The Role of Information Literacy in Environmental Scanning as a Strategic Information System - A Study of Singapore SMEs

Bilgi Okur Yazarlığının Stratejik Bir Bilgi Sistemi Olarak Çevresel Taramadaki Rolü – Singapur KOBİ'leri Üzerine Bir Araştırma

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Abstract*: The development of information technology and telecommunication has created both opportunities and challenges for business organizations. On the one hand, it provides various channels and applications for accessing, processing and distributing information; on the other hand, it imposes higher requirements of information literacy (IL) skills of employees for dealing with information. Despite the number of studies undertaken to investigate the role of IL in the workplace, few of them have integrated IL skills with a specific business management activity, and even fewer of them have tried to evaluate the impact of IL on real business applications. This study aims to investigate the role of IL skills in environmental scanning (ES), a strategic information system used by organizations to cope with environmental changes. It will use both quantitative and qualitative methods: the quantitative approach through questionnaire survey will focus on finding statistically significant effects; the qualitative method through face-to-face interview is expected to discover more explorative information. The scope of the research is limited to SMEs (Small and Medium Enterprises), as they form a significant chunk of the economy in many countries, and they are more sensitive towards environmental uncertainties due to their limited financial resources. This study is expected to fill the knowledge gaps and build up a new model of environmental scanning as a systematic information system with consideration of the effect of IL skills and information technology applications.*

Keywords*: Information literacy, environmental scanning, SME, Singapore*

Öz: *Bilgi teknolojisi ve iletişimin gelişmesi işletme örgütleri için hem fırsatlar hem de meydan okumalar yarattı. Bir yandan bu durum bilgi erişim, işleme ve dağıtım için farklı kanallar ve uygulamalar sağlamakta, öte yandan bilgiyle ilgilenen çalışanların bilgi okur yazarlığı becerileri üzerinde daha yüksek gerekirlikler empoze etmektedir. İşyerinde bilgi okur yazarlığının rolünü inceleyen çalışmalar olmasına karşın, bunlardan bazıları bilgi okur yazarlığı becerilerini belli bir işletme yönetimi etkinliğiyle bütünleştirmiş, çok azı da bilgi okur yazarlığının gerçek işletme uygulamalarına etkisini değerlendirme girişiminde bulunmuştur. Bu çalışma bilgi okur yazarlığı becerilerinin örgütlerin çevresel değişimlerle başa çıkmak için kullandıkları stratejik bir bilgi sistemi olan çevresel taramadaki rolünü incelemeyi amaçlamaktadır. Hem nicel hem de nitel yöntemler kullanılmaktadır. Ankete dayalı nicel yaklaşım istatistiksel açıdan anlamlı etkiler üzerinde odaklanmaktadır. Yüze yüze yapılan görüşmelere dayanan nitel yaklaşım ile de daha keşfe yönelik bilgiye ulaşılması umulmaktadır. Araştırma KOBİ'lerle (Küçük ve Orta Ölçekli İşletmeler) sınırlıdır çünkü KOBİ'ler birçok ülkenin ekonomisinde önemli bir bileşeni oluşturmaktadır ve sınırlı mali kaynaklarından dolayı çevresel belirsizliklere daha duyarlıdırlar. Bu araştırma bu alandaki bilgi eksikliğini gidermeyi amaçlamakta ve sistematik bir bilgi sistemi olarak yeni bir çevresel tarama modeli geliştirmektedir. Yeni model bilgi okur yazarlığı becerilerinin ve bilgi teknolojisi uygulamalarının etkisini de dikkate almaktadır.*

Anahtar sözcükler*: Bilgi okur yazarlığı, çevresel tarama, KOBİ, Singapur*

Introduction

Advancement of information and telecommunication technology has facilitated vast improvements in developing sophisticated infrastructures, which makes a huge amount of information available to people with easy and flexible access, and also provides a variety of applications and channels for processing and distributing information.

