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Scanning practices and information sources: an empirical study of firm size

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Abstract

Purpose – The purpose of this paper is to analyse the environmental scanning practices and information sources used by large companies as well as by small and medium-sized enterprises (SMEs), the latter being relatively absent from scientific scrutiny. In doing so, it endeavours to contribute to a better understanding of the scanning and information-gathering behaviour of SMEs, in order to develop measures to overcome their potential disadvantages in this respect.

Design/methodology/approach – Data were obtained from 165 Portuguese firms. Respondents were required to evaluate their use of 11 different environmental scanning practices and 12 information sources. For data analysis, the variables were classified using principal component analysis. Subsequently, the retained components and variables underwent a one-way variance analysis.

Findings – Results indicate that smaller firms do not scan as broadly and as frequently as their larger counterparts. Although external information sources are used equally by larger and smaller enterprises, in general there is also a positive relationship between the exploitation of information sources and firm size.

Research limitations/implications – Findings are taken from the Portuguese context, with its own idiosyncratic economic structure and climate. Generalisations should therefore be made with caution.

Practical implications – As the "size effect" influences the propensity for environmental scanning, SMEs are urged to adopt inter-firm strategies in order to achieve a critical mass. The importance of building scanning and information networks among SMEs must be highlighted.

Originality/value – Research on environmental scanning in SMEs and comparative studies of the firm size effect have been relatively scarce. The findings reveal that firm size matters, insofar as the use of different scanning practices and information sources mostly augments with increasing firm size.

Keywords Environmental management, Information media, Small to medium-sized enterprises, Portugal

Paper type Research paper

1. Introduction

The environmental conditions facing today's businesses are increasingly fraught with complexity, turbulence and uncertainty. A firm's ability to survive partly depends on

its ability to anticipate external change and take this into account when defining the strategic targets that it wishes to pursue (Choo, 2001). To do so, it needs to be able to acquire, distribute and above all analyse information relating to the current state and evolution of its socio-economic environment. The implementation of environmental scanning systems is a response to that need (Lesca and Caron-Fasan, 2008). It is also a necessary condition for achieving performance (Daft *et al.*, 1988; Barringer and Bluedorn, 1999; Ogunmokun and Ng, 1999; Beal, 2000; Howell and Shea, 2001). In particular, research in the fields of strategic management and information systems stresses the importance of environmental scanning for organisations whose environments are perceived as complex, dynamic and turbulent (El Sawy, 1985). Moreover, scanning and interpreting environmental changes are critical elements of strategy formulation and strategic decision-making (Hambrick, 1981; Barringer and Bluedorn, 1999; Aguilar, 1967; Daft *et al.*, 1988; May *et al.*, 2000; Danneels, 2008; Liao *et al.*, 2008).

Despite environmental scanning and information search activities having received much attention in the management literature (e.g. Aguilar, 1967; Hambrick, 1982, Sawyerr, 1993; Sawyerr *et al.*, 2000), to date most studies have centred on large organisations. However, in order to develop and sustain competitiveness, the availability of timely and relevant information through effective environmental scanning is equally important for smaller firms (Pearce *et al.*, 1982; Walters *et al.*, 2005; Liao *et al.*, 2008). Despite this observation, the relative lack of slack resources as the main competitive constraint faced by these firms (Strandholm and Kumar, 2003; Rogers, 2004; Hewitt-Dundas, 2006) may force them to make choices concerning the scope and frequency of environmental scanning which could place them at an information disadvantage, compared to their larger counterparts.

Nevertheless, in line with Walters *et al.* (2005), research on environmental scanning among small and medium-sized enterprises (SMEs) has been relatively scarce. The few studies with a focus on the environmental scanning in this sector are far from conclusive (i.e. Pineda *et al.*, 1998; Beal, 2000; Raymond *et al.*, 2001; Ngamkroeckjoti *et al.*, 2005; Liao *et al.*, 2008). For example, Pineda *et al.* (1998) found that managers of SMEs are less willing to seek and accept advice from others, which can be attributed to their high internal locus of control. In contrast, several other researchers contended that SMEs decision-makers lack sufficient resources to create a formal system to conduct environmental scanning; therefore, they must rely more heavily on externally-focused scanning practices (Churchill and Lewis, 1983; Mohan-Neill, 1995). SMEs typically lack the infrastructure to search for and collect information in a suitable manner and they are more dependent on information coming from networks and other forms of association (Matthews and Scott, 1995; Liao *et al.*, 2008).

