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Résumé de l'article

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Environmental Scanning in Globally Oriented Small Businesses: Practices Suggested by Managers¹

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*This paper identifies information sources and practices of environmental scanning preferred by managers of globally oriented small and medium-sized enterprises (GOSMEs). Data were collected using a Delphi technique and were analysed by NUD*IST software and the Homogeneity Analysis technique. Major findings indicate that although managers of GOSMEs generally prefer external and personal sources in their environment scanning process, contingent conditions related to the industry, the organization and the owner-manager guide the choice of appropriate information source and the need to scan systematically each sector of the environment. Statistical relationships were identified, and these relationships allowed the formulation of general propositions that could be helpful for practice and research in GOSMEs. The paper concludes that the manager's need to scan systematically a specific sector of the environment and the information source the firm might use are dependent on the level of uncertainty aroused by this sector, the amount of pertinent information the source has, and its accessibility by the firm.*

INTRODUCTION

In an age of market globalization, enterprises see many areas of the planet as a target destination for their products, a possible source of supplies, and a possible source of competitors likely to invade their markets (Murphy, Daley, and Dalemberg, 1991; Agmon and Drobnick, 1994). In recent years, it has been observed that doing business in many countries is no longer an option limited to large companies. Some small and medium-sized firms extend their activities to many countries and a few are even considered worldwide leaders in their areas of activity (Simon, 1990; 1996). In the new integrating global environment, however, Etemad and Wright (1999: 4) affirm: “entrepreneurs and emerging businesses must learn about global business to thrive alongside larger firms already in the international marketplace.” These authors assert that managers of small firms must leverage their sources of competitive advantage “to compensate for the disadvantages of constrained resources, limited access to international markets, and general inexperience in international operations to perform successfully in international markets.”

Firms that operate globally face an increased challenge to identify, gather, sort, and analyze pertinent information needed for forming, monitoring, evaluating, and modifying successful strategy (Montgomery and Weinberg, 1998). According to Vernon-Wortzel and Wortzel (1997: 541), “the ability to collect, process, analyze, and disseminate information within the firm has become an important component of competitive advantage” in a global firm. Some scholars had observed in their studies that successful firms systematically use professionals to collect and organize methodically pertinent information about the external world. (Miller, DeMeyer, and Nakane, 1992; O’Guin and Ogilvie, 2001). Others, such as Preble, Rau, and Reichel (1988), have observed that information collected by staff members in subsidiaries located abroad is the preferred source for many multinationals. The use of professionals or subsidiaries is particularly difficult for globally oriented small and medium-sized enterprises (GOSMEs), given their more limited resources (Earl and Feeny, 1995; Miller, DeMeyer, and Nakane, 1992) and the lack of subsidiaries in the majority of foreign countries where they are operating (Burgel and Murray, 2000). Therefore, it should not be surprising that the search for pertinent information be recognized as a bottleneck in the international activities of SMEs (Karagozoglu and Lindell, 1998).

The purpose of this study is to answer the following questions: what information sources and methods can GOSMEs use to become and remain informed about the issues essential to their activities? What factors related to the industry, the organization and the owner-manager’s characteristics can explain the choices that different GOSMEs make and the practices they adopt in their environmental scanning?

The term “globally oriented small and medium-sized enterprise” (GOSME) is used in this study for an independent (not a subsidiary) company

with less than 500 employees, that is managed by owner(s), and is doing business in at least two foreign countries located in two (or more) of the three primary and distinct regional markets, including North America, Europe, and Asia (Ohmae, 1985; Porter, 1986, Barlett and Ghoshal, 1989). Such firms have been called “world class SMEs” (Paradas and Torrès, 1996) and “hidden champions” (Simon, 1990; 1996). Such an SME is not only international, but it competes on a worldwide basis (Barlett and Ghoshal, 1989, Simon, 1990; 1996).

Studies of environmental scanning have dealt with the identification of information sources, characteristics of scanning practices and the identification of factors explaining scanning practices.

With respect to information sources characteristics, many studies have observed that managers of SMEs more frequently use sources that are personal (Specht, 1987), external (Johnson and Kuehn, 1987), and informal (Peterson, 1988; Smeltzer, Fann, and Nikolaisen, 1988). By contrast, a study carried out by Preble, Rau, and Reichel (1988) on large multinationals revealed that they mainly used inside sources (professional staff in subsidiaries based abroad) to get information.

Studies have identified two categories of complementary theories based on characteristics of information sources: the trait theories and the social interaction theories (Webster and Trevino, 1995). Trait theories consider “media selection to be a function of traits of the media and characteristics of the task” (Carlson and Davis, 1998). Social interaction theories contend that media selection is influenced by social context (for example distance and time pressure) and meaning conferred to media by managers according to their perception, attitude and experience.

With reference to scanning practices, it has been observed that the frequency and interest in scanning can be high or low (Hambrick; 1982; Sawyerr, 1993) and passive or active (Farh, Hoffman, and Hegarty, 1984). Firms can use advanced or elementary scanning systems (Subramanian, Kumar, and Yauger, 1994) and formal or informal structures (Rinholm and Boag, 1987; Jennings and Lumpkin, 1989).

Moving to factors explaining scanning practices, those most frequently considered are related to the uncertainty of the environment, the firm and task to be carried out, the manager, and the characteristics of information sources (Carlson and Davis, 1998). Perceived strategic uncertainty was found to be a predictor of the frequency and complexity with which top managers scan environment sectors (Auster and Choo, 1994b; Boyd and Fulk, 1996). Other studies have found a link between information search activities and decision areas or organizational designs (Auster and Choo, 1994a; Choudhury and Sampler, 1997; Pineda, Lerner, Miller, and Phillips; 1998; Whitfield, Lamont, and Sambamurthy, 1996). The manager’s experience, specialization, personality, and position within the firm have also been found as explanatory factors for

scanning practices by some studies (Cooper, Folta, and Woo, 1995; Donckels and Lambrecht, 1997; Lee and Heath, 1999; Thomas, Clark, and Gioia, 1993; Zmud and Carlson, 1999).

