, comment on, and share the information they have received.

5.4 Evaluation of the integrated model at Pyromet Technologies

This integrated model has only been functioning for a short time. In two years time a more detailed evaluation would be possible as the researcher is of the opinion that this is how long it will take for the system to be up and running smoothly.

5.4.1 Strengths of the integrated model

- The main strength of the success of the system up to now has been the fact that top management supports the initiative and understands that it takes time for the model to be developed in totality. It is also not just another staff function.
- The model is customer driven, in this case top management. The tasks are focussed.
- Information gathering is the responsibility of everyone within the company. It is not easy getting people to understand the importance of information, especially if there exists a feeling that they are not benefiting directly from it.

5.4.2 Weaknesses of the integrated model

- Too much emphasis has been placed on collection, most probably because it is part that is the easiest to do. This leads to no or very little value being added.
- Educating people within the company to share information is still quite a challenge as there has been a culture in certain functional areas where the sharing of information does not come easily. Staff collects information but does not always share it with others nor do they care how they store it as long as they can access it for their own use. Through internal training programs they will have to be taught that what they know can help the company as a whole. A process of information sharing has already started through monthly presentations where the experts in the company imparts knowledge relating to their field of

expertise. Everyone in the company should learn firsthand the power of information, competitive intelligence and environmental scanning even if they do not contribute to the melting pot of information. Even if they only take information, the system has worked partly.

- As individuals have their own methods and techniques to collect information, guidelines should be established regarding these methods and techniques.

In the intelligent, knowledge-based organisation, information management aligns well with the organisational mission and goals. Just as organisational strategy and objectives must not remain static but regenerate from time to time, the information management function itself must respond to change and new demands, and seek constant adaptation and innovation. Designing the information management architecture becomes a critical component of an organisation's strategic envisioning and planning process.

Since the use of information usually takes place in the context of a task or problem situation, it is helpful to recognise that information needs consist in two distinct parts, namely what information is needed and why the information is needed and how it will be used. Depending on the information use requirements, information could elaborate on existing goals or suggest new directions. It can help define problems or make assumptions explicit. Identifying information needs therefore not only involves determining the topics of interest to the user, but also the attributes of the information to be provided that will enhance its value and usefulness.

In developing information services and products, the objective should be to provide relevant information to the user as well as to provide information in a form that will increase the usability of the information. Information should be presented so that the content, format and orientation address the situational requirements that affect the resolution of the problem.

The organisation's information structures and processes will have to be open, flexible and as vigorous as the processes they support. Information managers

and specialist should be participants in decision processes to enable them to understand the information needs that emerge as the process unfolds.

5.5 Guidelines for developing an integrated process model

5.5.1 Understanding the existing information flow

- Spend time early in the strategic information system design process to learn about existing information systems within the company. These can reside with management, the marketing team, project, etc. As many of these systems were designed largely to produce paper reports and to support a different set of managerial decision needs, they could be awkward to work with. It is critical to understand where the business critical information exists, who creates, controls and uses it.
- Complete an information audit to obtain a roadmap of the information infrastructure and a summary of the uses of the information.

5.5.2 Planning and focus

- Understand why a strategic information management systems is being implemented.
- Develop a system that fits the company's strategic information needs.
- Make sure to deliver what is required.
- Decide whether all activities should be done in-house or whether some could be outsourced.
- Let employees know what to collect and how to share what they collect.
- Design a strategic information structure and strategy.
- Decide on a budget.

5.5.3 Needs identification

- Identify and elicit the strategic information needs of decision makers exactly.
- Develop effective communication and interviewing skills.
- Know the company structure, culture and environment.
- Remain objective at all times.
- Conduct an information resource gap-analysis.

5.5.4 Information collection

- Obtain knowledge of primary and secondary sources and ensure that it is the right information.
- Know how to assess internal and external sources. Use credible sources.
- Recognise anomalies in the information through ensuring reliability and validity of sources.
- Develop formal research skills.
- Collect information according to corporate information gathering patterns.
- Know who in the company are the experts.

