December 1998

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ENVIRONMENTAL SCANNING ON THE INTERNET

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Abstract

This study investigates the important organizational task of environmental scanning in an Internet context. A theoretical model relating potential causal factors to effectiveness of environmental scanning was formulated based on a synthesis of environmental scanning literature that took into consideration the Internet context. A questionnaire was developed for data collection. Responses from 105 organizations were tested for convergent and discriminant validity before the theoretical model was assessed using PLS analysis. Results showed that smaller organizations tend to scan more frequently on the Internet, both use of external consultants and volatility of competitor sector tend to cause organizations to scan more frequently on the Internet, and both use of external consultants and scanning frequency on the Internet tend to result in effectiveness of environmental scanning. Additional insights on these results were obtained through telephone interviews with 10 respondents.

1. INTRODUCTION

Environmental scanning is defined as the acquisition and use of information external to an organization, the knowledge of which would assist management in planning future courses of action (Aguilar 1967). As an antecedent to the development of organizational strategies (Dess 1987), environmental scanning often initiates a chain of actions that lead to organizational adaptation to environmental changes (Hambrick 1981). To the extent that viability of organizations depend on their ability to stay ahead of environmental challenges, environmental scanning can be considered a vital organizational task (Boyd and Fulk 1996).

For three decades, research has studied environmental scanning activities in organizations in terms of environmental sectors covered (e.g., Nishi, Schoderbek and Schoderbek 1982), nature of information sources used (e.g., Preble, Rau and Reichel 1988), and scanning frequency (e.g., Fahey and King 1977). Some studies have tried to link scanning frequency to organizational performance indices such as profitability (e.g., Daft, Sormunen and Parks 1988). While scholars and practitioners agree on the importance of environmental scanning, no study has explicitly examined the potential causal factors (Choudhury and Sampler 1997) to see which could impact effectiveness of environmental scanning.

With more and more information becoming available in electronic form, organizations have increasingly carried out environmental scanning using information technology such as executive information systems linked to online databases (Vandenbosch and Huff 1997). This trend is likely to grow with the Internet, which provides organizations access to a vast amount of information in electronic form. The borderless nature of the Internet suggests that organizations may be able to scan a greater variety of information sources that cover a wider range of environmental sectors. The ease of access to information on the Internet implies that organizations may be able to scan more frequently. In short, as a borderless information resource that transcends traditional

boundaries and notions for information acquisition and use, the Internet may change the way organizations conduct environmental scanning in the future. Case studies have provided anecdotal evidence on the benefits of using the Internet for environmental scanning (Choo 1995).

To better understand the vital task of environmental scanning, this study seeks to develop a theoretical model that relates causal factors to effectiveness of environmental scanning. Since many organizations are turning to the Internet for innovative business solutions in increasingly borderless trading communities, we assess our theoretical model in the Internet context so that the knowledge gained will be valuable to organizations as they attempt to leverage their future environmental scanning efforts on the Internet.

2. LITERATURE AND HYPOTHESES

Environmental scanning was initially carried out as informal, unstructured activities by individual managers who gathered information as part of their work (Aguilar 1967). Over time, with rapid increases in environmental complexity, environmental scanning evolved to become more organized and coordinated efforts that employed sophisticated techniques (Klein and Linneman 1984) and information technology (Preble, Rau and Reichel 1988). Some organizations create specialized internal units to carry out environmental scanning activities while others outsource such activities to external consultants (Choudhury and Sampler 1997). For example, General Foods outsourced all its environmental scanning efforts to an external consultant who placed information gathered in a database accessible by employees of General Foods (Choo 1995).

During environmental scanning, information is gathered from both personal and impersonal sources (Daft, Sormunen and Parks 1988). Face-to-face and telephone communication are key bases for tapping personal sources of information. Information from personal sources tends to be rich in content and facilitates understanding when environmental complexity is high (Daft, Sormunen and Parks 1988). Thus, personal sources are the preferred choice when dealing with ambiguous or uncertain situations (Choo 1995). The success of this approach depends very much on the availability of a wide personal network (Kotter 1982). Impersonal sources of information include newspapers, magazines, company reports, television broadcasts, and online databases. Impersonal sources condense large amounts of information into concise summaries (Daft, Sormunen and Parks 1988) and are ideal for broad scans of the environment (Choo 1995). However, collecting and synthesizing information from printed impersonal sources can be a laborious task. Furthermore, although online databases offer benefits such as abundant and updated information, and versatile search capabilities, less experienced users tend to find such databases difficult to access (Olaisen 1990).