Some studies show that SMEs do obtain value from their environmental scanning activities (e.g. Lang *et al.*, 1997; Beal, 2000), but these studies do not include a comparison with larger companies. Thus, they are not of much help in determining whether smaller firms have information shortcomings relative to larger companies. This is an important issue insofar as within the EU-27 context more than 99 per cent of all businesses are classified as SMEs, employing two-thirds of the total EU workforce (Eurostat, 2009). Against this background, the purpose of this study is to examine and compare the environmental scanning practices and information sources used by large companies as well as by SMEs. Specifically, we focus on two research questions. First,

compared to large companies, do SMEs undertake different environmental scanning activities? Secondly, do SMEs differ in their information research compared to large companies? Therewith, we seek to contribute to a better understanding of the scanning and information gathering behaviour of SMEs, in order to develop measures to overcome their potential disadvantages in this respect.

The remainder of the paper is structured as follows. Section 2 introduces the importance of environmental scanning and information sources; it also shows some particular characteristics of SMEs and presents our research hypotheses. Section 3 illustrates the research method, sample, data and the different statistical analyses used. Section 4 discusses the empirical findings in the light of our hypotheses. Finally, Section 5 concludes and makes recommendations for SME managers and policy-makers.

2. Theoretical background and hypotheses
2.1 Differences between large companies and SMEs
When comparing the environmental scanning practices and information sources used by large companies and SMEs, it seems wise to begin by explaining the particular characteristics that these firms possess. On the one hand, the relative weakness of SMEs depends on their "liability of smallness" (Aldrich and Auster, 1986; Brüderl *et al.*, 1992). This concept predicts that larger companies have better survival prospects than smaller ones and consequently, size should be an advantage. Therefore, the reason lies in the constraints that SMEs face in gaining access to critical resources and capacities (Lang *et al.*, 1997; Strandholm and Kumar, 2003; Hewitt-Dundas, 2006). For instance, they have only limited access to knowledge and human capital compared to large companies (Rogers, 2004).

On the other hand, the behavioural advantages of SMEs are their key relative strengths. They are generally more flexible than their larger counterparts, more responsive to market needs and more innovative in their ability to meet customer demand (Ghobadian and Gallear, 1997; Lewin and Massimini, 2003). Furthermore, achieving cultural change is easier in SMEs. These features are mainly due to their organisational structure: while large companies tend to be bureaucratic and rely on a formalised coordination, SMEs usually have a flat hierarchical structure and fewer departmental interfaces (Younger, 1990). In addition, the inner-firm communication and decision processes in SMEs are likely to be less complex and based on strong personal relationships.

Taken together, Ghobadian and Gallear (1997) see the characteristics of SMEs in relation to large companies as their simple and informal processes, less-standardised procedures, low-specialised and innovative structures, as well as their preference for tested techniques due to awareness of the greater consequences of failure. Hence, it is likely that SMEs also use environmental scanning practices and information sources differently, so that the respective knowledge gained by studying larger companies cannot be generalised and will not be applicable to SMEs.

2.2 Environmental scanning practices
In general, scanning refers to the practices and processes associated with the acquisition of information on events, trends and relationships potentially affecting the supply of resources (Pfeffer and Salancik, 1978). It assists management in planning the organisation's future course of action (Aguilar, 1967). With regard to scanning

activities, scholars have widely discussed several modes, e.g. inactive, reactive or proactive (e.g. El Sawy, 1985; Jain, 1984), as well as environmental scanning segments, e.g. economic, technological, political or social (e.g. Hambrick, 1981; O'Connell and Zimmerman, 1979). About the latter, Qiu (2008) states that scanning of multiple market sectors enhances organisations' competitive advantages.

Numerous attempts have been made to extrapolate research on environmental scanning from large organisational settings to small firms, but with limited success (i.e. Pearce *et al.*, 1982). SMEs differ from large companies in several important ways that may affect their scanning behaviour. Overall, environmental scanning practices are expected to be low for SMEs (Smeltzer *et al.*, 1988). This is primarily because SMEs usually have:

- little presence of formal organisational structure and management information systems geared toward environmental scanning (Premkumar and Roberts, 1999);
- a lack of extensive external contacts and sophisticated internal management information systems (Kagan *et al.*, 1990) and relative inability to influence external events;
- low levels of resources available for information research (Golde, 1964); and
- a lack of specialisation in scanning activities among senior management and dependence on particular individuals for information research (Hambrick, 1981; Walters *et al.*, 2005).

