

# Environment Intelligence: An Innovative Information Service

*Shaheen Majid*

*Christopher Khoo*

*Nanyang Technological University*

## **Abstract**

Libraries are continually developing innovative and creative services to keep pace with the fast changing society. ICT developments, particularly those providing easy access to information on the Web, have considerably increased the expectations of library users, who expect the same speed, breadth, and comprehensiveness in information services provided by libraries. To meet these challenges, libraries are coming up with specialized, innovative and value-added information services, such as provision of environment intelligence. This paper introduces the concept of environment intelligence and its scope, and discusses how environmental knowledge can be used for problem solving, developing new initiatives, tactical and strategic planning, and organizational learning and restructuring. This paper also provides an overview of efforts made by library and information education programs in imparting new competencies to their graduates for undertaking environmental scanning and other related activities.

**Keywords:** Environment intelligence, information service, innovation, library schools, competencies

## Introduction

Library and information science (LIS) is a multi-disciplinary and dynamic field which adapts rapidly to technological and social developments, and keeps pace with emerging ideas and technologies. The willingness of library and information professionals to proactively accept changes and venture into new knowledge territories is helping the LIS discipline to stay relevant and useful in the fast changing society. Other factors that are driving innovation and creativity in LIS, are the popularity of the Web as an alternative source for information acquisition as well as competition from non-library agencies now involved in information provision. In recent years, library and information professionals have readily embraced and contributed to certain new disciplines and technologies such as digital libraries, RFID applications, developing taxonomies and metadata, Web archiving, organizational repositories, human-computer interface, web-intelligence, mobile reference services. On one hand, these pioneering initiatives have helped the LIS discipline to continue contributing to human knowledge; on the other hand, they have enabled the LIS discipline to create new job opportunities for its professionals. These successes have given encouragement and confidence to library and information professionals to explore new opportunities and undertake non-traditional information dissemination activities. One such information-intensive application, which has recently captured the attention of LIS professionals, is environment intelligence. In the literature, the terms 'environmental scanning' and 'environment intelligence' have been used interchangeably.

## What is Environment Intelligence?

Environment intelligence is an encompassing concept covering disciplines such as competitor intelligence, competitive intelligence, business intelligence and social intelligence. It is important to understand and distinguish environment intelligence from 'intelligence' related activities undertaken by spy agencies. Environment intelligence is the collection of information about events and changes happening in the external environment of an organization by using legal and ethical information gathering channels and techniques. The external environment here refers to relevant social and physical factors outside the typical boundaries of an organization which may affect its performance and future survival (McGee & Sawyer, 2003). According to Albright (2004), environment intelligence focuses on the identification of emerging issues,

trends, events, and potential dangers that may affect an organization's future. The information collected through environment intelligence can be used for evaluating the organization's strengths and weaknesses in response to external threats and opportunities. In other words, environmental scanning is a process of identifying, collecting, processing and translating information about external influences into useful plans and decisions (Hough, 2004). Continuous and systematic environmental scanning enables an organization to avoid surprises and gain competitive edge over its competitors through timely and effective decision-making.

## **Importance of Environment Intelligence**

Employees in a an organization need high quality, up-to-date, relevant and accurate information for performing their daily tasks, for decision making, considering new initiatives, undertaking key projects, and doing tactical and strategic planning. Libraries and information units in these organizations develop their information resources, services and facilities to meet these information needs. Traditionally, many libraries focus on collecting and providing access to traditional information sources such as online databases, monographs, magazines, institutional annual reports, and reference materials. A weakness of these information sources is that they are usually produced for a broad range of audience and may not satisfy the information needs of a specific organization. Many organizations, in addition to traditional information provision, need sharply focused and context-specific information which is directly relevant to their activities and operations. One such information need is the knowledge of what is happening around an organization. What are their competitors doing? How technological developments are expected to affect their products and services? How will changes in government policies affect their business? Most of these questions can be answered through an effective and systematic environment intelligence effort.