Being an easy to use and extremely powerful information resource, the Internet has been touted as the future tool of competitive intelligence (Cronin et al. 1994). As a global network linking organizations and people across political and physical boundaries, the Internet promises both the ability to build personal networks and access to the largest repository of information resources worldwide. Personal sources of information can be tapped using electronic mail, discussion groups, or chat functions. Impersonal sources of information would include electronic versions of newspapers, magazines, and company reports available on the World Wide Web. By making many information sources available from a single point of access, the Internet has the potential to revolutionize environmental scanning activities. In this study, research hypotheses were formulated by a synthesis of environmental scanning literature that took into account the Internet context.

2.1 Organizational Size

Organizational size has been shown to affect environmental scanning activities (Yasai-Ardekani and Nystrom 1996). With more financial and intellectual resources at their disposal (Ein-Dor and Segev 1982), larger organizations tend to expend more resources (Klein and Linneman 1984) and use more sophisticated techniques (Diffenbach 1983) so as to scan their environment more frequently and widely. When environmental scanning is being carried out using traditional sources of information, organizational size tends to be positively correlated with scanning frequency (Yasai-Ardekani and Nystrom 1996). However,

being vulnerable to the effects of environmental volatility (Welsh and White 1981), smaller organizations need to scan the environment as much as, if not more than, larger organizations. Neglecting critical environmental signals can be fatal to smaller organizations so they need to acquire quality and timely environmental information. However, given their lack of resources to scan traditional sources of information, smaller organizations need to turn to alternative sources to satisfy their information needs. Being an economical but extensive source of information, the Internet is likely to be attractive to smaller organizations as a means of conducting environmental scanning. Conversely, given that larger organizations are likely to have a mechanism for scanning traditional sources of information (Diffenbach 1983), they are less likely to conduct environmental scanning on the Internet. Therefore, we hypothesize:

H1: Organizational size will be negatively related to Internet scanning frequency.

2.2 External Consultants

Environmental scanning typically involves sifting a large amount of potentially useful information and trying to make sense out of it (Daft and Weick 1984). Some critical environmental signals may be confusing or difficult to detect and analyze. To cope with such problems, organizations can hire external consultants with the necessary expertise (Lucas and Plimpton 1972) to help them conduct environmental scanning. Traditionally, external consultants have helped to enhance effectiveness of environmental scanning by gathering and interpreting information for organizations. This is likely to be applicable even in the Internet context. In addition to such services, external consultants can help to facilitate organizational learning (Turner 1982) by directing them to useful information sources. In the Internet context, external consultants can play this role by providing organizations with useful Web sites. With such assistance, organizations are likely to do environmental scanning on the Internet more frequently. Therefore, we hypothesize:

H2: Use of external consultants will be positively related to Internet scanning frequency.

H3: Use of external consultants will be positively related to Internet scanning effectiveness.

2.3 Environmental Volatility

The organizational environment has two components: general environment (comprising economic, technological, regulatory, and socio-cultural sectors) and market environment (comprising customer and competitor sectors) (Fahey and Narayanan 1986). Most organizations are susceptible to volatility in their market environment because changes in customer expectations or competitor actions can directly affect their performance (Boyd and Fulk 1996). Shifting market structures and competitive dynamics have compelled organizations to collect, analyze, and act on information from their market environment at an increasing pace (Eisenhardt 1989). Besides reducing uncertainty, such information can help organizations to alter their business strategies to make competitive strikes (Hedberg 1981). To cope with volatility in their market environment, organizations can scan their customers and competitors sectors to see what customers really need and what competitors are offering (Yasai-Ardekani and Nystrom 1996). This information can then be interpreted against information from the general environment to facilitate formulation of organizational strategies (Fahey and Narayanan 1986). The more volatile their market environment, the more frequently organizations need to scan their market and general environments for information. The Internet is potentially a rich source of information on market and general environments. Thus, organizations are likely to turn to the Internet when gathering such information. Therefore, we hypothesize:

H4: Volatility in customer sector will be positively related to Internet scanning frequency.

H5: Volatility in competitor sector will be positively related to Internet scanning frequency.