However, opportunities come with challenges. Without proper skills to deal with information as well as the related technologies and applications, people suffer from various problems, such as information overload, inability to locate and extract relevant information and disorganization of information. In the workplace, employees must possess adequate information literacy skills to search, process and evaluate information to conduct research, make decisions and solve problems, with support from information technology applications. Previous researchers have highlighted the importance of information and information literacy skills for business organizations, and they have also detected serious problems due to lack of knowledge and information handling skills. Despite the number of studies that have been conducted regarding the role of information literacy in the workplace, few of them have integrated IL skills with a specific business management activity, and even fewer of them have tried to evaluate the impact of IL skills on real business applications with consideration of the support from a suitable and effective information system. Environmental scanning, a strategic information system used by organizations to cope with environmental changes, is a typical business management process with application of both information literacy skills and information technology. This study aims to investigate the role of information literacy skills in environmental scanning for Singapore SMEs (Small and Medium Enterprises).

Literature Review

Definition of Information Literacy

The term "information literacy" was coined by Paul Zurkowski in the 1970s to bring attention to the needs of people working in the newly emerging technological environment (Kapitzke, 2003). Since then, the concept has been mainly used by information specialists, and promulgated worldwide through the work of the American Library Association (ALA) and the National Forum for Information Literacy (Feather & Sturges, 2003).

However, there is no agreed definition of the term. Some researchers describe IL as requisite to lifelong learning (Hancock, 1993; Moore, 2002), while others perceive it as a natural extension of the concept of literacy in our society (Bruce, 2002; Stern, 2002). Some have acquainted IL with information technology (Mitchell, 1996), while others have used it interchangeably with library skills (Kuhlthau, 1990). The 1989 Final Report of the American Library Association's Presidential Committee on Information Literacy, a milestone in the history of IL research, not only recognized the importance of the term, but also sought to define the skills of IL (ALA, 1989). This definition was widely accepted: to be information literate, a person must be able to recognize the need for information, to effectively access, evaluate and creatively use information. Todd, Lamb and McNicholas (1992) defined IL as "a holistic, interactive learning process encompassing the skills of defining, locating, selecting, organizing, presenting, and evaluating information". Goad (2002) gave a brief definition as "the ability to search for, find, evaluate, and use information from a variety of sources".

Information Literacy in the Workplace

A number of researchers have pointed out the importance of information and IL skills in the workplace. Porter and Miller (1985) report information as one of the most important elements in competitive advantages. Forward-looking companies take the view that information is a strategic asset of the enterprise in much the same way as a company's financial resources, capital equipment and real estate, and properly employed information assets would create additional value with a measurable return on investment, and can be leveraged into strong competitiveness (Karim & Hussein, 2008). Drucker (1992) elaborates on the need for organizations to become information literate. He suggests that corporations need to learn to ask questions as: What information do we need in this company? In what form and how do we get it? Mutch (1997) also pointed out the potential importance of IL skills to business as he outlined how the concept might be employed within the business field. IL is a means of helping individuals handle the massive amount of information that pervade their daily life (Lyman, 2001). Karim and Hussein (2008) state that good and quality information can improve decision-making, enhance efficiency and allow organizations to gain competitive advantage.

Despite its importance highlighted in the literature, information literacy, the key to information power, has not been of great concern in the business sector. Employees tend to attend more to the need for computer skills than IL skills (Bruce, 1999). Nevertheless, having the ability to handle technology does not necessarily mean that they are information literate (Cheuk, 2002). Negative examples were observed in various workplace contexts, such as "unable to determine the nature and the extent of the information needed", "unable to retrieve information effectively from the information systems", "not aware of the full range of resources available" and so on, which may result in increased operating cost and inability to fully exploit valuable information sources (Cheuk, 2002; O'Sullivan, 2002).

Definition and Process of Environmental Scanning

In the field of ES, the first notable study was carried out by Aguilar (1967). Aguilar defines environmental scanning as acquiring information about events and relationships in a company's outside environment, the knowledge of which would assist top management in its task of charting the company's future course of action. Subsequent studies reinforced Aguilar's definition without substantially altering this perspective; however, the process of ES was gradually extended and has been conceptualized as an integrated information management system (Aaker, 1983; Albright, 2004; Costa, 1995).

