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ENVIRONMENTAL SCANNING: PRELIMINARY FINDINGS OF A SURVEY OF CEO INFORMATION SEEKING BEHAVIOUR IN TWO CANADIAN INDUSTRIES

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ABSTRACT

Today's business organizations thrive in turbulent environments characterized by rapid changes in the competition, technology, and economic and social conditions. *Environmental scanning* is the activity of gaining information about events and relationships in the organization's environment, the knowledge of which would assist management in planning future courses of action.

This paper reports the preliminary findings of a survey of the environmental scanning behavior of 207 CEOs in two Canadian industries – publishing and telecommunications. The CEOs indicated which sources they used to learn about trends and events in the business environment, and their perceptions of the accessibility and quality of various information sources. The survey found that the CEOs use a variety of internal and external, as well as personal and impersonal sources to scan their business environment. The sources used most frequently are newspapers and periodicals, subordinate managers and staff, broadcast media, customers, and internal documents. Analysis shows that between perceived source accessibility and quality, source quality is the more important explanatory variable, in that it accounts for a greater portion of the variance in the frequency of using sources to scan. This is contrary to earlier user studies, particularly those of engineers and scientists, which concluded that perceived source accessibility was the overwhelming factor in source selection.

INTRODUCTION

Today's business organizations face the challenge of succeeding in an increasingly dynamic environment that is characterised by rapid change in competitor and customer behaviour, technological advancement, government regulations, as well as economic and social conditions. Learning about events, trends, and relationships in the external business environment thus becomes a critical activity of the chief executive officer (CEO) who is charting the course of the firm. The objective of this research is to increase our understanding of how CEOs of business organizations acquire information about the external business environment. Aguilar in his 1967 landmark study defines this process of scanning the business environment as "... scanning for information about events and relationships in a company's outside environment, the knowledge of which would assist top management in its task of charting the company's future course of action." [1]

In this paper, we focus on the selection and use of information sources by CEOs to scan the environment, and we examine how the CEOs' perceptions of source accessibility and quality influence their usage of information sources.

CONCEPTUAL FRAMEWORK AND RESEARCH QUESTIONS

(This study's conceptual framework is based on the scheme that the authors presented at the 1991 54th ASIS Annual Meeting [2], which contains a fuller discussion. This paper reports a part of a larger study that is in progress.)

Duncan [3] defines the **environment** as "the totality of physical and social factors that are taken directly into consideration in the decision-making behavior of individuals in the organization." The environment may be viewed as a source of information, continually creating signals and messages that organizations should attend to [4, 5]. In the present study, the executives are asked to consider the external business environment as consisting of six sectors: customer, competition, technological, regulatory, economic, and sociocultural sectors [6].

Past research examines the executive's **scanning behavior** in terms of the use of information *sources* and the *amount* of scanning done. Aguilar [7] found that personal sources of information were far more important than impersonal sources. Keegan [8] observed that for multinational companies, sources outside the organization were more important than inside sources. Daft et al [9] found that chief executives reacted to perceived uncertainty with greater scanning using multiple, complementary sources to interpret an uncertain environment.

Hambrick [10] surveyed executives in three industries and observed that they consistently ranked publications as the dominant information source, and follow-up interviews found that they tend to equate scanning with publication reading. In the present study, the first research question we address is therefore:

Question 1: Which information sources do CEOs use to scan the external business environment?

The **acquisition of information** involves selection and use of a variety of sources. Our research investigates the idea that a manager selects a source based on the perceived *cost* associated with using that source, compared with the perceived benefit or *value* offered by the source [11, 12, 13]. Cost is indicated by the accessibility of the source, and includes the physical proximity of the source, as well as the time and effort needed to use it [14]. Value is indicated by the quality of the source, and this in turn depends on the quality of information provided by the source. Drawing on the research of Zmud [15], Taylor [16], Nilan et al [17] and Halpern and Nilan [18], the most important information quality dimensions include relevancy, reliability, accuracy, quantity, and timeliness. The present study examines how the use of information sources for environmental scanning is affected by the executive's perception of the quality and

accessibility of various sources. Thus, the executives are asked to rate each information source in terms of its accessibility and quality.