As noted by Chen and Hambrick (1995) and Strandholm and Kumar (2003), for example, larger companies have the ability to enter into and compete in more product and market domains than SMEs, due to the availability of more slack resources. In SMEs, the individuals responsible for environmental scanning activities are usually the owner-managers themselves (Cubillo, 1997). They often have a high degree of internal locus of control and self-efficacy. A major barrier to the use of information systems to support innovation is the leadership and technical knowledge of the owner and/or management team. Due to these contextual features, the environmental scanning behaviour of SMEs may be unique in many areas, compared to large companies (Liao *et al.*, 2008).

Given the constraints of SMEs (i.e. resources, degree of specialisation), their managers may be more likely to use perceptual processes to simplify scanning practices (Liao *et al.*, 2008). Most prior research always assumes a rational perspective that SMEs managers would conduct extensive research and make the "best" decision. It fails to consider how bounded rationality affects the search efforts of SMEs' decision-makers and how they make decisions heuristically. In this sense, managers in SMEs and large companies share similar human cognitive limitations when facing a task of complexity, ambiguity and uncertainty, such as environmental scanning. However, based on the foregoing, it is hypothesised that:

H1. There are differences in the use of environmental scanning practices between large companies and SMEs.

2.3 Scanning information sources
Environmental scanning is the acquisition and use of information on events, trends and relationships in a firm's external environment (Ngamkroeckjoti and Speece, 2008).

Information sources for scanning cover the range of sources from which environmental scanning data are obtained, and the depth of data gathered from those sources. Firms that do not scan broadly are not only likely to miss out on opportunities, but also fail to guard against threats (Strandholm and Kumar, 2003). In fact, both large firms and SMEs may have a need for frequent scanning. Ngamkroeckjoti *et al.* (2005) suggest that a wider range of information sources is part of the more extensive use of environmental scanning, which can help companies in their search for competitiveness. Because scanning increases a firm's access to timely information on changing environmental circumstances (Beal, 2000), scanning a broad set of information sources will be equally important to both large companies and SMEs.

Acquisition of information involves selection and use of sources (Auster and Choo, 1993). Following the classification scheme proposed by Aguilar (1967), Keegan (1974) and Kobrin *et al.* (1980), sources are grouped into two categories, external and internal, and further sub-divided into personal and impersonal sources. External scanning includes several informants and sources, including the direct actors in the market, such as customers, suppliers and competitors, but also actors outside the market whose objective is the coordination of economic activities, such as public administrators and professional associations (Phanuel, 2004). For example, as mentioned by Culnan (1983), electronic information services are classified as internal impersonal sources because databases or information services are accessed directly within the organisation. According to Auster and Choo (1993), impersonal sources would include sources such as conferences, trade associations, publications, etc. Nevertheless, there is no universally accepted way of classifying information sources for scanning.

Responding to changing environmental conditions, SMEs tend to be very alert. According to Piore and Sabel (1984), taking into account the small size of their assets and human capital, SMEs are more responsive to rapid changes than large companies. However, SMEs need time to develop a clear strategy to respond to changes and to gather information to implement their plans. In doing so, effective environmental scanning allows a small business manager to develop a "profound understanding of the external environment" (Grant, 1995, p. 8). It appears reasonable to believe that obtaining information from as many different environmental sources as possible will facilitate the firm's alignment with the environment. Notwithstanding, because SMEs generally do not have the same resources that larger companies have for covering all information sources (Golde, 1964), SME managers may be forced to make decisions restricting the scope and frequency of scanning information sources (Choudhury and Sampler, 1997; Walters *et al.*, 2005).

A study made by Ngamkroeckjoti *et al.* (2005), of Thai SME, concluded that these small firms frequently fail to tap information through some form of environmental scanning, believing that they do not have sufficient resources. In contrast, large companies are more likely to follow a step-by-step approach in scanning the environment, formulating strategy and evaluating its results. Therefore, it is hypothesised that:

H2. There are differences between large companies and SMEs in the use of information sources for environmental scanning.