5.5.5 Analysis and synthesis of information

- Employ inductive and deductive reasoning.
- Obtain an overview of basic analytical models.
- Know when and how to use analytical tools, for example trend analysis, risk assessment, event analysis, personality profiling, etc.
- Get the right people to analyse the information.
- Ensure that value is added to information. Do not present rehashed information.

5.5.6 Communicating the strategic information

- Use persuasive presentation skills.
- Use the format or media appropriate for each end-user.

5.5.7 Contextual and management

- Define the strategic information/ intelligence function.
- Discuss the importance of a learning organisation.
- Identify the strengths and weakness relating to information sharing within the company.
- Discuss ways of marketing strategic information within the company.
- Occasional in-depth analysis is of little use. This is not an ad-hoc activity, but an ongoing process.
- Get a champion within the management team.

5.6 Conclusion

When information management, environmental scanning and competitive intelligence is treated as business processes then it is possible to develop an integrated information management model. Information as a strategic resource should be the departure point for the integrated process to function to its full advantage.

It is not enough to rely upon internal factors alone as drivers of businesses, or of planning activities. Competition and the business environment have emerged as the key drivers of strategic decision making.

As the structure of strategic decision making changes, the information needs of managers also change. It has become the means by which the company can gauge the competitive and environmental objectives and strategies lying beneath the surface.



CHAPTER 6

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

6.1 Introduction

The work of managers is information intensive. Managers receive a huge amount of information from a wide range of sources and use the information to make day-to-day decisions and to formulate longer-term strategies.

The goal of information management is thus to harness information resources and information capabilities to enable the organisation to learn and adapt in an ever-changing environment.

One of the greatest challenges facing an organisation is to understand how the external environment is changing, what the changes mean, and how the organisation can best respond to the new provisos. The process of learning about the external environment is known as environmental scanning.

Key information processes were assessed with reference to special problems of managing each process. At the same time the opportunity for change was highlighted by combining an understanding of information use behaviours with a more flexible, user centred design of information services and systems.

Although organisations may be experiencing an information glut, there is often a lack of knowledge to elucidate their choices and actions. A sufficient number and variety of information sources need to be activated in order to accurately reflect the span and sweep of external occurrences. Access to specialised sources need to be identified and ways suggested of matching sources to information needs.

Competitive intelligence on the other hand is the systematic process of gathering and analysing information about the activities of competitors and general business trends to further the organisation's goals. All definitions point toward creating knowledge from openly available information by use of a systematic process involving planning, collection, analysis, communication and management which results in decision-maker action. While competitive

intelligence incorporates knowledge management processes of collecting and storing information, competitive intelligence definitions also talk more about the actual analysis of the data.

A problem arises when information management is separated from the knowledge-based functions of business environmental scanning and competitor intelligence. As all three these processes are fairly similar the question can now be asked whether there is a role for information management in environmental scanning and competitor intelligence.

6.2 An integrated information management model.

6.2.1 Summary

In chapter 2 the sub-problem of information management as a process was discussed to determine whether managers are information seekers and information users. Criteria for a successful information management process was touched on and a case was made that integration between business strategy and information management is possible.

It was found that managers are information users and managerial work highlights the following implications for information management:

- Information management must recognise informal and formal information sources and information flows both internal and external to the organisation (Kirk, 1999).
- Information management needs to enable managers to integrate business strategy and information
- Information management has the potential to contribute to the effectiveness of managers in their diverse organisational roles.

Information management should seek to meet the information needs of managers and enhance their information capabilities.

The process model discussed in this chapter depicts information management as a continuous cycle of six closely related activities: identification of information needs; information acquisition; information organisation and storage; development of information products and services; information distribution; and information use (Choo, 2001).

The integration of information and business strategy presupposes a learning organisation which is team based. Managers as domain experts are able to use and create information and knowledge so that both information and business strategy are embedded in the innovations, products, processes or services developed by the team (Kirk, 1999).