Organizations have always been collecting information about their external environments for improving their operations and for developing future business strategies. However, in recent years, environment knowledge has become crucial as the business environment is becoming more complex, competitive, and unstable due to factors such as rapid globalization, technological innovations, frequent economic crises, changing lifestyles, terrorism threats, political realignments, and epidemics and natural disasters. Therefore, organizations need to regularly monitor their micro and macro

environments, and use this knowledge for making necessary adjustments in their operations and strategies (Kamoun-Chouk, 2007). Environment intelligence can also help organizations identify opportunities and threats emerging in their outer environments. Continuous and systematic environment scanning enables an organization to avoid surprises and gain competitive edge over its competitors through timely and effective decision-making (Temtime, 2004).

## **Types of External Environments**

Broadly the external environment can be divided into two major categories: the domain or near environment and the general or remote environment.

### ***I. Domain or Near Environment***

This environment (also called micro environment) exists immediately outside an organization's boundary and includes those factors that may directly influence its operations, performance, and outcomes (Myburgh, 2004). In addition to competitors of the organization, this environment also includes those entities with which the organization has business relationships such as customers, suppliers and other stakeholders. Organizations need to closely monitor their domain environments as any significant change in it can instantly affect them and any delay in response could be lethal for them. The following sections outline the types of information companies usually seek about different players in their domain environment:

- A. ***Competitors:*** Information about current and potential competitors such as their products and services, marketing strategies, distribution channels, human and physical resources, volume of trade, key clients, promotional campaigns, research and development activities, future projects.
  
- B. ***Customers:*** These could be end-customers of an organization or other companies buying ingredients or parts from the organization to manufacture their own products. In either business-to-business (B-2-B) or business-to-customer (B-2-C) relationship, organizations need detailed information about their existing and potential customers, such

as, their purchase frequency and buying power, strengths and weaknesses, their access to substitute products.

- C. **Suppliers:** In a business-to-business situation, suppliers are those companies that supply ingredients or parts to an organization for manufacturing its products or offering certain services. The desired information about such suppliers could be their credit status, clients and competitors, market share and strategies.
  
- D. **Technology:** This factor is very important for those companies that are either producing technology-based products or using hi-tech manufacturing processes. It may include information about developments in the technology used by the company and its competitors, pace of technological innovations, impact of technology on current operations and product/service quality, threat from substitute products using sophisticated technology.

## 2. General or Remote Environment

Factors included in the general environment, also called macro environment, may indirectly or in the long run influence a company's performance and growth. Companies need to carefully watch these factors as these may become significant over a period of time. The following are some major factors that may affect a company:

- A. **Demographic Factors:** Proportion of ageing population, birth rate, life expectancy, education, income, mobility, etc.
  
- B. **Economic Factors:** The overall economic situation and business culture in a country. It may also include information about mergers and alliances, growth rates, employment rates, inflation, interest rates, monetary policies, business infrastructure.
  
- C. **Political Factors:** Some businesses are affected by political situation in a particular country or election success by a political party with different economic agenda and strategies. For example, change in

policies pertaining to privatization or nationalization, new taxes or rebates, preference to a particular business sector.

- D. ***Social and Cultural Factors:*** These factors may also affect a business over a period of time. For example, emergence of new social classes, family structure, lifestyle changes, living standards, buying behavior, and work culture in a particular society.
  
- E. ***ICT Developments:*** Some ICT developments and innovations are affecting all types of organizations. It may include new gadgets, and pace of ICT diffusion in a society.

## **Who is Using Environment Intelligence?**

Initially the concept of environment intelligence was presented and implemented by large business organizations. Aguilar (1967) studied the approaches used by 137 managers from 41 companies for getting information about events occurring outside their boundaries. During the next two decades several such studies were undertaken, investigating different aspects of environment intelligence and its utilization. After the 1980's, the environment scanning activities gained momentum and many large companies and multinationals started strengthening their intelligence gathering efforts by using trained manpower and sophisticated technology. Now almost all types of organizations including public, academic, Non-Governmental Organizations (NGOs), and charities are actively capturing, processing and utilizing environment intelligence for problem solving, undertaking new initiatives, and for tactical and strategic planning.