2.4 Research model
To summarise, Table I outlines the principal variables that we identified in the literature related to environmental scanning practices and scanning information

| Environmental scanning practices	Scanning information sources	
Commercial	Annual reports	
Competitive	Conferences and seminars	
Ecological	Customers	
Information security	Suppliers	
Legal	External consulting	
Marketing	Fairs and exhibitions	
Patent and trade mark	Internet	
Political	Public organisations	
Regulatory	Sector legislation	
Risky country	Specialised publications	
Subcontractor	Specialised training	
Technological	Specific databases	
Trade-union	Universities	Table I.
	Technological centres	Research model

scanning sources. Subsequently, the variables in this research model will be used as a theoretical basis for analysing potential differences in their importance and use by large companies and SMEs.

3. Methodology
3.1 Research design
In this section, we first illustrate the research design that we applied. Overall, we chose a quantitative approach. After identifying the research problem and caveat, we started with a literature review in order to reveal the status quo, as well as to develop our research model and hypotheses. Subsequently, we conducted a cross-sectional analysis using data on Portugal, which because of its economic structure is a suitable laboratory for empirically testing the hypotheses, in view of its economic structure. Figure 1 provides an overview of the research design of our study.
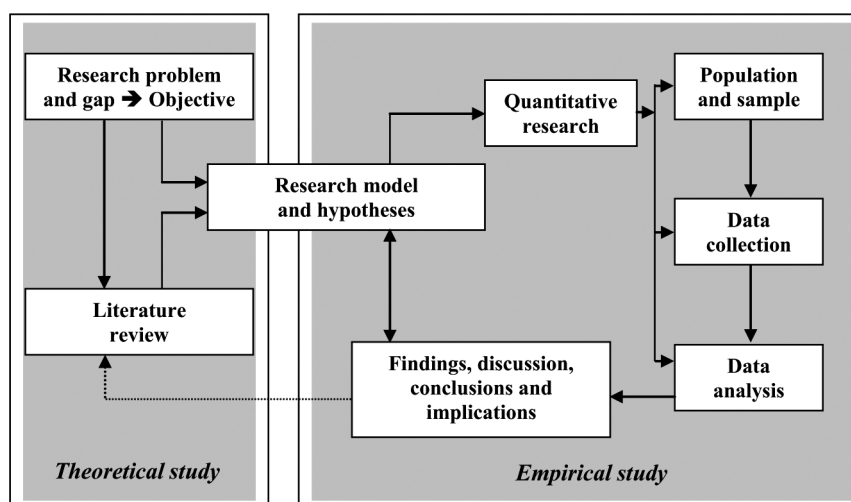
Figure 1.
Research design

3.2 Sample and data collection
We obtained data from the Portuguese Industrial Association – Business Confederation (with the acronym AIP-CE). Thus is the main business association in Portugal, created in 1837, with 4,403 directly affiliated firms at the time of our inquiry. In Portugal, the AIP-CE plays the leading role in the promotion of technical and commercial expertise among Portuguese firms, particularly in the fields of training, quality, innovation, internationalisation and competitiveness.

From the total AIP-CE population, a stratified random sample of 1,200 firms was formed. In this sample, approximately 14 per cent (171) were large companies, 23 per cent (281) medium-sized firms, 47 per cent (563) small firms and 15 per cent (185) micro firms. For the purposes of this study, in order to classify the business units as SMEs, the number of employees was used as the defining criterion, i.e. fewer than 250 employees (see European Commission Recommendation 2003/361/EC). The questionnaire that we applied was divided into several parts: Part 1 dealt with gathering general information about the company; Part 2 was concerned with environmental scanning practices; and Part 3 with scanning information scanning sources. It was administered to the senior management of the selected firms during the period from October 2005 to January 2006. The response rate was 13.8 per cent, corresponding to 165 firms.

Responding firms were mainly concentrated in the coastal districts of Portugal, such as Lisbon (44.8 per cent) and Leiria (20.6 per cent). Although the sample includes firms operating in several economic activities, the most represented activity is manufacturing (43 per cent). Regarding firms' sales and capital, we found an average sales volume of 2,042,184 € and average capital of 1,278,833 €. Firm size is predominantly large and medium-sized, with an average of 481 employees. The firms are headed fundamentally by the manager/administrator, the majority having a university degree. Most of these firms have the legal form of SCorporation (61 per cent of firms). Note that SCorporations are legally different from corporations due to the limited capital permitted by law (5,000 € as opposed to 50,000 €) and the minimum number of partners (two as opposed to five).