Some researchers have explored the link between environmental scanning and other organizational variables such as performance (Beal, 2000; Subramanian, Kumar, and Auger, 1994), strategy (Beal, 2000), innovation (Hartman, Tower, and Sebora, 1994), and size of the firm (Johnson and Kuehn, 1987).

In the particular context of SMEs, Culnan (1983), for example, has found that the frequency with which an SME used a given information source was positively related to its perceived accessibility and the firm's environmental complexity. Kaish and Gilad (1991) have observed, however, that even if managers of SMEs most frequently used personal and accessible information sources, they tended to use a complementary variety of external and internal sources. Lee and Heath (1999) found managers using richer media when keeping up-to-date with technology and service issues rather than in tracking economic and sociopolitical issues.

The use of broad categories of information sources, the examination of one or two environmental sectors, and the lesser attention paid to the scope of the operating market characterize the majority of previous studies on scanning in SMEs. In most of the studies mentioned above, an SME's environmental scanning sources are described in broad categories such as personal sources versus impersonal ones and external sources versus those that are internal (Culnan, 1983; Johnson and Kuehn, 1987; Kayes, 1995). Although these broad categories allow an easy comparison with environmental scanning practices in large businesses, they do not reveal the diversity of information sources and means used by SMEs according to their contextual differences. Sometimes, scanning activities are examined only for one sector of the environment such as the technology (Raymond, Julien, and Ramangalahy, 2001). The importance of environmental sectors may be different from one industry to another and from time to time. Finally, with Cui (1992) as an exception, studies do not distinguish between SMEs operating domestically from those operating internationally. Yet SMEs doing business in many countries are facing challenges unknown to SMEs oriented only to domestic markets (Fombrun and Wally, 1992). Given that many globally oriented SMEs do not have subsidiaries abroad, there is a need to identify their strategic environmental scanning sources, focusing on the contingent nature of choices made by decision-makers according to the industry, organization, and the characteristics of the owner-manager.

In addition to this introduction, this paper will present a summary of the methodology that a summary of results will follow. Thereafter, these results will be discussed in the light of previous studies. Finally, some propositions will be stated, followed by a conclusion.

METHODOLOGY

To understand the environmental scanning practices of GOSMEs better, owner-managers of international SMEs (independents, with less than 500 employees, no subsidiaries, managed by owners) from the Province of Quebec (Canada) were chosen according to their recognized reputation in specialized magazines dealing with business, the number of countries where they are doing business (at least two foreign countries), and the relative success of their organizations in recent years (above the average of the industry). Two consultations that utilized an adapted form of Delphi decision-making technique (Dalkey, 1972, Nadeau, 1982) took place from June 1996 to February 1997. In the first consultation, I faxed a questionnaire to 86 owner-managers previously contacted by phone. Every respondent was invited to give information about his/her industry, his/her organization, and himself/herself. Also, the respondent was invited to suggest information sources that a firm like his/hers could use to get information about different sectors of its activities in order to achieve sustainable success in the global marketplace.

Many scholars have used two or three dimensions related to the industrial environment, objective business-level criteria, and executive characteristics in view of integrating environmental determinism and strategic choice perspectives in the process of strategic decision making (Hitt and Tyler, 1991; Thomas, Clark, and Gioia, 1993; Zeffane and Cheek, 1994). In the current study, the industry was described by five variables: the nature of the demand (standardized or customized), the scope of the product use (specialized or general use), the target market (industrial/institutional or end-user consumers), the development stage (emerging or mature), and the level of technology intensity (lower or higher). Perceptual measures were used for each variable according to recommendations in previous studies (Harrigan, 1988; Easton, Burrell, Rothschild, and Sherman, 1993; Nooteboom, 1994; Carter, Stearns, and Reynolds, 1994). Indeed, the manager was invited to locate the standardization or specialization level of his/her industry on a scale of 100. Thereafter, he had to indicate if his/her primary product/service existed 5 years ago, was already familiar to potential buyers, had a growth demand inferior to 10%, and was competing with other products considered as performing better in the marketplace (Lee, 1995). The firm's level of technological intensity was measured by propositions related to the newness of technology used, the number of competitors using it, the level of knowledge ambiguity about the technology, and the competitive advantage provided by the technological process (Butler and Carney, 1986; Rothwell, 1991; Senker, 1994; Dodgson, 1994).

The firm was described by four variables (Miller, 1986; 1988; Bluerdorn, 1993; Dodge, Fullerton, and Robbins, 1994; Martin and Staines, 1994; Boyer, 1994; Whitfield, Lamont, and Sambamurthy, 1996). These are: its age (young if five years old or less, and old if more than five years old), its size (small if employed fewer than 100 employees, or medium if 100 or more employees), its

required core competencies for success (technological-based or human resource-based), and its organizational structure (organic or mechanistic). Finally, four explanatory variables described the owner-manager (Gupta, 1984; Martin and Staines, 1994). These were: age (young if 45 years old or less, and old if more than 45 years old), experience (low if less than one year since first contact with the industry and the moment of taking charge of its current position, and higher if more than one year elapsed since first contact with the industry and the moment of getting in charge of current position), educational level achieved (university graduate or not), and specialization (low if no prior training in the area of the main product or service, and high if prior training received in the area of the main product or service).

The question about environmental scanning was an open one, stated as follows: to achieve sustainable success in the global market, what means might a firm like yours use to stay well informed about different issues concerning its activities?

Forty-seven respondents returned their questionnaire after the first consultation. But two of them were discarded because their enterprise profiles did not match the criteria used in this study. Answers from the 45 remaining owner-managers were analysed by the NUD*IST software. This enabled me to identify and categorize the scanning sources suggested (see table 1) and explanatory variables. Statistics on information sources from this analysis in frequency table forms, along with each respondent's own answers, were returned for a second consultation to each respondent. The questionnaire for this second consultation included closed questions regarding details about the need for and frequency of a systematic scanning, and invited owner-managers to indicate the best information source for each environment sector. Six aspects of the firm's environment were considered: competitor, customer, technological, regulatory, economic, and socio-cultural sectors (Daft, Sormunen, and Parks, 1988). At this stage, respondents were asked to modify, if necessary, their previous answers.