Past studies on the information needs and uses of mainly scientists, technologists, and social scientists have found that these users tend to use information sources which are perceived to be more accessible. Several studies have found that the accessibility of an information channel has a far greater effect than its quality (see for example the classic studies of Rosenberg [19], Gertsberger and Allen [20], and Allen [21]). It would be useful to re-examine, for the case of executives seeking information about the environment, the relative influence of the perceived source characteristics of accessibility and quality. Three questions about the effects of perceived source characteristics are posed.

Question 2: Is the frequency of using an information source in environmental scanning related to its perceived accessibility?

Question 3: Is the frequency of using an information source in environmental scanning related to its perceived quality?

Question 4: Is the perceived accessibility of an information source more important than its perceived quality in determining the use of the source in environmental scanning?

METHOD

Study Population and Data Collection

The study population consists of CEOs in the Canadian publishing and telecommunications industries. Both industries are vital to the Canadian economy and are dominated by firms which are Canadian-owned. They thrive in volatile business environments in which the drivers of change include technological advances, market liberalization, new business structures, population growth, and changing social preferences. The industry sectors were defined with the appropriate US Standard Industrial Classification Codes. Using these codes, an online search was done in the Canadian Dun's Market Identifiers database and the Cancorp Canadian Corporations database. Companies with annual revenues equal to or greater than C\$5 million were selected. This procedure yielded a total of 207 CEOs – 94 in publishing, and 113 in telecommunications. Data were collected by a mailed questionnaire survey that was sent to every one of the executives identified.

Measurement of Variables

(1) Environmental scanning

In the questionnaire, environmental scanning is defined to the CEO as "gaining information about events and relationships in your company's external environment, the knowledge of which would assist you in planning the company's future course of action". Scanning activities could range from gathering data deliberately such as by doing market research, to informal conversations with other executives, or reading the newspaper. The environment is divided into six sectors: customer, competition, technology, regulatory, economic, and sociocultural sectors. It is made clear that all questions refer to the executives' perception and use of information sources when

they scan for information about developments and trends in these environmental sectors.

(2) Information sources

Sixteen information sources are identified in the questionnaire. They may be grouped into four categories: external personal sources (eg. customers, competitors), external published/non-personal sources (eg. newspapers, periodicals), internal personal sources (eg. subordinate managers and staff), and internal printed sources (eg. internal reports, company library).

(3) Perceived source accessibility

Respondents are asked two questions concerning the accessibility of each source:

- a. How much of your time and effort is needed to approach, contact, or locate each information source?
- b. After contacting or locating the source, how easy is it to get the desired information from that source?

For each of the 16 sources, respondents indicate on a five-point ascending scale how accessible they perceive the source to be. The response scores from these two questions are summed to give an overall index of the perceived accessibility of each source.

(4) Perceived source quality

Respondents are asked two questions concerning the quality of each source:

- a. How relevant is the information from each source about the environment?
Relevant information is defined as information that is needed and useful with respect to the goals and activities of the respondent's firm.
- b. How reliable is the information from each source about the environment?
Information is reliable when it is authoritative and dependable. It is information that you personally trust.

For each of the 16 sources, respondents indicate on a five-point ascending scale their perception of the relevance and reliability of each source. The response scores from these two questions are summed to give an overall index of the perceived quality of each source.

(5) Frequency of information source use

The main dependent variable is the frequency with which the CEO uses each information source to scan the environment. Each respondent is asked to indicate how frequently he or she uses each of the 16 sources to scan the environment. The response is indicated on an ascending scale with five categories: "At least once a day," "At least once a week," "At least once a month," "Few times a year," "Less than once a year," and "Never."

RESULTS

Profile of Respondent CEOs and Firms

Of the 207 CEOs in the study population, 115 CEOs returned useable questionnaires, giving a response rate of 59%. Sixty seven of the respondents are CEOs of telecommunications companies (59%), with the remaining 48 being CEOs of publishing firms (51%). The 115 firms have a combined annual turnover of over C\$18 billion and employ a total of over 132,000 people. The smallest firms had an annual sale of C\$5 million, while the largest has sales of over C\$7.3 billion and hires 50,000 staff. On the whole, the distribution of respondent firms

by size is similar to that of the study population. Among the respondents, 44% fall in the age group 45 - 54, while another 27% are between 35 and 44. In terms of length of tenure as chief executive, the mean number of years as CEO is 6.5. The mean number of years with the firm is 12. Before becoming CEO, 48% of the respondents were in the marketing functional area, with another 15% in production. As for educational background, 41% have a Bachelor's degree, and another 28% have a Master's degree.