In order to evaluate the non-response bias that could emerge, we compared the characteristics of the entire population against those of the final sample. The responses of the 165 participants did not differ in any systematic way from the responses of non-participants (Armstrong and Overton, 1977; Blumberg *et al.*, 2005). According to the procedure of Dillman (2000), no significant differences were found for several demographic characteristics, such as the economic activity of the firm and the number of employees. A t-test was also used to compare the early and late responses for each of these research variables.

3.3 Measures and variables
Environmental scanning practices. This concept was determined by asking the respondents to estimate on a five-point Likert scale from 1 (corresponding to "not used at all") to 5 (equivalent to "extensively used") how frequently they use different types of environmental scanning practices. Therefore, 11 different types of environmental scanning practices were offered to the respondents. These activities were identified by our literature review and highlighted in the research model.

Sources of information. A total of 12 sources were selected for the questionnaire, also based on the outcomes of our research model. As in the previous case, we asked the respondents to evaluate on a five-point Likert scale from 1 ("not used at all") to 5 ("extensively used") how regularly they use different sources of information.

3.4 Data analysis

Several statistical analyses were applied to the data obtained to fulfil the research objective and to empirically validate the hypotheses. First, a descriptive analysis was made of the various environmental scanning practices and information sources used by the firms. Second, the number of variables associated with these items/variables was reduced using the technique of factor analysis. Based on this type of multivariate statistical analysis, a broad set of variables was reduced and combined in some dimensions. Also with the aim of extracting factors from the initial variables, the method of analysis of principal components (Reis, 1997; Hair *et al.*, 1998) was adopted. The first factor emerging from application of this method explains the greatest percentage of the total sample variance. The second factor corresponds to the second biggest percentage of the total variance and so on successively.

To obtain greater consistency of results and facilitate interpretation of the factors (dimensions), the varimax procedure of orthogonal rotation was applied, since it was seen to be sufficient to interpret the results, not having obtained substantially different results with the other two procedures (quartimax and equamax). Finally, to check acceptability of the technique, the Kaiser-Meyer-Olkin sample suitability measure, the Bartlett Sphericity Test and Cronbach's Alpha were taken into consideration to measure the level of consistency between the variables.

To test the hypotheses, the retained factors/dimensions and the individual variables that formed them underwent a one-way variance analysis (ANOVA). This test is used to compare the averages of each of the variables in the various defined groups (firm size). According to Hair *et al.* (1998), this type of analysis consists basically of an F-test in which an estimate of the variance between groups is compared with an estimate of the variance within groups, dividing the former by the latter. It should be noted, however, that application of the ANOVA analysis was only carried out after checking that the variables respected the assumptions of normal distribution of residuals and homogeneity of their variance. For this purpose, the Kolmogorov-Smirnov tests with correction of Lilliefors (Guimarães and Cabral, 1997) and the Levene test were carried out, to explore these two assumptions respectively. To summarise, Table II outlines the main methodological aspects that we adopted in this empirical research.

4. Findings and discussion

4.1 Clustering of scanning practices

The analysis of different environmental scanning practices is based on their mean frequency, as shown in Table III. The results obtained reveal that, in general, Portuguese firms make little use of scanning practices to obtain data and information for decision-making. Thus, the findings indicate that scanning practices such as "Competitive scanning", "Commercial/marketing scanning" and "Technological scanning" are the most frequently cited. These scanning activities have average values from 3.69 to 3.38. It appears that the most frequent scanning practices are related to the firms' competitiveness.

				Cumulative %	Cronbach's	Factor
Temporal basis			Cross-sectional			
Geographical area			Portugal			
Activity sector			Various industries			
Firm size			Micro, small, medium and large			
Unit of analysis			Firm			
Sample method			Stratified random sample			
Initial sample size			1,200 companies			
Data gathering			Questionnaire			
Response rate and sample error			165 valid questionnaires Response rate: 13.8% Sample error: ± 7.6% Reliability: 95%; Z = 1.96; $p = q = 0.5$			
Period of field work			October 2005 to January 2006			
Key informant			Senior management: CEO			
Data analysis			Univariate, bivariate and multivariate			