It is in their daily work that managers have opportunities to integrate business strategy and information. In the knowledge creating company (Nonaka, 1991:103) there is a continual shift in meaning as new knowledge is diffused through the organisation. At times the confusion created by this shift escalates to ambiguity and even chaos which can lead to fresh insights and a new sense of direction. The job of managers is then to "orient this chaos towards purposeful knowledge creation" (Nonaka, 1991:103). Most senior managers articulate metaphors, symbols and concepts about the company's future, middle managers orient the chaos with their co-workers on company teams. In the learning organisation, middle managers make explicit the tacit knowledge of senior managers and their co-workers and incorporate it into new technologies and products. In this sense, managers are knowledge engineers. In other words, middle managers and their teams create information as an object on the basis of the information constructs of others (Nonaka, 1991:103).

The evaluation of information management needs to take into account different views on information and the evaluation process needs to include also information as a construct and information processes. One approach to the evaluation of information management could be based on the processes of information management discussed earlier. Another approach might be based on innovations in the organisation and might include consideration of the information capabilities of managers and their co-workers (Kirk, 1999).

Information management has multiple meanings. Its meanings are shaped by different perspectives on information, on organisations and on the work of managers. Information management has the potential to transform organisations but only when information and business strategy are integrated.

In chapter 3 the question on whether environmental scanning relates to information needs, information seeking and information use behaviour was discussed. An overview was given of the criteria that makes up the environmental scanning process and the relationship between environmental scanning and information management was indicated.

It was found that for organisations wanting to encourage their members to scan more pro-actively, both the level of analysing the environment and the level of organisational intrusiveness need to be raised.

In chapter 4 the sub-problem of the competitive intelligence process was discussed. It was found that the critical success factor in any intelligence operation is that of meeting the user's real needs. Needs identification is not an easy task and the identification of management's intelligence needs is possible through using the process of Key Intelligence Needs.

In chapter 5 an integrated information management model was proposed which would bring together all the bits and pieces of information throughout Pyromet Technologies that could contribute to an integrated whole to assist management regarding strategic choices and decisions.

External and internal organisational factors that could be perceived as causing change in the environment were identified through interviewing management.

To start of the process for an integrated model, answers had to be found to how information, competitive intelligence and environmental scanning were used within Pyromet and also how it should be used.

Information is sought and used throughout the entire decision process, not just at the start or during a few narrow activities. The intensity of information use, however, does vary according to the decision phase, with the greatest

amount of information resources being consumed during the development phase in working out solutions or elaborating opportunities.

6.3 Conclusion

Key factors for success of information management in organisations reinforce the need for the integration of business strategy and information. The key factors are the relationships with customers and suppliers; flatter management structures and better use of resources; training and quality and environmental issues. Each of these factors rests on information, its use, creation, storage and distribution.

One of the greatest challenges facing an organisation is to understand how the external environment is changing, what the changes mean, and how the organisation can best respond to the new provisos. The process of learning about the external environment is environmental scanning, i.e. the art of gathering and interpreting information about the environment enabling the organisation to have the knowledge to develop effective courses of action.

The basic goal of information management is to harness the organisation's information resources and information capabilities to enable it to learn and adapt to its changing environment. Information creation, acquisition, storage, analysis and use therefore provide the intellectual framework that supports the growth and development of an organisation.

It is possible to develop an integrated model if everything centres on strategic decision making.

6.4 Recommendations

Improvements and changes to the integrated model will centre mainly on the question on who needs to take responsibility for information related activities and what needed to be done with the information once it was acquired. Attention should also be paid to improving the dissemination of environmental scanning information. This information should be passed on, and should not reside only with the person performing the environmental scanning activity.

The value of information should be as important as the environmental scanning activity itself.

It is also recommended that the informal information culture develops into a more formal culture, in other words that the majority of information is not only passed on orally, but that a more formal means of conveying information is found.

Further research could be undertaken to determine whether integrated strategic information models exist within the engineering/project management industry in South Africa, and how such models differ between smaller and larger companies.



ADDENDA

Addendum 1

QUESTIONNAIRE TO DETERMINE PERCEPTIONS RELATING TO THE ENVIRONMENT AND INFORMATION SOURCES

Note:

Environmental Sectors

The external environment may be divided into the following sectors, namely customer sector, competition sector, technological sector, regulatory sector, economic sector and socio-cultural sector.