Synthesizing the reviewed literature, a six-step ES process is proposed (Figure1). With clearly defined scanning needs, the formal ES process starts. Organizations actively collect environmental information through various channels and from various information sources, then process and synthesize the acquired information with the existing organizational knowledge. The processed environmental intelligence may be stored in an organization knowledge repository for future action, or disseminated to target users for final evaluation and use. If the end-user's information need is not satisfied, he may initiate a new round of ES. It is worth noting that, sometimes steps like "information processing and synthesizing" and "information distribution" may be skipped due to certain factors, such as limited time or shortage of human resources, or the collector of information will use it by him/herself without sharing it with others.

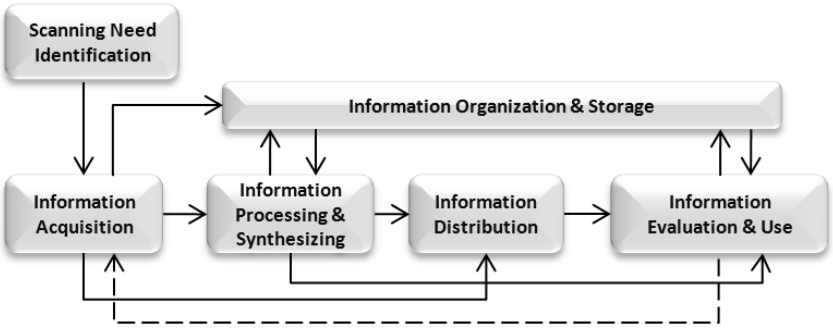

Figure 1. Environmental scanning process

Although the majority of recent studies define ES as a systematic process with several steps, few empirical studies investigating ES in practice have paid equal attention to each of its steps. Most studies only focused on information collection while neglecting the rest (Ebrahimi, 2000; McGee & Sawyerr, 2003; Strandholm & Kumar, 2003).

Environmental Scanning as a Strategic Information System

Harrod's Librarians' Glossary (Prytherch, 1995) defines an information system as an organized procedure for collecting, processing, storing, and retrieving information to satisfy a variety of needs. Avinson and Fitzgerald (2006) pointed out that an information system is a human activity system, which may or may not involve the use of a computer system. It can be either computer-based or paper-based.

The information system of an organization will be required to help it analyze the business along with its environment, formulate strategies and check whether it achieves its goals (Avinson & Fitzgerald, 2006). Organizations scan their business environment for market opportunities, for threats to present competitive positions, for potential replacement of currently marketed products and services, and for possible acquisitions and expansions. Such information is regarded as strategic information, and systems designed to acquire, store, organize and make available for use such information are strategic information systems (Feather & Sturges, 2003). From the information perspective, the ES process, also known as an information scanning system (Costa, 1995), is a strategic information system in the workplace.

In the literature, several studies have been done to identify the influence of an organization's information system on the ES effectiveness and hence organizational performance. For example, Subramanian, Fernandes and Harper (1993) found that firms having advanced systems to monitor events in the external environment exhibited higher growth and greater profitability than firms that did not have such systems. Similarly, Ahituv, Zif, and Machlin (1998) discovered significant differences in terms of the use of information systems and ES levels between more successful and less successful firms in introducing new products into the market. The differences are in the ES pattern and frequency, the number of computerized applications, and the number of advanced marketing information systems.

Information Literacy Skills at each Step of Environmental Scanning as a Strategic Information System

While IL is not mentioned specifically in mainstream ES literature, it is an implicit aspect of ES, as each ES step could only be completed effectively by people with the corresponding IL skills with support from an organizational information system. Specifically, employees should possess IL skills to identify information needs and to locate the best sources to obtain accurate and current information, as well as the abilities to present the information effectively to the intended audience after data mining and repackaging, which is extremely valuable to the overall effectiveness of ES and hence the success of the organization. By improving their own skills of creating, acquiring and transferring knowledge, they enable their organization to modify its behavior according to the continuously changing external environment (Giesecke & McNeil, 2004). Without employees possessing proper IL skills, organizations would not be able to conduct effective ES activities, and hence achieve alignment with the external environment.

Identification of Scanning Needs

The first step in developing an ES strategy is to accurately appraise the information needs of the various individuals and groups in the organization. Understanding their information needs and requirements would be a significant step in developing information strategy and tools for providing effective information services and promoting organization-wide creativity and innovation (Karim & Hussein, 2008). In the context of ES, information needs occur when the existing organizational knowledge cannot cope with the signals from the external environment. In other words, organizations need to acquire more information to analyze environmental uncertainty and adapt to it accordingly. A good recognition of scanning needs at all points in the organization is essential, as they determine the scope and depth of ES.