Over the years, realizing the importance of environmental knowledge, small and medium sized enterprises (SMEs) have started taking more interest in environmental scanning (McGee & Sawyer, 2003; Majid & Kowtha, 2008). Many developing countries, such as Bulgaria (Elenkov, 1997), Thailand (Ngamkroekjoti, Speece & Dimmitt, 2005) and Tunisia (Kamoun-Chouk, 2007), also joined these efforts and started gathering environment intelligence.

The need and importance of gathering environment intelligence may vary from industry to industry. Two major factors that determine the frequency, level of effort, and allocation of financial and manpower resources for environmental scanning are degree of change and degree of environmental complexity (Robbins & Coulter, 2005). If environmental changes are minimal and predictable, it is called a 'stable' external environment. On the other hand, if components in an organization's environment are vibrant, unpredictable and changing frequently, it is considered a 'dynamic' environment. Some industries where environmental scanning is more popular are education (Chorney, 2000), healthcare (Sisk, 2006), travel (Majid & Ishak, 2004), and the food industry (Ngamkroeckjoti, Speece & Dimmitt, 2005).

## Applications of Environment Intelligence

The collected environment intelligence can be used for multiple purposes, but the type of information gathered for various applications could be slightly different. The following sections highlight the major applications of environment intelligence:

- A. ***Tactical Use of Information:*** Organizations need different types of information for short-term and tactical decision making. Usually information collected from the domain environment is more useful for this purpose. Organizations need to act immediately on this information as unnecessary delay could be damaging. For example, a company needs to continuously monitor market promotions, product launches and pricing structures of its competitors and make appropriate moves to maintain its market share.
  
- B. ***Strategic Use of Environment Intelligence:*** Proper environment intelligence can contribute significantly to the strategic planning of an organization. Strategic planning is a mechanism by which an organisation collects and evaluates information about its own operations and its relationship to its environment, generates projections about future changes, and sets organisational goals based on these projections. Xu and Kaye (1995) present the '80:20 rule' for strategic planning where 80% of the needed information comes from the external environment while 20% is from within the organization. For

example, environment information plays a significant role in effectively using the planning techniques of SWOT (Strengths, Weaknesses, Opportunities and Threats) analysis and PEST (Political, Economic, Social and Technology) analysis.

- C. ***Environment Intelligence and Organizational Learning:*** Gisescke and McNeil (2004) defined the learning organization as an organization skillful in creating, acquiring, and transferring knowledge and at modifying its behavior to reflect new knowledge and insights. Environment intelligence supports an organization's efforts to learn through acquisition, interpretation and use of information about events, trends, and their relationships. This information can also be used for both short-term single-loop learning and long-term double-loop learning.

## **Environmental Scanning Process**

Over the years, the process and scope of environmental scanning has gradually extended by incorporating certain information management concepts. Environmental scanning is no longer an activity to collect information from the environment. Instead, it is a set of inter-related activities which involves information gathering, filtering, analyzing, repackaging, identifying major trends, and information dissemination to relevant individuals and departments. Generally, environmental scanning involves the following five inter-related activities:

- A. ***Identifying Information Needs:*** The first step in developing an effective environment scanning program is to understand the information needs of different individuals and departments in the organization. It involves an analysis of tasks performed by different categories of staff, the organization's core work processes, and the type of information required for decision-making and strategic planning.
- B. ***Information Acquisition:*** A variety of print, online and human sources can be used for gathering the needed intelligence. As organizations need environmental information that is directly relevant to their

specific activities and operations, many traditional information sources can only provide limited context-specific information. It is, therefore, desirable for libraries to identify and use certain non-traditional information sources to meet the information needs of their users.

Another aspect in which environment intelligence differs from an information management service is the use of organization's staff for gathering the needed information. It is because many employees may come across a lot of useful and updated information while performing their responsibilities through interaction with the external environment (companies and individuals). Proper training and orientation can help these employees to understand how to capture, document and share the information with their peers.