Forty respondents returned the questionnaire following the second consultation. Four respondents out of five who did not return their questionnaire were away from their headquarters and the fifth one declined to continue with the study. The scanning frequency was measured on the basis of regularity and formalization of the process (Subramanian, Kumar, and Yauger, 1994). The need to scan sectors illustrated the level of complexity of scanning activities (Culnan, 1983; Specht, 1987). The complexity was low if systematic scanning was suggested for only three environment sectors or fewer. It was high if the systematic scanning was suggested for more than three sectors of the environment.

Data from the second consultation were analyzed by HOMALS (homogeneity analysis by alternating least squares), a kind of multiple correspondence analyses (Greenacre and Blasius, 1994). HOMALS was used to identify relationships in a qualitative multivariate analysis. Indeed, in addition to its few

requirements about the nature of data and the distribution structure, HOMALS allows users to analyse linear as well as non-linear relationships on multiple qualitative variables (Heisser and Meulman, 1994; Gifi, 1990; Greenacre, 1994; 1993; 1991; Hoffman and Franke, 1986; Strutton and Pelton, 1994).

Particularities of HOMALS related to the meaning of the principal inertia require that its results be interpreted in a different way than is done for a traditional multiple correspondence analysis where the quality is based on the percentage of variance (Greenacre, 1991, 1993). For each sector of the environment or level of complexity, I examined the relationships between, on the one hand, suggested best sources, scanning frequency or level of complexity, and, on the other hand, the explanatory variables. For each analysis carried out, two axes could be retained (Greenacre, 1993). However, the two axes are retained only if the eigenvalue is more than $1/Q$ (Q = number of variables). On each axis, a suggested information source is retained for interpretation only if its discrimination measure (squared correlations) is, at least, within 10% of the corresponding eigenvalue (Greenacre, 1991; Gifi, 1990; Jambu, 1989; Lebart, Morineau, and Warwick, 1984). In addition, care was taken to ensure that the discrimination measures on the two dimensions retained were unrelated, in order to satisfy the usual orthogonality condition between the two principal axes (Bryant and Yarnold, 1995; Greenacre, 1993).

Furthermore, referring to Gifi (1990), the relationships identified were subjected to informal verification of stability (Heisser and Meulman, 1994; Van de Geer, 1993). Relationships were initially found between suggested scanning activities and variables belonging to all three dimensions of the explanatory characteristics. Thereafter, relationships were found between suggested scanning activities and explanatory characteristics belonging only to each dimension. Relationships were considered to be consistent only if they were found at the two levels of analysis (Blasius, 1994; Jambu, 1989; Lebart, Morineau, and Warwick, 1984).

RESULTS

Profile of SMEs studied

Regarding the industry environment, 69 percent of SMEs faced a standardized demand, 87 percent had a specialized product, and 80 percent targeted industrial customers. Fifty-six percent of SMEs studied faced a mature industry environment, while 60 percent faced a higher level of technological intensity.

Considering organizational characteristics, 89 percent of SMEs studied were old, 53 percent were medium-sized, and the success of 71 percent was based upon human resources. Most of them (56 percent) had a mechanistic structure, although they were highly decentralized and employed participatory management techniques.

Most owner-managers of these SMEs (69 percent) were mature. Less than half (47 percent) had lengthy experience with the principal product/service. However, 53 percent of owner-managers had worked in the same industry sector for at least 20 years. Most of the owner-managers (71 percent) were university graduates, but only 42 percent had taken specialized training related to their principal product/service.

Information sources suggested for environmental scanning

Respondents made 220 suggestions about information sources for international SMEs facing worldwide challenges. The five information sources most frequently suggested are, successively, customer contacts, reviews and other specialized publications, trade associations, trade shows, and purchase of technology (Table 1).

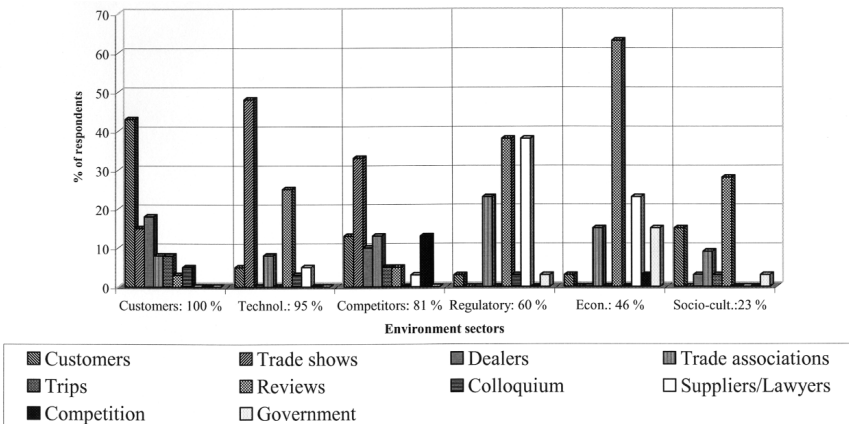
Table 1
Information sources suggested by owner-managers of globally oriented SMEs

Information sources	Percentage of respondents*
1. Customer contacts	67
2. Reviews and specialized writings	64
3. Trade associations	51
4. Trade shows and fairs	38
5. Purchase of technology	33
6. Networking partners	31
7. Colloquium and seminars	29
8. Dealers and wholesalers	27
9. Suppliers	24
10. Competitors and benchmarking	20
11. Internal human resources	20
12. Experience and practice	20
13. Training	16
14. Government	11
15. Trips and visits	11
16. Internet	9
17. Recruitment	7
18. Openness and good attitude	4
19. Research	4
20. Ethical behavior	2
Total	100

*In this table, the percentage is related to the proportion of the number of times each source has been suggested compared to the total of respondents.

Of these 220 information sources that managers suggested that firms like theirs use to scan the environment, 85 percent are external and 82 percent are personal. Sources that are both external and personal represent 68 percent whereas those that are both external and impersonal make up 17 percent. On the other hand, sources that are both internal and personal constitute 14 percent while only 1 percent of sources are both internal and impersonal. Despite the high number of external and personal information sources suggested, it is important to examine the differences related to the best sources that managers suggested for scanning each environment sector (Figure 1).