2.4 Scanning Frequency

Although the market environment has strategic significance for organizations (Boyd and Fulk 1996), environmental scanning should not be restricted to the market environment because information on the general environment assists in interpreting information on the market environment (Fahey and Narayanan 1986). More exposure to information on their market and general environments can help organizations to respond more quickly and effectively to environmental changes (Eisenhardt 1989) if such information helps to generate awareness on organizational strengths and weaknesses, and insights on existing and impending issues (Yasai-Ardekani and Nystrom 1996). The frequency with which organizations conduct environmental scanning using traditional sources of information influences their level of exposure to environmental information (Hambrick 1982) and may affect the effectiveness of their environmental scanning. As a potentially rich source of information on market and general environments, the Internet is likely to offer needed environmental information to organizations. Organizations that carry out environmental scanning frequently on the Internet are likely to be better at responding to environmental changes. Therefore, we hypothesize:

H6: Internet scanning frequency will be positively related to Internet scanning effectiveness.

3. RESEARCH METHODOLOGY

The survey research method was used to collect data for testing our theoretical model.

Table 1. Operationalization of Constructs

Construct	Measures	Scale (Source)
Organizational size (OrgSize)	1. Number of employees	Interval (Yasai-Ardekani and Nystrom 1996)
Use of external consultants (ExtCon)	1. Gather information or sources 2. Analyze information or sources	7-point interval (Self-developed)
Volatility of customer sector (CustSec)	1. Demographic patterns affecting demand 2. Customer needs 3. Customer segments served	7-point interval (Yasai-Ardekani and Nystrom 1996)
Volatility of competitor sector (CompSec)	1. Entry and exit of competitors 2. Penetration of markets by competitors 3. Product innovations by competitors 4. Marketing innovations by competitors	7-point interval (Yasai-Ardekani and Nystrom 1996)
Internet scanning frequency (ScanFreq)	1. Customer sector 2. Competitor sector 3. Supplier sector 4. Economic sector 5. Technological sector 6. Regulatory sector 7. Socio-cultural sector	7-point ordinal (Daft, Sormunen and Parks 1988; Boyd and Fulk 1996)
Internet scanning effectiveness (ScanEff)	1. Strategic planning 2. Forecasting 3. Outdoing competition 4. Identifying opportunities	7-point interval (Self-developed)

3.1 Operationalization of Constructs

As far as possible, constructs were measured using tested questions from prior studies to enhance validity. Where this was not possible, new questions were developed based on a review of environmental scanning literature and subsequently tested for validity. Table 1 summarizes the operationalization of constructs examined in this study.

Organizational size was measured using number of employees as in Yasai-Ardekani and Nystrom (1996). Use of external consultants was measured with two questions asking organizations the extent to which external consultants helped them to gather and analyze (Lucas and Plimpton 1972) environmental information (and sources of information) on the Internet. Volatility in customer and competitor sectors were each assessed using two sets of questions taken from Yasai-Ardekani and Nystrom. The first set gauged actual impact of environmental changes on the organization for the past three years while the second set gauged anticipated impact of environmental changes on the organization over the next three years. For the customer sector, environmental changes captured were demographic patterns affecting demand, customer needs, and customer segments served. For the competitor sector, environmental changes captured were entry and exit of competitors, penetration of markets by competitors, product innovations by competitors, and marketing innovations by competitors. Volatility in both sectors were computed from the difference between responses to the first and second sets of questions (Yasai-Ardekani and Nystrom 1996).

The organizational environment can be compartmentalized using taxonomies (Hambrick 1981). This study employed a taxonomy with six sectors (Daft, Sormunen and Parks 1988): customer, competitor, economic, technological, regulatory, and socio-cultural. Supplier sector, deemed relevant based on the literature (e.g., Boyd and Fulk 1996), was added. Internet scanning frequency for each sector was measured on an ordinal scale: (1) never, (2) yearly, (3) quarterly, (4) monthly, (5) weekly, (6) daily, and (7) more often than daily. Overall Internet scanning frequency was measured based on Internet scanning frequency for each sector. Internet scanning effectiveness measures the extent to which information arising from Internet scanning activities can contribute to organizational strategic formulation. Due to the lack of research on effectiveness of environmental scanning, no validated questions for Internet scanning effectiveness were available. A review of the literature (e.g., Aguilar 1967) and interviews with managers revealed that information from environmental scanning activities was commonly used for strategic planning, forecasting, outdoing competition, and identifying opportunities. Hence, four questions that asked organizations the extent to which environmental scanning activities had helped them to achieve these four objectives were used to gauge Internet scanning effectiveness.