In an organization, the identification of information needs begins with an analysis of key decision-makers and the environment of the organization, and key decision-makers are found to be not only at the top of the organization, but also among middle managers and tactical employees (Myburgh, 2004). In other words, identification of an organization's information needs starts from identification of individual information needs. To ensure the organization's scanning needs to be well-captured, first of all, individuals working in the organization must be able to identify their own information need clearly; secondly, they must possess essential communication skills to express their needs; finally, the person in charge of the aggregation of individual information needs should be capable in information processing and synthesizing, and conclude the organization's scanning need.

Information Acquisition

Information acquisition aims to satisfy the identified information needs. In the literature, three key issues are highlighted during the process of information acquisition: where to collect, how to collect, and when to stop.

"Where to collect" regards the source of information. Case (2002) categorized information sources as internal (the company manager and staff) and external (printed and broadcast media), which is not exhaustive. Choo (2002) divided information sources into three categories: textual sources, online sources and human sources. Information literate workers should realize that each kind of information source has its own advantages and disadvantages, and information sources need to be matched with the information needs and strategic objectives as well as their "accessibility" and "reliability". For example, textual sources are well suited to situations when the information is structured and formal, or when the transmission accuracy of information is highly demanded; online sources are especially useful when reasonably complete and up-to-date information needs to be gathered swiftly; human sources tends to be preferred when dealing with ambiguous, unstructured problem situations (Choo, 2002).

"How to collect" concerns the methods or techniques used for gathering information. They could be routinely getting information through various media channels like newspapers, market reports or television, or acquiring first-hand data through active research methodologies like questionnaires, interviews and participant observation, or passively receiving information through subscribed alerting services provided by information vendors. With the number of methods and techniques available, people in charge of collection of environmental information should be able to select the most appropriate one, with consideration of the quality of information and the cost of collection. Moreover, information literate workers would be able to formulate a suitable search strategy which enables them to retrieve information effectively through various channels. Last but not least, collectors should be aware that the methods and techniques hired should be based on legal collection of open-source or public domain information, without involving immoral, unethical or illegal activities.

"When to stop" is about the judgment of "enough" information to satisfy the identified information needs. Both qualitative and quantitative criteria are helpful for making rational choices to determine when the collected information is "enough" (Prabha & Connaway, 2007). The personal judgment of experienced information workers would also help identify the quantity of collection.

Information Organization and Storage

Acquired or created information should be organized and stored systematically in order to facilitate future information retrieval and sharing. In enterprises, information on paper originals could be stored in a traditional filing system, or digitized and archived on hard disks attached to file servers. No matter in which format, the design and performance of the organization and storage system, such as its creation of taxonomies, resource description and comprehensiveness, would highly affect the accessibility and retrieval of stored information, especially when the majority of the information is collected from electronic sources and the Internet. Without IL skills, organization would not be able to organize their knowledge base properly which may result in various barriers for future retrieval and use.

Information Processing and Synthesizing

The collected or generated information could be directly stored for future accessibility, or processed into information products or services through some sets of value-added activities, such as filtering, interpreting and repackaging. Analyzing the collected information and extracting meaning from it is the most important part of ES; moreover, in today's complex and turbulent environment places there is a premium on the reliability and quality of information. The collected information should be analyzed for issues and trends that may influence the organization, to assist users to acquire a better sense of situations and make better decisions, and hence facilitate the creation of a dynamic knowledge capability. The relevant information from each source should be extracted and information from multiple sources should be organized. Srinivas (2009) pointed out that questions needing to be addressed during processing are: Which parts of the information collected will be used? What additional data is needed? How can information be best presented to enable situation understanding and problem-solving?

However, a recent study reports that knowledge workers are spending more time collecting information and less time analyzing it (Anonymous, 2005). Inadequate filtering of information would result in information overload; with inadequate time for analysis; the collected information will provide either a recital of facts or a "dump" of data with little advice or confirmation (Myburgh, 2004). Without proper information processing skills, the gathered information would be underutilized as "the organization does not know what it knows" (O'Dell & Grayson, 1998).