Figure 1
Best information sources most mentioned and percentage of managers suggesting a systematic scanning by environmental sector



To scan competition, the best source that managers most often suggested is trade shows or fairs (33 percent). Trade associations, customer contacts and benchmarking come in the second position, and each was suggested by only 13 percent of respondents.

The best source suggested to scan the market is customer contact (43 percent). It is followed by contact with dealers and wholesalers (18 percent). Trade shows are suggested most often as the best source to scan the technological sector (48 percent). They are followed by reviews and other specialized publications (25 percent). This last source is also suggested as the best one to scan regulatory (38 percent), economic (63 percent), and socio-cultural (28 percent) sectors. For these sectors, the best source in the second position is, respectively, lawyers (23 percent), trade associations (15 percent), and customer contacts (15 percent).

The need for systematic scanning differs by environment sector too. One hundred percent of managers suggested scanning systematically the customer

sector, and only 23 percent suggested following the same procedure in looking at the socio-cultural aspect of the firm. Between these extremes are technological (95 percent), competitor (81 percent), regulatory (60 percent), and economic (46 percent) sectors. In addition to the results presented in the Figure 1, it is interesting to note that the percentage of respondents who consider that scanning activities of the sectors listed above should be systematic and on a formal basis is 73 percent for customer, 40 percent for technological, 38 percent for competitor, 30 percent for regulatory, 12 percent for economic, and 0 percent for socio-cultural sectors.

Systematic scanning activities, but on an informal basis, are suggested by managers successively for technological (55 percent), economic (43 percent), competitor (42 percent), regulatory (35 percent), customer (27 percent), and socio-cultural (23 percent) sectors. The range of sectors according to suggestions for scanning activities on an occasional basis is as follows: economic (45 percent), regulatory (35 percent), socio-cultural (25 percent), competitor (20 percent), technological (5 percent), and customer (0 percent). Fifty-two percent of respondents consider that it is never necessary to scan the socio-cultural sector of their environment. It is interesting to note that most managers suggest scanning systematically and formally the customer and technology sectors. In contrast, most managers suggest scanning the economic sector only occasionally and informally.

Relationships between environmental practices and industry, organization, and owner-manager characteristics

The two levels of analysis by HOMALS allowed me to identify relationships presented in Tables 2, 4, and 5². The relationships found in this study suggest that for firms in an emerging environment where the level of technological intensity is higher and where owner-managers are university graduates, the managers suggest to primarily use trade shows and fair visits to get information on their market (customer needs). By contrast, in medium-sized firms in a mature environment where the level of technology intensity is lower, and whose product is targeted to a standardized market demand, the managers suggest to scan their market primarily by using customer and marketing intermediary contacts (dealers and wholesalers).

This study did not observe contrasting relationships in the technology sector. In fact, only a few consistent relationships were found between some information sources suggested for technology and the characteristics of particular firms. Thus, it appears that managers have most frequently suggested trade show visits and reviews as the best information sources for firms in a mature environment to scan the technology sector. It appears also that managers without specialization and/or university education have frequently suggested reviews as the best information sources on technology for firms whose main product or service is customized.

Table 2
Associations between explanatory variables and most often suggested best information sources by environment sector

		Competition					Customer		Technology		Regulatory		Economic			Socio-cultural					
Variables	Categories	Trade shows	Trade association	Customers	Competitors	Dealers & wholesalers	Customers	Dealers & wholesalers	Trade shows	Reviews	Reviews	Reviews	Lawyers	Trade associations	Reviews	Trade association	Government	Reviews	Customers	Trade association	No one
Nature of the demand	Customized			**			**				**				**		**				
Scope of the product use	Standardized												**								
Target market	Specialized											**	**		**						
Technological intensity	General			**			**					*			**	**	**				
Stage of development	End-user			**			**					**	**		**		**	**	**	**	
Size of the firm	Industrial	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**
Organizational Structure	Low																				
Required core competencies	High	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**
	Emerging	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**
	Mature	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**
	Small	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**
	Medium			**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**
	Organic																				
	Mechanistic																				
	Human resource	**	**			**		**													
	Technology			**	**																

(continued next page)

Table 2 (continued)
Associations between explanatory variables and most often suggested best information sources by environment sector

Variables		Competition				Customer			Technology		Regulatory			Economic			Socio-cultural			
		Trade shows	Trade association	Customers	Competitors	Dealers & wholesalers	Customers	Dealers & wholesalers	Trade shows	Trade shows	Reviews	Lawyers	Trade associations	Reviews	Trade association	Government	Reviews	Customers	Trade association	No one
Age of the firm	Young Old		**	**	**	**		**						**			**			**
Manager's level of specialization	Less High			**	**	**				**				**	**				**	**
Manager's level of instruction	No university University		**			**		**									**	**	**	**
Manager's level of experience	Low High	**	**			**														
Age of the manager	Young Mature		**			**	**	**							**	**	*	**	**	**

*** Association observed in the analysis considering all explanatory variables for the three dimensions and in the analyses considering only explanatory variables per dimension. Only these associations are commented upon in the text.

Table 4
Eigenvalues and discrimination measures of correspondence analysis on all explanatory dimensions

	Customers	Technology	Competition	Regulatory	Economic	Socio-cultural
Eigenvalue						
Axis 1	,2069	,2190	,2122	,2207	,2214	,2181
Axis 2	,1627	,1565	,1610	,1554	,1538	,1693
Discrimination measures by variable						
MANAGER'S	Axis 1 Axis 2	Axis 1 Axis 2	Axis 1 Axis 2	Axis 1 Axis 2	Axis 1 Axis 2	Axis 1 Axis 2
Age	,230 ,055	,225 ,057	,206 ,015	,576 ,003	,361 ,004	,287 ,020
Experience	,003 ,057	,004 ,156	,006 ,333	,435 ,003	,013 ,072	,001 ,078
Education	,335 ,117	,208 ,295	,203 ,079	,117 ,262	,221 ,198	,265 ,199
Specialization	,063 ,111	,033 ,402	,010 ,356	,000 ,179	,039 ,219	,017 ,327
Industry's						
Develop. stage	,617 ,046	,631 ,005	,570 ,004	,023 ,200	,585 ,002	,601 ,007
Techn. intensity	,494 ,047	,569 ,011	,473 ,014	,334 ,016	,454 ,003	,563 ,023
Market segment.	,051 ,418	,144 ,199	,113 ,048	,046 ,294	,148 ,299	,181 ,359
Product special.	,004 ,029	,009 ,005	,023 ,059	,075 ,049	,001 ,080	,002 ,223
Standardization	,055 ,285	,020 ,179	,007 ,069	,423 ,000	,016 ,250	,020 ,157