3.2 Pilot Studies

The survey instrument was tested with several colleagues to identify and rectify potential problems due to the framing and wording of questions. Next, it was tested with five managers, who were asked to comment on layout of questions and highlight questions that were confusing or difficult to answer. The revised instrument was sent back to these managers for verification before the survey was administered. Besides contributing to the refinement of the instrument, insights provided by colleagues and managers gave us a better idea of the type of responses that might be expected and the meanings behind those responses (Fowler 1988).

3.3 Survey Administration

The survey was administered to 750 organizations, randomly selected from Dun and Bradstreet (1996). In accordance with Hambrick's (1981) recommendation that research on environmental scanning should cover multiple industrial sectors, we sampled both manufacturing and service organizations. The survey was addressed to the CEO of each organization because the CEO was likely to be cognizant of many aspects of the organization and should be able to provide accurate and correct information. The CEO was requested to redirect the survey to a strategic planner if the latter knew more about environmental scanning activities in the organization and was in a better position to respond.

A parcel comprising a cover letter, a copy of the survey instrument, and a self-addressed return envelope was sent to the CEO of each organization. The cover letter explained the purpose and significance of the study. To increase the response rate, follow-up telephone calls were made, four weeks and six weeks after the survey was mailed, to organizations which had not responded. An additional 102 parcels were sent to organizations which had misplaced the original parcels.

A total of 42 organizations in our sample had ceased operations. Among the remaining 708 organizations, 142 responded, yielding a response rate of 20.1%. Responses from 37 organizations were dropped because these organizations had not used the Internet at all and had no idea how the Internet could be employed for environmental scanning. The remaining 105 responses were used for data analyses. Missing data in several responses were obtained through telephone interviews with respondents. Among the responding organizations, the number of employees ranged from three to 7,000, while the sales turnover ranged from US$4 million to US$ 2 billion. T-tests revealed that the respondents and the entire sample did not differ significantly in terms of number of employees ($t = 1.25$, p = n.s.) and sales turnover ($t = 0.94$, p = n.s.). These results helped to enhance the generalizability of our findings to the entire sample of organizations. To gain additional insights into our survey findings, telephone interviews were carried out with 10 respondents who were able and willing to help us interpret the results. By giving us a better understanding of the meanings behind those findings, these interviews helped to rule out alternative explanations and increased our confidence in the survey findings.

4. DATA ANALYSES

Partial least squares (PLS), a structural equation modeling technique, was used to assess the theoretical model, which comprised all the hypotheses. Results obtained from such techniques are superior to those obtained using traditional statistical techniques (e.g., regression, factor analysis, and path analysis) because the measurement model, reflecting the psychometric properties of the questions, can be assessed within the context of the structural (theoretical) model (Fornell 1982). PLS was used for two reasons. First, it does not require multivariate normal distributions, interval scales, or large sample sizes for its data (Fornell and Bookstein 1982). Second, it is primarily intended for causal-predictive analysis in situations of low theoretical information and is appropriate for earlier stages of theory development (Howell and Higgins 1990). Given that this study represented an initial attempt at developing a theory on effectiveness of environmental scanning in the Internet context, PLS was an appropriate technique for data analyses.

4.1 PLS Measurement Model

The measurement model linked each construct in the structural model to questions that measured the construct. The strength of the measurement model could be demonstrated by means of convergent and discriminant validity (Hair et al. 1992). With the exception of organizational size, all other constructs were measured using perceptual questions and had to be assessed for convergent and discriminant validity.

Three tests were used to assess convergent validity: reliability of questions, composite reliability of constructs, and variance extracted by constructs (Fornell and Larcker 1981). Reliability of questions was determined by examining the loadings of questions on their intended constructs, provided by PLS. Hair et al. (1992) recommended 0.5 as indication of adequate reliability. When computing composite reliability of constructs, PLS took into account relationships among constructs. Additional evidence of composite reliability was obtained based on Cronbach's alpha. Nunnally (1978) proposed 0.8 as indication of adequate composite reliability. PLS computed variance extracted by constructs based on the extent to which all questions measuring a construct actually tapped into the same underlying construct. Fornell and Larcker (1981) suggested 0.5 as indication of adequate variance extracted. All constructs in this study had adequate convergent validity (see Table 2).