Moreover, there are more than 100 different analytical techniques which could be used to glean meaning from the collected data and information, such as blind spot analysis, competitor benchmarking and SWOT analysis (Myburgh, 2004), and due to the rapid technological development, more advanced information systems equipped with enterprise decision support tools are available. However, these tools would still rely heavily on human interpretation and cognition (Karim & Hussein, 2008). If staff have insufficient knowledge of those techniques, and are without the ability to manage information flows for future utilization and development, advances in information and communication technology may also impose an immense challenge for people to handle the existing over loaded information (Karim & Hussein, 2008).

Information Distribution

The processed environmental information, with potential effects on the organization, should be reported to the appropriate decision-makers within the firm. Myburgh (2004) and Albright (2004) suggest some points deserving special attention in information distribution. The first one is to ensure that the correct information or intelligence makes its way to the correct destination, as the decision-makers may be scattered throughout the organization; secondly, the information should be delivered through vehicles and in formats that mesh well with the user's information preferences and work habits; thirdly, the intelligence also must match the users' requirements of presentation, such as its orientation and content. Briefly, the real issue is getting the right information to the right person at the right time and in a usable form.

Moreover, the benefits of a wider distribution of information are also highlighted in the literature. Nutt (1999), from the perspective of decision-making theory, found that when the same piece of information is distributed to many individuals, multiple interpretations could be resolved and a consensus reached. Daft (2001) discovered that multiple interpretations of the same information could improve decisions by redefining the problem. A wider distribution of information may bring more broadly based and more frequent organizational learning, as retrieval efforts are more likely to succeed and individuals and units are more likely to be able to learn (Huber, 1991).

Information Evaluation and Use

On receiving the processed information, the end-users would finalize it to be ready for assisting decision-making. In the current information-intensive business environment, the utilization of information is indeed a critical factor in the achievement of organizational success (Souchon, Cadogan, Procter, & Dewsnap, 2004). Information literate decision-makers would be open-minded and objective, relying not merely on the guidance of instincts and their

experience. At this stage, various IL skills are required. For example, decision-makers need information evaluation skills to make judgments about the quantity and quality of the received information in terms of reliability, accuracy, timeliness and so on. If they find the information to be insufficient or unqualified, they may re-identify their scanning needs and start a new round of ES; with sufficient and high-quality information, they may still need to process and synthesize it based on the real-time situation and different usages.

Proposed Research Models

Based on Daft's widely accepted model (Daft, Sormunen, & Parks 1988) (Figure 2), we proposed a refined model of ES as a strategic information system (Figure 3). It is believed that perceived strategic uncertainty (PSU) would trigger the need for scanning. In Daft's model, the measurement of PSU is structured PI×(C+R), where PI=perceived sector importance; C+R=perceived sector uncertainty; C=the perceived sector complexity; R=the perceived sector rate of change; the measurement of ES is scanning frequency (how often environmental information is collected) and scanning mode (use of personal or non-personal, internal or external information sources).

In our model, three factors are proposed to measure the ES process, and they are not restricted to the step of information collection. The three factors are "implemented frequency of each ES step", "rate of interest of each ES step" and "actual effectiveness of each ES step". "Rate of interest of each ES step" refers to the importance attached to each ES activity, in terms of conducting manner (primitive, ad hoc, reactive and proactive) (Jain, 1984) and assigned scanning unit (Olsen, Murthy, & Teare, 1994). The "implemented frequency of each ES step" and "rate of interest of each ES step" are proposed to be determined by the combination of PSU and "perceived effectiveness of each ES step". For example, with the same PSU level, higher perceived effectiveness of an ES step may result in less frequency and less interest of that ES step. With the same perceived effectiveness of an ES step, higher PSU would result in higher frequency and interest of that ES step. The "actual effectiveness of each ES step" is proposed to be determined, new from an information perspective, by the "actual effectiveness of technology and media" and "actual level of IL skills". The "actual effectiveness of each ES step", "implemented frequency of each ES step" and "rate of interest for each ES step" would together impact on the quality of the actual ES product, which would be used for assisting tactical and strategic decision-making.