Sources used most frequently to scan the environment

Figure 1 shows the mean frequency with which the CEOs collectively use each source to scan the environment. A high numerical score indicates a frequently used source. (In the questionnaire, 6 =>Once a day, 5 =>Once a week, 4 =>Once a month, 3 =>Few times a year, 2 =<Once a year, and 1 = Never.) Newspapers and Periodicals are the most frequently used source, followed by Subordinate Managers, Subordinate Staff, Broadcast Media, and Internal Memoranda and Circulars. These highly used sources are from three categories: External published sources (newspapers, periodicals, and broadcast media); Internal personal sources (subordinate managers and staff, and superiors); and External personal sources (customers and business or professional associates). Thus, the CEOs frequently use both internal and external sources, as well as personal and printed sources of information to scan the environment. As with other studies on scanning, published and personal sources are the most important. However, these personal sources tend to be internal to the organization, with external personal sources like Competitors and Government Officials being less used. The least frequently used sources are the Company Library, Electronic Information Services, and Government Officials.

Figure 1. Frequency of Using Information Source to Scan the Environment

FREQUENCY OF USING SOURCE TO SCAN		
Source	Mean	SD
Newspapers, periodicals	5.32	1.04
Subordinate managers	5.05	1.14
Subordinate staff	4.78	1.20
Broadcast media	4.64	1.49
Internal memo, circulars	4.45	1.34
Customers	4.43	1.21
Business/professional associates	4.13	1.18
Internal reports, studies	4.04	1.13
Superiors, board members	3.75	1.20
Industry, trade associations	3.75	0.91
Competitors	3.68	1.12
Government publications	3.44	1.18
Company library*	3.32	1.00
Conferences, trips	3.09	0.82
Government officials	3.03	1.08
Electronic information services	2.93	1.79

*: Firms with company libraries.

Sources perceived to be most accessible

Figure 2 shows how the CEOs collectively perceive the accessibility of each information source. The higher the numerical score (Perceived Source Accessibility or PSA), the more accessible the source is seen to be. (Respondents use a five-point ascending scale to rate each source, with each point defined by a short description.) Not surprisingly, Internal Memoranda and Circulars are perceived to be the most accessible source, followed closely by Subordinate Staff, and Subordinate Managers. The most accessible sources are from two categories: Internal printed sources, and Internal personal sources. The least accessible sources are the Competitors, Government Officials, and Customers. As a category, the External personal sources are seen to be the least accessible.

Figure 2. Perceived Accessibility of Information Sources

PERCEIVED SOURCE ACCESSIBILITY		
Source	PSA	SD
Internal memo, circulars	7.95	1.38
Subordinate staff	7.92	1.47
Subordinate managers	7.83	1.53
Broadcast media	7.76	1.51
Internal reports, studies	7.74	1.39
Newspapers, periodicals	7.71	1.57
Superiors, board members	7.68	1.34
Company library*	7.49	1.72
Government publications	7.26	1.48
Industry, trade associations	7.23	1.19
Electronic information services	7.09	2.01
Business/professional associates	7.08	1.27
Conferences, trips	6.68	1.39
Customers	6.58	1.77
Government officials	6.20	1.67
Competitors	5.74	1.61

*: Firms with company libraries.

Sources perceived to be of high quality

Figure 3 shows how the CEOs collectively perceive the quality of each information source. The higher the numerical score (Perceived Source Quality or PSQ), the higher is the perceived quality of the source. (Respondents use a five-point ascending scale to rate each source, with each point defined by a short description.) Information from Subordinate Managers and Customers are seen to be of the highest quality, measured in terms of their perceived relevance and reliability. The next best regarded sources are Subordinate Staff and Internal Reports and Studies. With the exception of Customers, these top four sources are in the Internal personal and Internal printed categories. The Company Library, Electronic Information Services, and Broadcast Media have the lowest mean quality scores.