- C. *Information Processing and Storage:*** Information processing usually involves activities such as resource description, classification and categorization by using certain simple tools and techniques. The gathered intelligence can be stored in a paper-based filing system or in the enterprise portal, intranet or a specialized database.
- D. *Information Products and Services:*** This activity is crucial in converting the raw information collected from the environment into more meaningful and actionable information products and services. For this purpose, certain value-added activities such as filtering, interpreting and repackaging could be useful.
- E. *Information Dissemination and Use:*** Library and information professionals should consider several factors while disseminating the environment intelligence to their intended users. They should ensure that the correct information or intelligence makes its way to the correct destination; secondly the information should be delivered through channels and in formats that mesh well with users' information preferences and work habits.

## **Environment Intelligence based Information Services**

As information needs of employees in an organization are quite diverse, libraries should consider offering a variety of information services targeting

different segments of its users. Usually organizations, based on the attributes of their environments, decide what types of information products and services will be useful for meeting the information needs of their users. Some of the following services can be used for disseminating intelligence gathered through environmental scanning:

- A. **Daily Briefings:** Some organizations arrange daily briefings for their staff to highlight certain important issues, including possible implications of intelligence gathered from the environment. This face-to-face interaction provides an opportunity for the staff to ask questions and express their opinions on new developments.
- B. **Environment Intelligence Alerts:** These alerts are like ‘breaking news’. A library on receiving an important news from the environment, needing immediate attention, may send an email or SMS ‘alert’ to all concerned individuals and departments for taking appropriate action. Such a service can help organizations to immediately respond to an emerging situation and avoid or minimize its negative effects.
- C. **Periodic Intelligence Reports:** A library may compile regular environment intelligence reports on different topics. The frequency of such reports usually depends on the complexity and degree of change in the external environment. Many organization issues such reports either on a monthly or quarterly basis.
- D. **On-demand Environment Intelligence:** An organization, before embarking on a new project or initiative, may ask its library to conduct one-off environmental scanning on a given topic. At the time of strategic planning, it may also ask its library to provide more comprehensive and in-depth analysis of the external environment.

## Preparing Competent Information Professionals

As there is a degree of overlap between information management and environment intelligence activities, some of the competencies provided by LIS programs to their graduates will be useful in undertaking environmental

scanning. Nevertheless, information professionals need an additional set of competencies to effectively provide this service. For example, LIS professionals would need a basic understanding of business and marketing principles to effectively undertake certain environmental scanning activities such as competitor intelligence and business intelligence.

Library and information programs are using different approaches for preparing LIS professionals with adequate understanding of environmental scanning and related disciplines. Some LIS programs offer full courses on environmental scanning, competitor intelligence and other related subject areas. For example, the College of Information Studies, University of Maryland (USA) offers a course on 'Environmental Scanning for Information Managers' (<http://www.clis.umd.edu/courses/syllabi.shtml>). Some LIS programs offering courses in 'competitor intelligence' are Loughborough University (UK), the University of British Columbia (Canada), Drexel University, University of Denver, Dominican University, University of Illinois, University of Maryland, University of Oklahoma, and Rutgers University. A course on 'business intelligence' is taught in the information studies programs at University of Tennessee (USA) and Nanyang Technological University (Singapore).

Some LIS programs include environmental scanning and related topics as a segment of a broader course. For example, the Faculty of Management and Information Sciences, University of Brighton, covers these topics in its course on 'Managing Information Services' (<http://www.brighton.ac.uk/cmisis/courses/postgraduate/information/>). Similarly, the focus of the 'Information Management' course in the School of Communication and Information, Nanyang Technological University, Singapore, is on environmental scanning and competitor intelligence ([http://www.ntu.edu.sg/sci/graduate/information\\_studies.html](http://www.ntu.edu.sg/sci/graduate/information_studies.html)).

Recognizing that 'hybrid' professionals, possessing in-depth knowledge of information and business management, will be in a better position to effectively meet the information needs of a business organization, some academic institutions have started offering dual degrees in business management and library and information science. For example, the University of Michigan offers a dual-degree programme leading to a Master of Business Administration and a Master of Science in Information (<http://www.si.umich.edu/msi/dual/mba-msi.htm>). Similarly, dual-degree programmes leading to a Master's degree in Business Administration and a Master's degree in Library & Information Studies are offered by Dalhousie

University, Canada ([http://management.dal.ca/Degree%20Programs/Dual Degree Programs.php](http://management.dal.ca/Degree%20Programs/Dual%20Degree%20Programs.php)) and by Kent State University, USA ([http://www.slis.kent.edu/index.php?option=com\\_content&task=view&id=77&Itemid=113](http://www.slis.kent.edu/index.php?option=com_content&task=view&id=77&Itemid=113)).