Two tests were used to assess discriminant validity. First, all questions were subjected to a factor analysis to ensure that questions measuring each construct loaded more highly on their intended construct than on other constructs (Thompson, Higgins and Howell 1991). Second, each question should correlate more highly with other questions measuring the same construct than with other questions measuring other constructs. This could be determined by seeing whether the variance extracted by each construct exceeded the shared variance between that construct and other constructs (Igbaria, Parasuraman and Badawy 1994). Tables 3 and 4 reveal that all constructs in this study passed both tests of discriminant validity.

Table 2. Results of Tests on Convergent Validity

Construct and questions	Reliability of question	Composite reliability of construct	Cronbach's alpha	Variance extracted by construct
ExtCon		0.99	0.96	0.99
ExtCon-1	0.97			
ExtCon-2	0.97			
CustSec		0.94	0.81	0.84
CustSec-1	0.66			
CustSec-2	0.74			
CustSec-3	0.79			
CompSec		0.95	0.83	0.83
CompSec-1	0.54			
CompSec-2	0.65			
CompSec-3	0.69			
CompSec-4	0.75			
ScanFreq		0.99	0.92	0.96
ScanFreq-1	0.58			
ScanFreq-2	0.76			
ScanFreq-3	0.69			
ScanFreq-4	0.80			
ScanFreq-5	0.67			
ScanFreq-6	0.70			
ScanFreq-7	0.61			
ScanEff		0.99	0.92	0.98
ScanEff-1	0.84			
ScanEff-2	0.88			
ScanEff-3	0.93			
ScanEff-4	0.89			

4.2 PLS Structural Model

Given an adequate measurement model, the hypotheses could be tested by examining the structural model. The explanatory power of the structural model was assessed based on the amount of variance in the endogenous constructs (Internet scanning frequency and Internet scanning effectiveness) for which the model could account. Our structural model could explain 25% of the variance for Internet scanning frequency and 20% of the variance for Internet scanning effectiveness. Both figures greatly exceeded 10%, which Falk and Miller (1992) suggested as indication of substantive explanatory power.

After computing parameter estimates for all paths in the structural model, PLS employed a jack knifing technique to compute T-values for all paths. Given that each hypothesis corresponded to a path in the structural model, support for each hypothesis could be determined by examining the sign (positive or negative) and statistical significance for its corresponding path. All tests of hypothesis were carried out at a 5% level of significance. Results showed that all hypotheses were supported except H4, which predicted a positive causal relationship between volatility in customer sector and Internet scanning frequency (see Figure 1).

5. DISCUSSION AND IMPLICATIONS

In this study, a theoretical model linking potential causal factors to effectiveness of environmental scanning in the Internet context was formulated and empirically tested (see Table 5). The results reveal that organizational size, use of external consultants, and volatility of competitor sector had significant impact on Internet scanning frequency. Moreover, use of external consultants and Internet scanning frequency led to significantly greater Internet scanning effectiveness. These findings have important implications for scholars and practitioners.

Table 3. Results of Factor Analysis

Question	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
ExtCon-1	0.19	0.24	0.08	-0.01	**0.92**
ExtCon-2	0.25	0.19	0.07	-0.01	**0.93**
CustSec-1	0.03	0.10	0.31	**0.76**	0.02
CustSec-2	0.09	0.09	0.19	**0.83**	-0.05
CustSec-3	0.10	-0.03	0.12	**0.87**	0.04
CompSec-1	-0.04	0.05	**0.78**	0.16	0.05
CompSec-2	0.07	0.15	**0.77**	0.20	0.11
CompSec-3	0.22	-0.11	**0.79**	0.09	-0.02
CompSec-4	0.12	-0.17	**0.84**	0.18	0.03
ScanFreq-1	**0.80**	0.28	0.10	0.07	0.11
ScanFreq-2	**0.77**	0.15	0.02	-0.01	-0.02
ScanFreq-3	**0.84**	0.09	0.01	0.08	0.15
ScanFreq-4	**0.81**	0.19	0.04	0.11	-0.01
ScanFreq-5	**0.71**	0.02	0.14	0.15	0.29
ScanFreq-6	**0.78**	0.26	0.09	-0.07	0.14
ScanFreq-7	**0.83**	0.22	0.13	0.05	0.11
ScanEff-1	0.25	**0.83**	-0.06	0.07	0.06
ScanEff-2	0.27	**0.83**	0.01	-0.04	0.15
ScanEff-3	0.24	**0.90**	0.04	0.07	0.11
ScanEff-4	0.17	**0.87**	-0.05	0.09	0.18
Eigenvalue	6.80	3.33	2.10	1.62	1.21
Variance (%)	34.0	16.6	10.5	8.1	6.1
Cumulative variance (%)	34.0	50.6	61.1	69.2	75.3