Figure 3. Perceived Quality of Information Sources

PERCEIVED SOURCE QUALITY		
Source	PSQ	SD
Subordinate managers	8.62	1.24
Customers	8.55	1.36
Subordinate staff	8.07	1.35
Internal reports, studies	7.98	1.41
Superiors, board members	7.91	1.61
Business/professional associates	7.66	1.42
Internal memo, circulars	7.57	1.53
Conferences, trips	7.49	1.75
Industry, trade associations	7.46	1.55
Competitors	7.11	1.55
Newspapers, periodicals	7.00	1.52
Company library*	6.58	1.50
Government officials	6.56	1.78
Government publications	6.22	1.68
Broadcast media	6.17	1.70
Electronic information services	6.10	2.31

*: Firms with company libraries.

Correlation between frequency of source use and source accessibility and quality

In order to investigate Question 2 and 3, the Frequency of using each source to scan is separately correlated with the Perceived Source Accessibility and Perceived Source Quality, as shown in Table 1. Question 2 may imply that source usage is significantly correlated with source *accessibility*. The survey data show that this is the case with 4 of the 16 sources covered by this study: namely, Superiors and Board Members, Subordinate Managers, Company Library, and Electronic Information Services. However, the correlation coefficients are small, and for 2 sources, the correlation is significant only at the 10% level. We conclude that there is weak support for the idea that source use is correlated with perceived source accessibility. Question 3 may imply that source usage would be significantly correlated with source *quality*. This is borne out by significant correlations (all at $p \leq .001$, with 1 exception at $p \leq .01$) for all 16 information sources. Furthermore, the majority of the sources have medium to high coefficient values, indicating a medium to strong correlation. We conclude that there is clear support for the notion that source usage in environmental scanning is positively related to the perceived source quality.

Table1. Correlations between Source Use and Perceived Source Accessibility & Quality

Information Source	Perceived Source Accessibility	Perceived Source Quality
1 Customers	-.03	.40****
2 Competitors	-.03	.29***
3 Business/professionals	.15	.38****
4 Government officials	.00	.53****
5 Newspapers, periodicals	.15	.32****
6 Government publications	.11	.49****
7 Broadcast media	.02	.42****
8 Industry, trade association	-.06	.45****
9 Conferences, trips	.08	.55****
10 Superiors, board members	.16*	.52****
11 Subordinate managers	.16*	.50****
12 Subordinate staff	.10	.45****
13 Internal memo, circulars	.06	.52****
14 Internal reports, studies	.14	.42****
15 Company library*	.26**	.54****
16 Electronic information	.33****	.70****

*: Firms with company libraries.

* $p \leq .10$ ** $p \leq .05$ *** $p \leq .01$ **** $p \leq .001$

Regression to explain source use based on accessibility and quality

In order to investigate Question 4, regression models were constructed for each information source to test the relationship between both source accessibility and source quality and source usage. The results are in Table 2. All 16 equations are significant at $p \leq .001$, with 2 exceptions at $p \leq .01$ and $p \leq .05$. However, for nearly all the sources, only the standardized regression coefficient for Perceived Source Quality is significant. In just 2 sources, Electronic Information Services and Business Associates and Professionals, are the coefficients for Accessibility also significant. The adjusted R^2 value indicates the proportion of the variance in source usage that is explained by source accessibility and source quality. For most of the

sources, the regression models do not account for much of the usage variance. This is not surprising because the models focus only on source characteristics and do not include for instance, organizational, environmental, and use variables. (A broader analysis encompassing more variables will be reported in a future paper.) However, for most of the sources, almost all of the explanatory power of the regression model is due to Perceived Source Quality: the adjusted R^2 value is due mostly to the squared semipartial correlation (sR^2) of the source quality variable. We conclude that the data in this study do not suggest that perceived source accessibility is more important than perceived source quality in explaining source usage. Instead, there is evidence that between the two variables, perceived source quality is the more important.