## Conclusion

Library and information science professionals need to use innovative and creative ways to meet diverse information needs of their users. It is particularly important as the work environment is becoming increasingly complex and competitive, and companies need to react immediately to changes happening in their external environments. It is, therefore, crucial for employees in these companies to have quick access to high quality, accurate, up-to-date and reliable information to make timely and well-informed decisions. Information professionals, in addition to providing traditional library services, need to use non-traditional and innovative methods to meet highly specialized information needs of their users. One such service which is becoming popular in almost all types of organizations is providing access to environment intelligence. As standard information sources are relatively less useful in gathering environment intelligence, LIS professionals need to identify and use a variety of non-traditional information sources. Library and information education programs also need to look beyond the traditional LIS jobs and start preparing professionals for emerging job roles.

## References

- Aguilar, F. J. (1967). *Scanning the business environment*. New York: Macmillan.
- Albright, K. S. (2004). Environmental scanning: Radar for success. *Information Management Journal* 38 (3), 38-45.
- Chorney, L. B. (2000). *Environmental scanning in Pittsburgh Proprietary Schools*. Doctoral dissertation, University of Pittsburgh.

- Elenkov, D.S. (1997). Strategic uncertainty and environmental scanning: The case for institutional influences on scanning behavior. *Strategic Management Journal* 18 (4), 287–302.
- Giesecke, J. & McNeil, B. (2004). Transitioning to the learning organization, *Library Trends* 53 (1): 54-67.
- Hough, J. R. (2004). Scanning actions and environmental dynamism: Gathering information for strategic decision making. *Management Decision* 42 (6), 781-793.
- Kamoun-Chouk, S. (2007). Environment scanning in Tunisia manufacturing SMEs. *Journal of Information & Knowledge Management* 6 (1), 57-67.
- McGee, J. E. & Sawyer, O. O. (2003). Uncertainty and information search activities: A study of owner-managers of small high-technology manufacturing firms. *Journal of Small Business Management* 41 (4), 385-401.
- Majid, S. & Ishak, N. (2004). Competitor intelligence initiatives undertaken by travel agencies in Singapore. *Singapore Journal of Library & Information Management* 33, 28-38.
- Majid, S. & Kowtha, R. (2008, May). Utilizing environmental knowledge for competitive advantage. Paper presented at the International Conference on Information Resources Management (Conf-IMR), Niagara Falls, Canada.
- Myburgh, S. (2004). Competitive intelligence: Bridging organizational boundaries. *Information Management Journal* 38 (2), 46-55.
- Ngamkroekjoti, C., Speece, M., & Dimmitt, N. J. (2005). Environmental scanning in Thai food SMEs: The impact of technology strategy and technology turbulence. *British Food Journal* 107 (5), 285-305.
- Xu, X. & Kaye, G. R. (1995). Building market intelligence systems for environment scanning. *Logistics Information Management* 8 (2), 22-29.
- Robbins, S. P., & Coulter, M. 2005. *Management* (8th ed.). NJ: Prentice Hall
- Sisk, J. (2006). Asset management: Scan the horizon for clinical success via enlightened technology. *Healthcare Purchasing News* 30 (1), 53-54.
- Temtime, Z. T. (2004). Linking environmental scanning to total quality management through business planning. *Journal of Management Development* 23 (3), 219-233.

## **About the Authors**

Shaheen Majid, Associate Professor, Wee Kim School of Communication & Information, Nanyang Technological University, Singapore

Email: [asmajid@ntu.edu.sg](mailto:asmajid@ntu.edu.sg)

Christopher Khoo, Associate Professor, Wee Kim School of Communication & Information, Nanyang Technological University, Singapore

Email: [assgkhoo@ntu.edu.sg](mailto:assgkhoo@ntu.edu.sg)