Table 4. Shared Variances (Variance Extracted) Among Constructs

Construct	ExtCon	CustSec	CompSec	ScanFreq	ScanEff
ExtCon	**(0.99)**				
CustSec	0.02	**(0.84)**			
CompSec	0.01	0.06	**(0.83)**		
ScanFreq	0.29	0.03	0.03	**(0.96)**	
ScanEff	0.22	0.04	0.01	0.25	**(0.98)**

Table 5. Results of Empirical Tests

Hypothesis	Coefficient	T-value	$p < 0.05$	Outcome
H1: OrgSize to ScanFreq	-0.12	-2.20	Yes	Supported
H2: ExtCon to ScanFreq	0.39	5.86	Yes	Supported
H3: ExtCon to ScanEff	0.32	4.18	Yes	Supported
H4: CustSec to ScanFreq	0.11	0.09	No	Not supported
H5: CompSec to ScanFreq	0.16	1.99	Yes	Supported
H6: ScanFreq to ScanEff	0.20	2.03	Yes	Supported

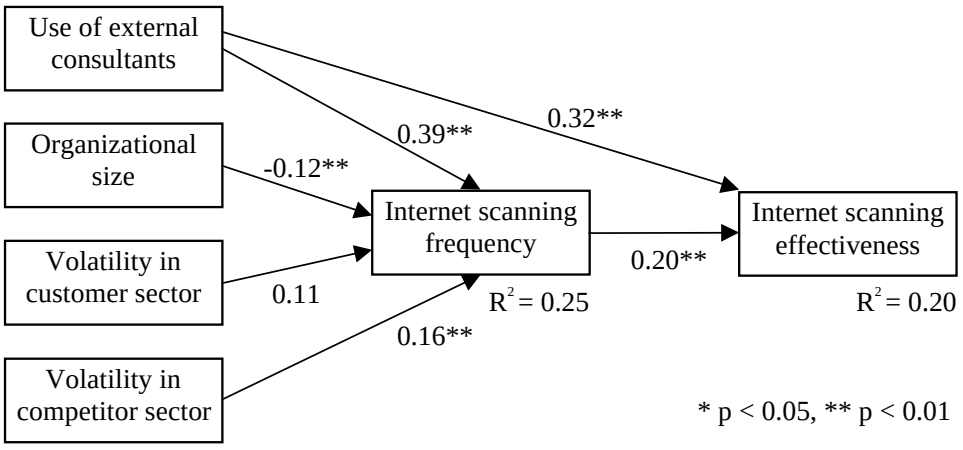

Figure 1. PLS Structural Model

5.1 Smaller Organizations are Leading

When conducting environmental scanning with traditional sources of information, larger organizations tend to take the lead and invest more resources into such activities (Yasai-Ardekani and Nystrom 1996) because they have more resources at their disposal (Klein and Linneman 1984). However, smaller organizations tend to take the lead when doing environmental scanning on the Internet.

Post-survey telephone interviews provide some insights into these findings. Many larger organizations had invested heavily in a sophisticated environmental scanning mechanism, often with links to online information sources (e.g., Reuters, Bloomberg, and Moody's). These organizations do not believe that information available on the Internet would be of comparable quality to information from traditional sources for which they have paid. Consequently, larger organizations do not see the need to change their existing mode of environmental scanning. Conversely, many smaller organizations see the Internet as an affordable means to obtain valuable information, and an opportunity which allowed them to make up for their lack of resources to access traditional sources of information. In recognition of such a market for information, some Web sites like EDGAR (http://www.sec.gov/smbus1.htm), The Mining Company (http://sbinformation.miningco.com), and Patsula Publications (http://www.patsula.com/buslinks.htm) have offered services to meet information needs of smaller organizations. Some smaller organizations are also planning to form strategic information alliances through combined environmental scanning efforts on the Internet.