Table II.
Methodological aspects

Factors/scanning practices	Mean	SD	Eigenvalue	Cumulative % variance	Cronbach's alpha	Factor loading
F1: Proactive scanning			2.564	23.313	0.781	
Trade-union	1.74	0.959				0.767
Political	2.22	1.125				0.712
Subcontractor	2.42	1.150				0.653
Risky country	2.51	1.301				0.586
Patent and trade mark	2.54	1.332				0.555
F2: Technological scanning			2.213	43.432	0.755	
Ecological	2.81	1.182				0.814
Legal/regulatory	2.93	1.157				0.783
Technological	3.38	1.200				0.677
Information security	2.95	1.190				0.503
F3: Commercial scanning			2.125	62.754	0.751	
Competitive	3.69	0.971				0.886
Commercial/ marketing	3.65	1.007				0.768

Notes: KMO = 0.829; Bartlett's sphericity test 543.382; gl = 55; $p < 0.000$

Table III.
Factor analysis: strategic scanning practices

Regarding the principal component analysis and by making use of the varimax rotation method, Table III also indicates three significant factors, namely proactive scanning, technological scanning and commercial scanning. They make good conceptual sense as they explain a total of 62.75 per cent of the observed variance and because all the factor loadings are above 0.50, which is preferable according to Hair *et al.* (1998). The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and Bartlett's test of sphericity were conducted before running the factor analysis. The KMO statistics need to be greater than 0.5 for a factor analysis to proceed (Kaiser, 1974). The findings demonstrate that the KMO statistic is 0.829 and that the Bartlett test is significant for all scales. In addition, the three factors have Cronbach alphas above 0.751, which guarantees high reliability of the psychometric instruments used in this study. The next paragraphs characterise the three factors identified:

(1) *Proactive scanning (Factor 1)*. In proactive scanning, the organisation must choose how to allocate its scanning resources among the overwhelming number of potential information sources in the environment (Choudhury and Sampler, 1997). Proactive scanning covers specific aspects in the market, political, legal and economic environments (Walters *et al.*, 2005). For example, intellectual property strategy is important for firms (Bérard and Delerue, 2010). This is reflected in the underlying variables identified in this factor. The particular objective of proactive scanning lies in monitoring and synthesising information to determine the best course of action. It is related to the firm's foresight strategy and scenario planning. Therefore, it can also be interpreted as the "war room" of environmental scanning.

(2) *Technological scanning (Factor 2)*. Technological scanning (van Wyk, 1997) is a means of developing awareness of technological options that are not known to the firm. It comprises the permanent observation of advances in R&D and new technology breakthroughs in the market, which could be relevant, exploitable or even harmful to the firm. Nor can it neglect legal or ecological conditions affecting the firm. Technological scanning can therefore be conceived as the firm's "eyes and ears" or as the "technology radar".

(3) *Commercial scanning (Factor 3)*. Possession of market knowledge is important for aligning a firm's strategy, especially regarding its customers' needs and wants. Market scanning is not only crucial to the analysis of competitors' actions, but also to the creation of new markets. Specifically for small firms, Peters and Brush (1996) found that scanning the environment for information related to competitors and market share is related to financial growth. In addition, a more distant market (e.g. through export operations) leads to greater reliance on external sources for market information (Belich and Dubinsky, 1998). Therefore, commercial scanning is closely related to the concept of "marketing intelligence".

According to these three factors, it must be stressed there is no particular outstanding scanning practice that a firm should adopt. Rather, the activities are carried out in combination; however, preference for one or another practice should be made as a function of the firm's objectives and priorities and based on its specific characteristics.

4.2 Clustering of information sources
When analysing different sources of information, the findings presented in Table IV reveal that sources such as "Customers and suppliers", "Internet", "Specialised publications" and "Fairs and exhibitions" are greatly used by the Portuguese firms in the sample. These information sources have average values above 3.5, being mostly referred to as "used" or "extensively used". It emerges that those most mentioned by respondents are related to external sources of information.