Table 2. Regression models to explain Information Source Used to Scan the Environment based on Perceived Source Accessibility & Perceived Source Quality

Information Source	Model F	Adj. R^2	Perceived Source Accessibility		Perceived Source Quality	
			Std β	sR^2	Std β	sR^2
1 Customers	10.16****	.14	-.03	.00	.40****	.16
2 Competitors	4.12**	.05	-.03	.00	.27****	.07
3 Business/professionals	10.33****	.15	.15*	.02	.37****	.14
4 Government officials	22.56****	.28	-.11	.01	.56****	.28
5 Newspapers, periodicals	6.29***	.09	.10	.01	.30****	.09
6 Government publications	15.60****	.21	.05	.00	.46****	.22
7 Broadcast media	11.09****	.16	-.02	.00	.41****	.17
8 Industry, trade association	14.19****	.19	-.13	.02	.46****	.19
9 Conferences, trips	21.19****	.27	-.01	.00	.54****	.29
10 Superiors, board members	20.76****	.27	.06	.00	.51****	.28
11 Subordinate managers	18.90****	.24	.08	.01	.49****	.25
12 Subordinate staff	14.01****	.19	.04	.00	.45****	.21
13 Internal memo, circulars	20.12****	.26	-.04	.00	.53****	.27
14 Internal reports, studies	12.74****	.18	.09	.01	.42****	.18
15 Company library*	16.52****	.29	.11	.01	.51****	.29
16 Electronic information	45.55****	.48	.15**	.02	.65****	.47

*: Firms with company libraries.

* $p \leq .10$ ** $p \leq .05$ *** $p \leq .01$ **** $p \leq .001$

Our finding that perceived source quality is more important in explaining source usage by CEOs is contrary to many earlier user studies, including the classic studies of Rosenberg, Gertsberger and Allen, and Allen [19, 20, 21]. We suggest that the turbulence of today's business environment [22], the strategic role of scanning for information about environmental change [23], and the special character of the information use contexts of managers [24], all interact to help explain why information quality may be more important than source accessibility when managers scan the environment. Given that managers have to formulate long-term, consequential plans for their firms' growth in a dynamic environment, we may reasonably expect that when they seek information about an environment that continually generates cues and signals to be attended to, they would tend to favour sources that they personally trust would provide relevant information. Taylor [25] has noted that when managers seek information to make unstructured decisions about unpredictable situations, the factor of 'physical accessibility'

may be less important than other traits (eg. noise reduction, data quality). Since strategic planning in response to external change would often have to deal with new, unpredictable situations, we may expect that accessibility is not a major concern in these conditions.

Furthermore, given that managers suffer from an abundance of irrelevant information, and that they have to subjectively analyze information in order to develop alternatives based on incomplete information, we may expect that when they use information about the environment, they would tend to prefer sources which are reliable and relevant.

SUMMARY

A preliminary analysis of our survey of CEOs in two Canadian industries leads to the following observations. First, these CEOs use a complementary mix of information sources to scan

the business environment. They frequently use both internal and external sources, as well as personal and printed sources of information to scan the environment. The sources used most frequently are newspapers and periodicals, subordinate managers and staff, broadcast media, customers, and internal documents. As was found in other studies on scanning, both printed and personal sources are important. Second, the use of an information source to scan is more strongly and significantly correlated with the perceived quality of the source than with its perceived accessibility. Source quality is measured as the perceived relevance and reliability of the information from the source, while source accessibility is measured as the time and effort needed to access the source, as well as the ease of getting the desired information from that source. Contrary to earlier user studies, we found that between perceived source quality and perceived source accessibility, quality is the more important variable in explaining the CEOs' frequency of using various information sources to scan the environment. We suggest that the high volatility of today's business environment, combined with the strategic use of environmental information and the special contexts in which managers use information, could help explain why information quality may be more important than source accessibility when managers scan the environment.

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NOTES

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Table 2. Regression models to explain Information Source Used to Scan the Environment based on Perceived Source Accessibility & Perceived Source Quality

<i>Information Source</i>	<i>Perceived Source Accessibility</i>		<i>Perceived Source Quality</i>			
	<i>Model F</i>	<i>Adj. R²</i>	<i>Std β</i>	<i>sR²</i>	<i>Std β</i>	<i>sR²</i>
1 Customers	10.16****	.14	-.03	.00	.40****	.16
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4 Government officials	22.56****	.28	-.11	.01	.56****	.28
5 Newspapers, periodicals	6.29***	.09	.10	.01	.30****	.09
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7 Broadcast media	11.09****	.16	-.02	.00	.41****	.17
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