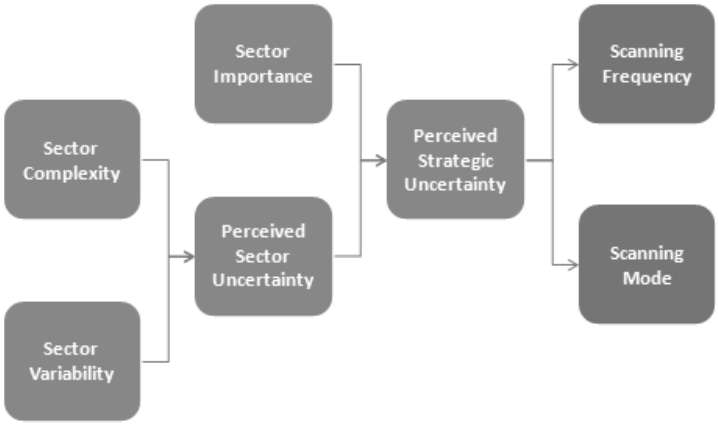

Figure 2. PSU and ES adapted from Daft et al. (1988)

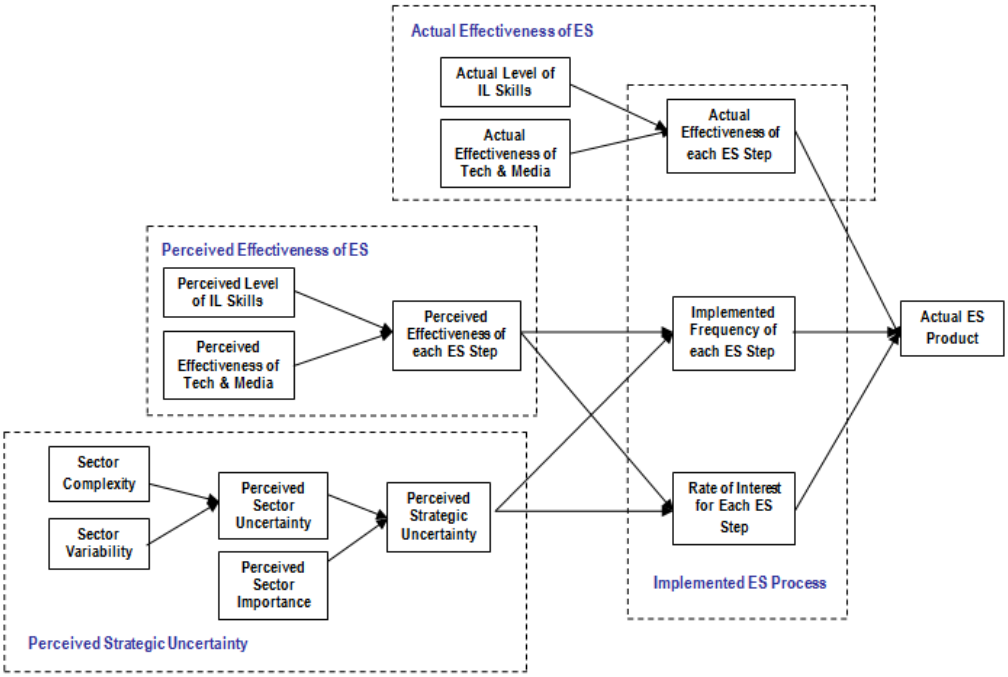

Figure 3. PSU and step-based ES process

For the step of information collection, two more factors regarding the accessibility of various information sources need to be taken into consideration, which is particularly important for SMEs with limited financial investment in information technologies and application, as well as unavailability of qualified information specialists. Specifically, the "perceived access to information sources" would help decide the frequency and rate of interest assigned to information collection, while the "actual access to information sources" would impact the effectiveness of information collection (Figure 4).