(continued next page)

Table 4 (continued)
Eigenvalues and discrimination measures of correspondence analysis on all explanatory dimensions

	Customers		Technology		Competition		Regulatory		Economic		Socio-cultural	
Eigenvalue												
Axis 1	,2069		,2190		,2122		,2207		,2214		,2181	
Axis 2	,1627		,1565		,1610		,1554		,1538		,1693	
Discrimination measures by variable												
Firm's	Axis 1	Axis2	Axis 1	Axis 2	Axis 1	Axis 2	Axis 1	Axis 2	Axis 1	Axis 2	Axis 1	Axis 2
Age	,312	,000	,241	,001	,322	,000	,312	,024	,323	,073	,263	,011
Required comp.	,004	,279	,103	,298	,121	,304	,003	,024	,063	,349	,090	,175
Structure	,138	,038	,084	,004	,121	,066	,258	,193	,058	,036	,054	,072
Size	,400	,070	,425	,006	,503	,001	,063	,272	,382	,008	,408	,012
Scanning												
Frequency	,064	,409	,102	,264	,078	,527	,323	,249	,156	,465	,118	,294
Sources	,334	,480	,487	,465	,428	,540	,322	,561	,502	,248	,400	,584

Table 5
Eigenvalues and discrimination measures (DM) of correspondence analysis by explanatory dimensions

	Customers	Technology	Competition	Regulatory	Economic	Socio-cultural
Manager characteristics						
<i>Eigenvalue</i>						
Axis 1	,3234	,3486	,3562	,3677	,3620	,3549
Axis 2	,2698	,2859	,2800	,3332	,2725	,3204
<i>DM per Variable</i>						
Age	,006 ,345	Axis 1 Axis 2	Axis 1 Axis 2	Axis 1 Axis 2	Axis 1 Axis 2	Axis 1 Axis 2
Experience	,141 ,263	,296 ,426	,011 ,457	,495 ,056	,510 ,071	,469 ,058
Education	,293 ,019	,129 ,004	,455 ,014	,125 ,004	,190 ,161	,039 ,262
Specialization	,353 ,119	,401 ,000	,019 ,388	,290 ,083	,219 ,037	,481 ,004
<i>Scanning</i>						
Frequency	,559 ,190	,465 ,058	,390 ,035	,099 ,318	,125 ,393	,193 ,392
Sources						
	,588 ,684	,168 ,510	,590 ,214	,524 ,711	,463 ,468	,345 ,588
		,633 ,717	,673 ,572	,674 ,828	,665 ,505	,603 ,618
Industry characteristics						
<i>Eigenvalue</i>						
Axis 1	,3017	,3449	,3039	,3253	,3257	,3398
Axis 2	,2872	,2487	,2542	,2685	,2438	,3002
<i>DM per Variable</i>						
Develop. stage	Axis 1 Axis 2	Axis 1 Axis 2	Axis 1 Axis 2	Axis 1 Axis 2	Axis 1 Axis 2	Axis 1 Axis 2
Techn. intensity	,680 ,006	,567 ,034	,649 ,001	,493 ,066	,536 ,093	,506 ,106
Market segment.	,750 ,000	,719 ,016	,677 ,035	,572 ,126	,554 ,113	,693 ,086
Product special.	,172 ,379	,294 ,238	,279 ,059	,411 ,144	,381 ,164	,488 ,135
Standardization	,002 ,098	,000 ,532	,019 ,382	,032 ,434	,020 ,359	,033 ,585
<i>Scanning</i>						
Frequency	,056 ,543	,006 ,240	,001 ,008	,010 ,247	,000 ,329	,001 ,213
Sources						
	,001 ,388	,267 ,097	,033 ,612	,338 ,535	,297 ,405	,007 ,337
	,451 ,596	,561 ,584	,468 ,682	,420 ,328	,492 ,244	,651 ,640

(continued next page)

Table 5 (continued)
Eigenvalues and discrimination measures (DM) of correspondence analysis by explanatory dimensions

	Customers	Technology	Competition	Regulatory	Economic	Socio-cultural
Firm characteristics						
<i>Eigenvalue</i>						
Axis 1	,3460	,3586	,3993	,3700	,3497	,3360
Axis 2	,2930	,2524	,3179	,3097	,3226	,2980
<i>DM per Variable</i>	<i>Axis 1</i> <i>Axis 2</i>	<i>Axis 1</i> <i>Axis 2</i>	<i>Axis 1</i> <i>Axis 2</i>	<i>Axis 1</i> <i>Axis 2</i>	<i>Axis 1</i> <i>Axis 2</i>	<i>Axis 1</i> <i>Axis 2</i>
Age	,301 ,146	,278 ,000	,376 ,019	,526 ,003	,348 ,435	,386 ,024
Required comp.	,016 ,473	,355 ,130	,246 ,282	,197 ,116	,319 ,182	,176 ,297
Structure	,469 ,012	,278 ,125	,296 ,202	,135 ,003	,165 ,045	,310 ,274
Size	,262 ,376	,489 ,071	,522 ,001	,391 ,106	,476 ,030	,464 ,073
<i>Scanning</i>						
Frequency	,450 ,190	,098 ,567	,271 ,705	,471 ,799	,294 ,492	,343 ,462
Sources	,577 ,561	,654 ,621	,685 ,699	,501 ,831	,497 ,753	,337 ,659

Regarding scanning of the competitor sector, small and young firms in an emerging environment where the level of technology intensity is higher should make use of customer contacts and trade associations as information sources. By contrast, firms in a mature environment with a lower level of technological intensity should use trade shows, benchmarking, and marketing intermediary contacts.