Table IV also indicates three significant components retained from the factor analysis, namely impersonal sources, institutional sources and external sources. This classification is mostly in line with the common categories proposed by Aguilar (1967), Keegan (1974), Kobrin *et al.* (1980) and Auster and Choo (1993), which were introduced earlier in the theoretical section. The three factors explain a total of 56.66 per cent of the observed variance, which represents a high degree of reliability. In addition, the KMO

Factors/scanning information sources	Mean	SD	Eigenvalue	Cumulative % variance	Cronbach's alpha	Factor loading
F1: Impersonal sources			2.748	22.903	0.768	
Sector legislation	3.29	1.202				0.797
Specialised training	3.37	1.171				0.726
Specific databases	3.16	1.185				0.609
Annual reports	2.76	1.167				0.556
Conferences and seminars	3.10	1.075				0.544
F2: Institutional sources			2.096	40.367	0.713	
Universities and technological centres	2.19	1.125				0.823
Public organisations	2.32	1.237				0.774
External consulting	2.55	1.343				0.644
F3: External sources			1.956	56.664	0.628	
Fairs and exhibitions	3.63	1.260				0.778
Customers and suppliers	3.97	1.010				0.644
Specialised publications	3.79	1.014				0.589
Internet	3.82	1.068				0.520

Notes: KMO $= 0.841$; Bartlett's sphericity test 457.001; gl $= 66$; $p < 0.000$

Table IV.
Factor analysis: scanning information sources

measure of sampling adequacy, Bartlett's test of sphericity and Cronbach's alphas underpin the high quality of the psychometric instruments used to classify the sources of information.

4.3 Scanning practices and firm size
In line with our research objectives and hypotheses, based on their relative size, i.e. number of employees, our sample was divided into micro, small, medium and large firms. Using relative size as opposed to absolute size is appropriate in the context of examining differences in behaviour between large companies and SMEs (Chen and Hambrick, 1995; Strandholm and Kumar, 2003). Thus, ANOVA analysis was then used to scrutinise the differences among these four groups in terms of their environmental scanning practices and the information sources used by the firms.

According to the results shown in Table V, we detected a number of significant outcomes. Large companies practise more actively, with decreasing priority, legal/regulatory, subcontractor, patent and trademark, risky country and trade-union scanning. The latter type, however, was relatively low-ranked, but significantly higher than the other sub-groups. Medium-sized firms above all pursue scanning activities in the technological, information security, ecological and political environments. Small and micro firms always show the lowest means in the scanning practices, and their importance generally declines with decreasing firm size.

When considering the scanning activities classified by the three categories (factors) extracted from the principal component analysis, we revealed that large companies, except for the political environment, practise relatively more proactive scanning (Factor 1). Contrary-wise, medium-sized firms appear to be more engaged in technological scanning (Factor 2), with the exception of the legal/regulatory environment. With regard to commercial scanning (Factor 3), the differences

Scanning practices	Firm size	Mean	S.D.	F
F1: Proactive scanning				
Trade-union	Under 10	1.26	0.682	7.373***
	Between 11 and 50	1.63	0.945	
	Between 51 and 250	1.94	0.982	
	More than 250	2.31	1.001	
Political	Under 10	1.48	0.851	6.670***
	Between 11 and 50	2.37	1.205	
	Between 51 and 250	2.55	0.961	
	More than 250	2.41	1.053	
Subcontractor	Under 10	1.77	1.055	7.492***
	Between 11 and 50	2.27	1.044	
	Between 51 and 250	2.65	1.112	
	More than 250	3.04	1.138	
Risky country	Under 10	2.00	1.211	2.910**
	Between 11 and 50	2.56	1.316	
	Between 51 and 250	2.68	1.301	
	More than 250	2.93	1.258	
Patent and trade mark	Under 10	2.17	1.341	2.230*
	Between 11 and 50	2.46	1.361	
	Between51 and 250	2.81	1.250	
	More than 250	2.97	1.322	
F2: Technological scanning				
Ecological	Under 10	2.38	1.314	4.413*
	Between 11 and 50	2.71	1.124	
	Between 51 and 250	3.28	0.958	
	More than 250	3.17	1.177	
Legal/regulatory	Under 10	2.37	1.217	5.633**
	Between 11 and 50	2.79	1.098	
	Between 51 and 250	3.29	0.938	
	More than 250	3.38	1.147	
Technological	Under 10	2.90	1.599	3.343*
	Between 11 and 50	3.41	1.027	
	Between 51 and 250	3.79	1.023	
	More than 250	3.57	0.971	
Information security	Under 10	2.55	1.338	3.613*
	Between 11 and 50	2.82	1.114	
	Between 51 and 250	3.33	0.957	
	More than 250	3.31	1.228	
F3: Commercial scanning				
Competitive	Under 10	3.61	1.174	1.173
	Between 11 and 50	3.67	0.729	
	Between 51 and 250	3.64	1.055	
	More than 250	4.00	0.910	
Commercial/marketing	Under 10	3.44	0.190	2.221*
	Between 11 and 50	3.59	0.937	
	Between 51 and 250	3.78	0.832	
	More than 250	4.03	0.944	