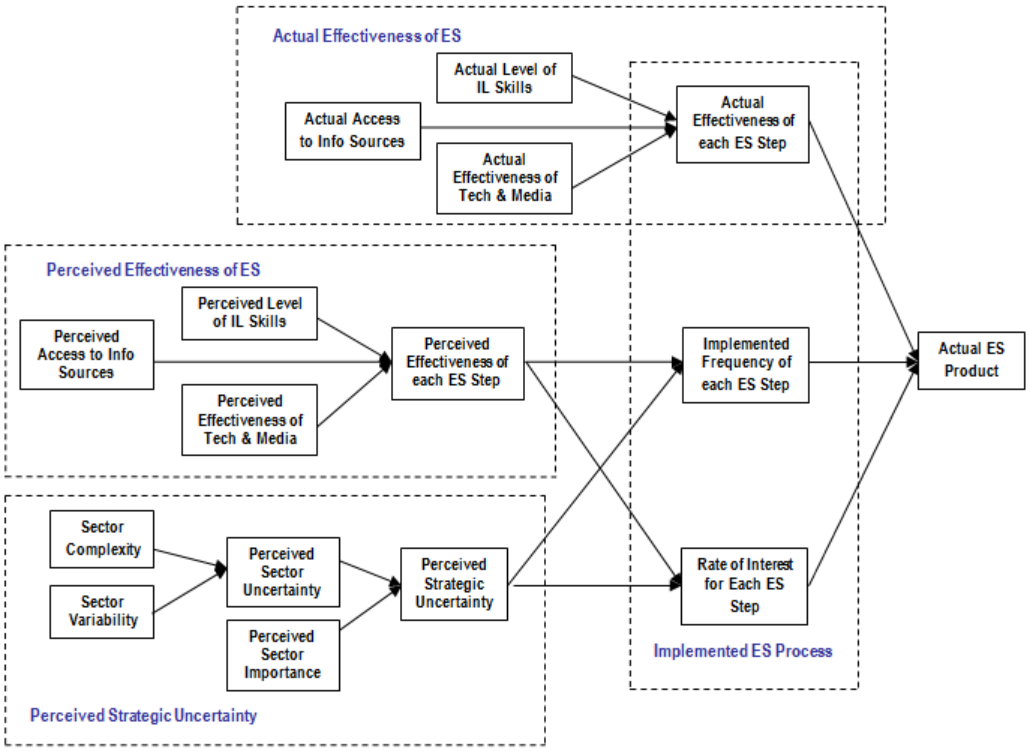

Figure 4. PSU and ES (information collection)

Proposed Research Methodology

Research Design

A combination approach of both quantitative and qualitative method is proposed. The quantitative method through questionnaire survey/test would help obtain a general picture of the ES process under different PSU situations, statistically reveal the impact of IL skills and effectiveness of information technologies and media on the overall quality of ES products, and verify the research models proposed. The qualitative method through face-to-face interviews is expected to provide more profound information regarding ES activities and the impact of PSU, IL skills and information technologies and media, and refine the research models based on the ES participants' perspective.

Quantitative Method through Questionnaire Survey/Test

Survey, as a relatively standardized and systematic approach of obtaining self-reported information about the beliefs, attitudes, behaviors, opinions or other characteristics of a specific population (Edward, Thomas, Rosenfeld, & Booth-Kewley, 1997; Fowler, 2002), is chosen to acquire a general picture of the ES activities conducted by Singapore SMEs. The target major respondents are chief executive officers, who would be responsible for the overall strategy and performance of the organization. However, some sections of the questionnaire may need to be completed by people engaged in the corresponding ES activities. The survey method is selected for three main reasons:

Firstly, since there have been very few studies on the scanning behavior of Singapore SMEs, and no prior studies have integrated the role of IL skills into the ES process, this study needed to collect data to obtain a broad picture of how SMEs in Singapore scan their environment. Survey research is probably the best method available to collect original data for describing a population too large to observe directly (Babbie, 1990). Questionnaire survey is an economical and efficient way to maximize the coverage of the sample size as compared to other approaches.

Secondly, a major part of the study is concerned with the respondents' perceptions, such as "perceived sector importance", "perceived access to information sources" and "perceived level of IL skills". A questionnaire would enable respondents to report their perceptions while remaining anonymous and honest on the feedback.

Thirdly, the quantitative survey data could be analyzed to statistically investigate the relationship among factors proposed in the structural equation model, for example, the relationship between PSU and each step of ES in terms of frequency and rate of interest, the impact of related IL skills on the effectiveness of a specific ES step and hence the quality of the final ES products.