Larger organizations tend to lag behind smaller organizations in using the Internet. For example, larger organizations with established marketing channels have approached the Internet with caution whereas many smaller organizations have moved on to market their products on the Internet (Applegate and Gogan 1996). However, as information becomes increasingly available on the Internet, effectiveness of environmental scanning would depend more on the ability to harvest information from this global, borderless resource and less on having a sophisticated mechanism. Hence, larger organizations should start exploring the potential of the Internet as an information resource.

5.2 External Consultants are Beneficial

Services provided by external consultants have impacted the effectiveness of environmental scanning both directly and indirectly. Some insights into these results were obtained from post-survey telephone interviews. As a global borderless resource, the Internet offers a vast amount of information. By helping organizations to search for useful information among numerous sources available on the Internet and interpret environmental indicators for organizational decision making, external consultants have helped to directly enhance effectiveness of environmental scanning. Besides providing and interpreting information, external

consultants have helped to equip organizations with the knowledge and skills for doing environmental scanning on the Internet. These services include conducting courses on the use of Internet tools (e.g., browsers, newsgroups, and file transfer programs) and compiling links to potentially useful information sources. By helping organizations to benefit from this vast but unruly information resource, such services promote greater use of the Internet and indirectly contribute to effectiveness of environmental scanning. In short, the acquisition of information high in organizational knowledge specificity should remain an internal organizational responsibility while the acquisition of information low in organizational knowledge specificity may be done by external consultants (Choudhury and Sampler 1997).

5.3 Competitor Sector is Critical

When the customer and competitor sectors are volatile, organizations engage in more frequent environmental scanning via traditional sources of information (Yasai-Ardekani and Nystrom 1996). However, only volatility in the competitor sector has motivated organizations to increase their frequency of environmental scanning on the Internet. Collectively, these results suggest that organizations tend to use information from both the Internet and traditional sources when the competitor sector is volatile but not when the customer sector is volatile. Post-survey telephone interviews reveal two reasons behind these results.

First, organizations tend to be better connected to their customers and more able to gather customer information through traditional means such as telephone interviews, market surveys, and analysis of purchase patterns. However, organizations tend to have little access to competitor information through traditional means. Instead, plenty of competitor information can be found on the Internet. Many businesses are now putting on their Web sites information such as customer profiles, performance statistics, career openings, and product specifications. Some information providers, such as Corporate Technology Information Services (http://www.corptech.com/index.cfm), have also made performance statistics of businesses and industry analyses papers available on the Internet. Through such sources, organizations can learn about competitor strengths and weaknesses, and make inferences about competitor strategies. In an exploratory study, Cronin et al. (1994) reported that the Internet had helped organizations to monitor competitor actions with greater ease than before. Given that the Internet is rich in competitor information, organizations conduct environmental scanning on the Internet more frequently when the competitor sector is volatile.

Second, changes in the customer sector (e.g., preferences and needs) tend to be available to organizations in advance due to the presence of established connections to customers. However, changes in the competitor sector (e.g., strategies and products) can sometimes catch organizations by surprise. This is especially true in a hypercompetitive context (Volberda 1996) where organizations continually try to outdo each other. To maintain their market position, organizations need to access competitor information quickly and devise new strategies swiftly. Besides allowing organizations rapid access to competitor information, the Internet provides information on the general environment (economic, technological, regulatory, and socio-cultural sectors) against which organizations can interpret competitor information when formulating strategies (Meyer 1987). Therefore, organizations turn to the Internet for environmental scanning more frequently when the competitor sector is volatile.

6. CONCLUSION

This study was based on one sample of organizations, so attempts to generalize its results to other contexts must be done cautiously. Future studies can extend these findings by investigating other constructs (e.g., organizational culture and technological competence) for their impact on effectiveness of environmental scanning on the Internet. Nevertheless, key conclusions have emerged from this study. As a borderless information resource that is vast but affordable, the Internet has changed traditional boundaries and notions for environmental scanning in three ways. First, it allows smaller organizations to overcome resource barriers. Second, it gives external consultants the opportunity to facilitate rather than just doing actual information acquisition. Third, it provides organizations with quick access to valuable competitor information previously unavailable.

In a world characterized by more and increasing environmental turbulence (Huber 1984), organizations need to continually enhance the effectiveness of environmental scanning to remain viable (Boyd and Fulk 1996). As the fastest growing information resource with links to increasingly borderless trading communities, the Internet offers organizations the opportunity to fulfill

their ever increasing information needs at an ever faster pace. It is imperative that we continue to conduct research about the Internet to better understand how this resource has changed our conventional wisdom on environmental scanning.

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