Information Sources

Business associates, information services, customers, competitors, trade associations, internal reports and studies, conferences, trips, internal memoranda, newspapers, periodicals, subordinate managers and staff.

1. Are trends and events in each environmental sector important?
2. How regularly does change take place within each sector?
3. Do diverse factors need to be taken into account during the decision making process?
4. Do you keep yourself informed about developments in the various environmental sectors? To what degree?
5. During a working day, how many hours do you spend on scanning?
6. Do you use information about the environment in your decision making activities? How frequently?
7. How frequently do you use information about the environment from the information sources when making decisions?
8. Which information sources do you use to scan the environment?
9. How useful is the information from the various sources with respect to Pyromet's activities?
10. How authoritative and dependable is the information from the various sources about the environment?
11. How much time do you spend on locating information sources?
12. How easy is it to get the desired information from the sources?

ADDENDUM 2

SURVEY TO DETERMINE THE REQUIREMENTS FOR AN ENVIRONMENTAL SCANNING SYSTEM WITHIN PYROMET

	Agree	Unsure	Disagree
1. A distributed network of specialists is responsible for information scanning and analysis.	1	4	3
2. The network of specialists scans selected journals, newspapers and magazines.	2	4	2
3. Analysis of the collected information is distributed to internal focus groups for discussion of issues relating to the changing industry environment, as well as competitors' strategies and success factors.	4	2	2
4. Participants in the focus groups are drawn from various functional areas to ensure diversity of background and specialisation.	3	2	3
5. A single analysis unit is responsible for environmental scanning and business intelligence.			8
6. Analysis is linked to specific functional areas, for example development monitors technology and product development.	5	3	
7. Project teams are formed with particular expertise to focus on specific environmental and competitive issues.	6	1	1
8. From time-to-time joint presentations are organised around a specific theme or competitor.	5	3	
9. Formal, multi-member analysis units exist.		2	6
10. Scanning is undertaken on an ad-hoc basis (to increase understanding about a specific event); re-actively (as an appropriate response to the market situation); pro-actively to predict for a desired future.	5	2	1
11. Scanning is the responsibility of dedicated personnel.		1	7
12. During information gathering the emphasis is on traditional sources such as journals, newsletters, electronic databases, patent information and external experts.	6	2	
13. Information analysis, evaluation and integration is done by end-users more than by the information specialist.	2	2	4
14. Local and international consulting companies, banks and diplomats are approached during information collection.	5	3	
15. The use of internal sources for market related information is important.	7		1
16. External sources used are newspapers, industry press, online databases and annual reports.	5	2	1
17. Intelligence is equated with information.		3	5
18. In obtaining information do you prefer human, textual or online sources?	6 indicated human sources 2 indicated textual sources		

ADDENDUM 3

ENVIRONMENTAL SCANNING: CATEGORIES IDENTIFICATION & FACTORS INFLUENCING CHANGE WITHIN THE ENVIRONMENT

Context	Factors	Issues (as identified by respondents)
External Context	Regulatory	<ul style="list-style-type: none"> • Mining charter (3) • Black business Empowerment (5) • Bilateral trade agreements (1) • Government intervention (3) • Economy – R/\$ fluctuation (4) • Nepad (1) • African Union (3) • International opportunities (4) • Joint ventures (2)
	Business Structure	<ul style="list-style-type: none"> • New entrants (5) • Competition (4)
	Strategic Change	<ul style="list-style-type: none"> • Company structure (3) • Planning (4) • Product Quality (5) • Continual improvement (4) • Environmental management (3)
Organisational Context (internal factors)	Factors - individual nature	<ul style="list-style-type: none"> • Information awareness (Personal responsibility) (3) • Information exposure (4)
	Factors – organisational nature	<ul style="list-style-type: none"> • Openness (4) • Information climate (communication) (5) • Exposure to information (4) • Organisational culture (5) • Internal sources (3) • External sources (2) • Personal sources (5)

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