Qualitative Method through Face-to-Face Interview

Based on the general understanding acquired from the quantitative data analysis, a face-to-face interview is proposed to ensure the gathering of more profound data from different hierarchical levels, which also allows the interviewees to express their feelings based on their own perspectives and experiences. Prior studies have found that scanning activities could be completed through staff from different functional units and at different hierarchical levels (Majid & Kowtha, 2008; Zhang & Majid, 2009). However, the reviewed ES studies have focused on top management (e.g. chief executive officers, managing directors), and paid insufficient attention to middle level managers or employees, who may also play an important role in the ES process. Interviewing staff engaged in ES activities with different functional roles and from various hierarchical levels would enable the researcher to acquire more in-depth data, and increase the chance of obtaining a more reliable overall picture of ES activities. Moreover, the interview method would enable the researcher to explore the ES activities conducted by the same company in different time periods through recall of various strategic situations.

Proposed Sample Selection and Characteristics

For better concentration, only two industries are proposed to be included in this study, i.e. travel agents and food manufacturers. These two industries are all dominated by small and medium sized enterprises (SMEs), but they are from different consumption layers. The food manufacturing industry is comparatively more stable as the products are kinds of human necessities, and companies' operation may not be sensitive to environmental changes. However, travel agencies operate in a more dynamic environment. They need to react immediately to environmental changes and their performance is determined by the economic conditions of the local economy.

According to NATAS (National Association of Travel Agents Singapore), there are 331 active members (NATAS, 2009); based on the directory provided by SFMA (Singapore Food Manufacturers' Association), there are 297 food manufacturers (SFMA, 2009). The sample for this study would be selected from the companies fulfilling two criteria. First, company size should be above 20 employees, which ensures sufficient manpower for conducting systematic ES activities. Second, those companies must be concentrating on a single business domain without operating across

different industries. This is to ensure that the firms would focus on the task environment of their primary business without paying attention to multiple operating environments as occurs in diversified firms.

Significance of the Study

From a Theoretical Perspective

As mentioned in the literature review, besides information acquisition, insufficient attention has been paid to the other steps of ES. Moreover, IL and information technology applications, as enablers to conduct effective ES activities, have not been highlighted in the reviewed studies. This research aims to address these problems and the findings are expected to fill in the knowledge gaps and build up a new model of ES as a systematic process with consideration of the effect of IL and information technology applications.

From a Practical Perspective

The findings of this study, to some extent, can provide insights into the current situation of SMEs in Singapore regarding their use of IL skills and information technology for ES, reveal their ES mechanisms, detect the problems they may encounter during the scanning process, and generate implications on how to improve the current situation. The study findings are expected to reveal the contribution of IL skills and adoption of information technology applications to conducting more effective ES activities, the results of which would help decision-makers to do better strategic planning, to achieve strategy-environment alignment, and hence contribute to the organizational performance. These demonstrated links would be able to create awareness of the power of information among SMEs, the importance of IL skills and adoption of a suitable information system and applications, as well as the significance of conducting ES. In the long term, SMEs could become information-literate learning organizations, responding to the changes and new threats from the environment in a timely manner, and thus survive and succeed in both local and international markets.

From a Methodological Perspective

The majority of previous studies have investigated ES activities using quantitative methods such as questionnaire survey or survey-based interview, even those trying to demonstrate the contribution of ES to organizational performance. Only limited qualitative studies have used interviews, and these interviews were limited to the top management level. This study will explore the feasibility of adopting both quantitative and qualitative methods to generate a quality set of findings and to cross validate them.

Conclusion

ES could provide early warning signals for organizations, and help companies develop and modify business strategies to meet changing external circumstances and hence improve their competitiveness and performance. In today's turbulent environment, to conduct effective ES activities, employees must possess the corresponding IL skills with support from the various information technology applications.

In the reviewed literature, the majority of studies investigating ES activities have mainly focused on the information collection step, and insufficient attention has been paid to the role of IL skills and information technology applications. For methodology, only limited interviews were conducted at the top management level. The common limitations of prior studies have been addressed in the proposed model through the equal attention paid to each ES step and the newly added variables as "perceived/actual level of IL skills" and "perceived/actual effectiveness of technology and media". Moreover, our proposed research design, as a combination of both quantitative and qualitative methods, expects to enrich this set of information by obtaining inputs across the hierarchy of the organization, thereby providing a richer and more accurate picture of ES by the various stakeholders involved in this process.

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