In dealing with the regulatory sector, firms making a product dedicated to a specialized use, and operating in an emerging environment where the level of technology intensity is lower, should use trade associations as the best information source. By contrast, firms making products dedicated to a general use and operating in a mature environment where the level of technology intensity is higher, should use reviews and networking partners as the best information source.

Government services should be used as the best information source of economic sector by firms managed by less specialized managers, those that operate in an emerging environment where the level of technological intensity is higher, and by firms that make customized products for industrial clients. By contrast, firms managed by specialized managers, those that operate in an environment where the technological intensity is lower, and firms that make general products for end-user consumers, should use reviews as the best information source.

With respect to the socio-cultural sector, customer contacts and trade associations are suggested as the best source of information for firms operating in an emerging environment where the level of technological intensity is higher. By contrast, reviews are suggested as the best source of information about the socio-cultural sector for firms operating in a mature environment where the technology intensity is lower.

Considering relationships between explanatory variables and the scanning structure process suggested (Tables 3, 4, and 5), one could notice that the technological sector does not have a consistent relationship with any explanatory variable. These results may indicate that this sector is scanned in the same way whatever the explanatory factors examined in this study. It can also be noticed that, except for the economic sector, explanatory variables related to the best information sources of a given sector were equally related to the desire to scan systematically this sector on a formal basis. For example, systematic scanning on a formal basis for the competitor sector is associated with firms whose success is human resource-based and whose managers have higher level specialization and experience. These explanatory variables are among those that were also associated with trade shows, the best information source most often mentioned for this sector. This finding may suggest that the trade show is the most appropriate information source because it is either more accessible or a richer source of relevant information needed to scan the competition sector of

this category of firms. A deeper analysis, however, is needed to know if this appropriateness of sources is based on accessibility or richness. Such analysis should contrast scanning practices used by successful firms to those used by less successful ones to make sure the appropriateness of information sources and scanning practices have contributed to the success of the former.

From the standpoint of the scanning complexity level, HOMALS results, as presented in Tables 3 and 6, show that a lower level of scanning complexity is related to firms managed by less specialized managers whose product is targeted to industrial customers, and whose success is based on available technology. By contrast, a higher level of scanning complexity is characteristic of firms managed by specialized managers who make a product targeted to end-user consumers, and whose success is based on skilled human resources.

DISCUSSION AND PROPOSITIONS

Differences in the levels of strategic uncertainty across environment sectors and a positive relationship between the level of uncertainty of each sector and its scanning frequency have been observed in previous studies (Auster and Choo, 1994b; Ebrahimi, 2000; Daft, Sormunen, and Parks, 1988). In the current study, the environment sectors range as follows according to the suggested necessity to be systematically scanned: customer, technology, competition, regulatory, economic, and the socio-cultural sectors. It would be interesting to compare this ranking to those found in previous studies as presented in Table 6.

A variety of factors may explain the differences observed in the positions of sectors in these studies. Thus, the economic sector is in the best position during a recession (Daft, Sormunen, and Parks, 1988), the political sector is in the best position when it really represents a threat (Ebrahimi, 2000; Sawyerr; 1993), and the technology sector is in the best position when its level of ambiguity is higher (Auster and Choo, 1994a; 1994b). In almost all studies, the customer sector occupies the first (or second) position while the socio-cultural sector is ranked in the last position. This may be explained by the fact that the customer sector is more volatile and equivocal than the socio-cultural sector whose content may be more easily codified than the content of the customer sector (Choudhury and Sampler, 1997; Larson and Kulchitsky, 2000; Lee and Heath, 1999; Roberts, 2000).

Differences in ranking indicate that the uncertainty of a given sector is not static but dynamic. It can change through times, industries, and countries. The first three sectors of the current study have been identified in recent publications as the most challenging for GOSMEs (Cervantes, 1997; Dodge, Fullerton, and Robbins 1994; Karagozoglu and Lindell, 1998). These observations suggest the following proposition:

Proposition 1: The higher the uncertainty level of a sector for the globally oriented SME, the more this sector will need to be systematically scanned.

Table 3
Associations between explanatory variables, scanning frequency and complexity

SCANNING FREQUENCY AND PROCESS FORMALIZATION																					COMPLEXITY	
Variables	Categories	Competition			Customer		Technology			Regulatory			Economic			Socio-cultural			Low	High		
		Systematic & formal	Systematic but not formal	Occasional	Systematic & formal	Systematic but not formal	Systematic & formal	Systematic but not formal	Occasional	Systematic & formal	Systematic but not formal	Occasional	Systematic & formal	Systematic but not formal	Occasional	Systematic but not formal	Never					
Nature of the demand	Customized				**									**								
Scope of the product use	Standardized				**									**								
Target market	Specialized										**											
Technological intensity	End-user				**									**				**	**			
	Industrial																		**			
Stage of development	Low										**											
	High											**										
Size of the firm	Emerging											**										
	Mature											**										
Organizational Structure	Small																					
	Medium																					
Required core competencies	Organic																					
	Mechanistic																					
	Human resource	**	**																**	**		
	Technology																					

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Table 3 (continued)
Associations between explanatory variables, scanning frequency and complexity

SCANNING FREQUENCY AND PROCESS FORMALIZATION																	COMPLEXITY			
Variables	Categories	Competition			Customer		Technology			Regulatory			Economic			Socio-cultural			Low	High
		Systematic & formal	Systematic but not formal	Occasional	Systematic & formal	Systematic but not formal	Systematic & formal	Systematic but not formal	Occasional	Systematic & formal	Systematic but not formal	Occasional	Systematic but not formal	Occasional	Systematic but not formal	Never				
Age of the firm	Young Old																			
Manager's level of specialization	Less High	**	**	**									**	**			**	**		
Manager's level of education	No university University														**					
Manager's level of experience	Low High	**	**													**				
Age of the manager	Young Mature															**				

** Association observed in the analysis considering all explanatory variables for the three dimensions and in the analyses considering only explanatory variables per dimension. Only these associations are commented upon in the text.

Table 6
Ranking by necessity of scanning an environment sector in the current study and perceived uncertainty
by sector in previous studies

Sectors by importance of scanning in the current study	Rank in perceived uncertainty observed by				
	Auster and Choo (1944a&b) on Canadian managers**	Daft, Sormunen, and Parks (1988) on US managers	Ebrahimi (2000) on Chinese (Hong Kong) managers	John and Kuehn (1987) on US managers	Sawyer (1993) on Nigerian managers
1. Customer	1	1	2	1	1
2. Technology	2	4	4	4	6
3. Competition	3	3	1	1	4
4. Regulatory	4	5	6	5	3
5. Economic	5	2	3	3	2
6. Socio-cultural Resources*	6	6	7		7
			5		5

*This sector has not been considered in the current study.

** In Auster and Choo 1994a, the study has a sample of 13 CEOs, in Auster 1994b, the study has a sample of 115 CEOs. A few differences are observed in the ranking.

Managers of young and small firms in an emerging industrial environment with a higher level of technological intensity prefer trade associations and contacts with customers in order to scan competition. This phenomenon may be explained, from my point of view, by the lower level of threat from competition for these SMEs. They generally have a distinctive competitive advantage that competitors cannot easily imitate. Thus, they can scan competition by the accessible but less expensive information sources. Likely, the choice of trade association by young, specialized, and university educated managers can be explained by their higher level of self-confidence and their tendency to rely on the most accessible information (Cooper, Folta, and Woo, 1995).

Trade shows, benchmarking, and contacts with wholesalers and dealers provide a great deal of pertinent information about competition. The value of benchmarking in providing pertinent information about competition seems obvious. Trade shows allow managers to meet with competitors and enable them to gather written materials containing information about their competitor products. In addition, they attend meetings and presentations identifying the main trends in the sector. Finally, wholesalers and dealers have products from many manufacturers and have more information about competition than end-user consumers.

The three information sources above are recommended by managers for scanning the competition of GOSMEs facing a higher level of uncertainty in this environment sector. These GOSMEs are old, medium-sized, and operate in a mature environment with a lower level of technological intensity. In this kind of SMEs, technology and the manufacturing process are generally well known, the number of competitors is higher, and consequently the competition is fierce (Dodge, Fullerton, and Robbins, 1994). It is then important to get more information on competitors. These observations lead to the following proposition:

Proposition 2: The choice of information sources used to scan a sector of the environment is related to the perceived level of uncertainty about this sector, the value of the source in pertinent information, and its accessibility by the GOSME.

Previous studies have reached contradictory conclusions on the relative importance of the media richness and the accessibility of the information source (Auster and Choo 1994b). The fact that GOSMEs, unlike the huge multinationals observed by Preble, Rau, and Reichel (1988), do not mainly use internal information sources, may lead to the conclusion that accessibility is a less important criterion than richness when one chooses an information source (Auster and Choo, 1994b). But it should be remembered that GOSMEs do not generally have subsidiaries or ad hoc services to collect information on foreign countries and must use resources that are readily available, that means, most accessible (Christensen and Bailey, 1997). It seems therefore that owner-managers of GOSMEs have suggested information sources and scanning behaviors that best fit with their relatively limited resources. But one may wonder if

sources selected by managers to scan environment sectors are really lean. This study does not have enough information to answer this question adequately. Nevertheless, I will examine the information sources that managers suggested rather than their broad categories on the one hand, and the level of uncertainty by sector on the other.

The results of the current study indicate that, while scanning a specific environment sector, managers choose some sources to the detriment of others, whether the sources should belong to the same broad category or have the same level of richness with a higher level of potential in social presence. For example, in scanning competition and technology, managers suggest that trade shows are the best personal information source. In the same way, they say that reviews are the best impersonal information source of the regulatory, economic, and socio-cultural sectors. In light of evidence about the choice of information sources according to their specific content, conclusions based on broad categories or on the richness criterion in terms of social presence may not be a sufficient way to understand scanning behavior in GOSMEs. Consequently, the following propositions may be stated:

Proposition 2a: The higher the level of perceived uncertainty of the environment, the more the value of pertinent information becomes the main criterion to the GOSME in choosing the information source.

According to the results of this study, a given information source does not have the same value in providing pertinent information for different environment sectors. Contacts with clients seem to give the best information on customers' needs, trade shows seem to give the best information on competition, and reviews seem to give the best information on the technological, regulatory, and economic sectors.

To better illustrate the proposition, let us examine the customer sector that was considered to be in need of systematic scanning. The level of uncertainty about the market is higher when an SME is medium-sized, operates in a mature environment where the level of technological intensity is lower, and when the SME targets end-user consumers who have a standardized demand. Indeed, an SME in this situation is generally reactive and needs more precise information on customers' desires for a better product or service adaptation. Customers themselves or wholesalers in regular contact with them are the best information sources about different customers' needs. By contrast, the level of uncertainty of a market is of lesser concern to a proactive, young and small-sized SME operating in an emerging environment where the level of technological intensity is higher. This kind of SME generally has an outstanding, unique product that gives it a quasi-monopolistic position in the market. It looks for information on future customer needs to maintain its position. Information about future customer needs can be obtained during trade shows, with related conferences and contacts.

Proposition 2b: The lower the level of perceived uncertainty, the more access to the information source is the main criterion when GOSMEs choose an information source.

The accessibility of the information is the factor that best explains the choice of the information source made by GOSMEs compared to the choices made by large businesses. This factor explains the fact that instead of preferring internal information sources, as observed in large multinationals by Preble, Rau, and Reichel (1988), managers of GOSMEs prefer external sources because they are more accessible or are the only ones to be available. However, the level of accessibility is different from one external source to another. Sometimes, even if the source is rich in pertinent information, the SME can leave it and choose another source that may have less information but that is more easily accessible. This is true most often when the level of uncertainty about the sector is lower or when a more valuable source has already been used.

This proposition is illustrated by many of the results presented above. SMEs facing a lower level of competition chose professional associations and contacts with customers in order to scan the competition. Firms facing a higher level of competition preferred benchmarking, trade show visits, and contacts with wholesalers and dealers in order to find out more about their competition. Internet use can also illustrate this proposition. This source provides a wealth of information about many environment sectors, but many managers have not preferred it. This can be explained by the fact that at the time of this study, only a few managers of GOSMEs could easily use this new information source. Indeed, the Canadian Federation of Independent Business (CFIB) observed that only 24 percent of Canadian SMEs were using the Internet at the end of 1996. For Canadian SMEs, this percentage rose to 31 percent (but it rose only to 19 percent in Quebec) in 1997 (Mallett, 1997). The low percentage of Internet use by SMEs, despite its value for gaining information, can be explained by its newness and low accessibility to SMEs.³

Proposition 2c: If the accessible source that a GOSME chooses provides a large amount of pertinent information about a sector, then the number of additional sources the firm uses to scan this sector is lower.

This proposition is deduced from the previous propositions. Indeed, information is searched to reduce uncertainty. If the most accessible source used reduces the uncertainty so that the environment becomes less equivocal for the firm, saturation is obtained and the firm will not need more information to take adequate decisions and actions. By contrast, if the environment is still equivocal after the SME uses the first source, the firm will look for supplementary information from other sources.

The current proposition is also congruent with Harrison's optimality concept (Harrison, 1999). According to Harrison, managers continually seek a balance between the cost of additional information, the amount of the perceived

payoff, and their own level of aspiration. At some point, the necessity of continually trying to perfect information will exponentially decline.

Proposition 3: If a GOSME has many environment sectors with a higher level of perceived uncertainty, then its scanning activities will be more complex.

This proposition is congruent with the first proposition above. It is also consistent with observations made by Daft, Sormunen, and Parks (1988). These authors observed that scanning behavior among environment sectors varies with their perceived uncertainty and the need for information. In the current study, the relationships found between the level of scanning complexity and some explanatory variables support this observation. The relationship between a lower level of scanning complexity and managers who are less specialized, have industrial customers, and whose success is technology-based can be explained by the low level of perceived uncertainty and the relatively lower need for information by managers of these firms. They have few customers and have a unique technology. By contrast, specialized managers of firms with end-user consumer products, and whose success is based on the competency of the available human resources, suggest a higher level of scanning complexity. Such firms are facing a higher level of uncertainty because their market is large and they can therefore attract huge companies. Furthermore, the fact that specialized managers have studied in the area of the principal product or service enhances their desire to look for information about many environment sectors (Senker, 1994). These managers need information on many environment sectors because their firms do adapt continuously by a better use of their internal creativity.

CONCLUSION

The purpose of this study was to identify environmental scanning information sources and practices that globally oriented small and medium-sized enterprises, according to their specific contexts, could use to succeed in their activities in the global marketplace. The results suggest that uncertainty, the amount of information provided by the sources, and their accessibility by the GOSME determine the choice of an information source and the frequency of scanning. In their preferences for information source, managers of GOSMEs do not seem particularly concerned by the internal exploitation of location specific advantages that generally characterize large multinationals scanning activities (Mucchielli, 1998; Canals, 1995, Preble, Rau, and Reichel, 1988). They do not combine their various firm-specific advantages and exploit them internally by creating their own system of subsidiaries abroad in order to gather pertinent information (Etemad and Wright, 1999). In contrast, they prefer sources more appropriate to their simple structures and limited resources, such as trade shows, customer contacts, reviews, and so on.

The level of uncertainty, the value of the source, and its accessibility

influence GOSME scanning activities in a complementary way. Some propositions have been stated about GOSMEs' behavior in relation to these factors. Uncertainty resulting from the environment, organization and managerial characteristics seem to be the starting point to better understand the choice of information sources and the need to scan a given environment sector. However, the effective choice of any source is also dependent on its richness in pertinent information and on its accessibility. A source can be used to get information on different sectors by the same SME. As well the same information source may be used for different purposes by two different SMEs. The propositions given above can help discover the characteristics of sources with relevant information for each GOSME. But they need to be systematically examined in future research and compared to those used by less successful firms.

The current study is exploratory, and the generalizations based on its results are limited by its small size and non-random sample. Future research should examine samples of globally oriented SMEs from many countries and manifesting different levels of success. Furthermore, they should take into account the fact that scanning for information is only part of the information search (location and content of an information source). The sensemaking (meaning of information) is the other part that can prevent distortions of information search in framing, predicting, and suggesting causal attributions (Starbuck and Milliken, 1988). Also, in future researches, one should be aware that the information search itself is only one of the inputs needed to improve the quality of managerial decisions and that the success of a strategic decision is dependent on the quality of the strategic decision as well as on its implementation (Harrison, 1999).

In spite of its limits, the current study shows that scanning behavior in GOSMEs is contingent on many factors. In addition, researchers should not consider information sources in broad categories related to their location inside or outside the firm, but individually in relation to their accessibility by the firm and their value in reducing uncertainty in the most important sectors of the firm's environment. These factors are not equally important and their respective importance for the same firm is not static. It varies from time to time and industry to industry. Also, the importance of each factor above can be related to a specific sector of the task environment as well as to the one in the general environment of the firm. Simultaneously taking into account these factors can explain some of the contradictions found in previous studies. Governments, consultants, researchers, and managers should be aware of what scanning contingencies to look for and of the dynamic nature of scanning behavior that GOSMEs actually use to try to provide themselves with relevant information.

NOTES

1. The author would like to thank Professors Gerald d'Amboise (Laval University, Quebec), Michael Gilmour (Providence College, Manitoba), and Aydon Charlton (University of Regina) for their insightful and helpful comments on an earlier draft.
2. Homals' outputs are composed of 52 graphics (four by each environment sector for information sources as well as for structure process, and four for complexity) with the same number of related tables of variables, discrimination measures, and category quantifications. Because of limited space, these graphics and tables are not presented here, but they are available from the author.
3. However, the situation is changing quickly. In 1999, 61 percent of Canadian SMEs were using the Internet while only 47 percent of SMEs in Quebec were using it. (Mallett, 1999).

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