Notes: * $p < 0.1$; ** $p < 0.01$; *** $p < 0.001$

Table V.
ANOVA for scanning
practices and firm size

between the four sub-groups are minute; they all attribute high average means to the variables in this factor.

In the light of these insights, our *H1* cannot be rejected, as only one of the eleven scanning practices, namely scanning the competitive environment, does not show a significant difference in average mean according to firm size. We can conclude that, in general, the use of scanning augments with firm size and large firms in particular give more importance to the scanning practices proposed to them in the questionnaire. Therefore, we confirm the statement that scanning practices are expected to be low for small firms (Smeltzer *et al.*, 1988). The relatively low use of scanning by small firms should be interpreted as an alarm signal for their competitiveness, as they are, in this respect, at a clear disadvantage compared to their larger counterparts.

As for the reasons for this situation, several explanations exist and according to Moati and Pouquet (1997), the particular characteristics of SMEs should be taken into account. Foong (1999) said that the introduction of scanning practices into SMEs has tended to be piecemeal and fragmented, lacking the link to broader business strategy. Premkumar and Roberts (1999) stated that management information systems are not usually well developed in SMEs. As opposed to large companies, scanning in small firms tends to be the responsibility of specific individuals rather than a specialisation among members of senior management (Hambrick, 1981; Walters *et al.*, 2005). In fact, decision-making and strategy development including scanning activities is often solely the responsibility of the SME owner-manager (Cubillo, 1997). An interesting argument for the relatively low importance of scanning among SMEs was given by Kaish and Gilad (1991). For these scholars, scanning practices tend to be neglected once the firm has achieved a certain level of experience and profitability, because the owner-managers then focus their efforts more on internal management issues rather than on discovering new business opportunities.

4.4 Information sources and firm size

When evaluating the use of scanning information sources by the four sub-groups, Table VI shows the results of the ANOVA analysis. Large companies, with decreasing priority, refer relatively more to sector legislation, annual reports, specific databases and external consulting. On the other hand, medium-sized firms make more use of specialised training and public organisations. Again, both large and medium-sized businesses exploit information from universities and technological centres at the same level and robustly more often than their smaller counterparts. Nevertheless, since almost half the information sources do not show significant differences in the average means of the importance attributed by the four sub-groups, there is only partial support for our *H2*.

Differentiating for the three categories (factors) identified as principal components of the range of information sources, we found that impersonal sources (Factor 1) are more employed by large companies, and institutional sources (Factor 2) are equally important for both large and medium-sized firms. Thus, for both factors, we revealed a positive relationship between firm size and use of information sources for scanning, i.e. their exploitation generally increases as the number of employees grows. More precisely, the larger companies in our sample use information sources more intensively to scan the environment, while small firms make very limited use of impersonal and institutional information sources.

Information sources	Firm size	Mean	S.D.	F
F1: Impersonal sources				
Sector legislation	Under 10	2.65	1.279	6.284***
	Between 11 and 50	3.34	1.154	
	Between 51 and 250	3.52	1.061	
	More than 250	3.96	1.022	
Specialised training	Under 10	2.97	1.378	3.761**
	Between 11 and 50	3.29	1.076	
	Between 51 and 250	3.81	0.931	
	More than 250	3.74	1.176	
Specific databases	Under 10	2.80	1.424	2.546**
	Between 11 and 50	3.14	1.131	
	Between 51 and 250	3.44	1.076	
	More than 250	3.56	0.870	
Annual reports	Under 10	1.90	0.923	14.140**
	Between 11 and 50	2.71	1.124	
	Between 51 and 250	3.19	1.030	
	More than 250	3.60	0.957	
Conferences and seminars	Under 10	2.87	1.231	1.686
	Between 11 and 50	3.05	1.048	
	Between 51 and 250	3.34	0.937	
	More than 250	3.40	1.041	
F2: Institutional sources				
Universities and technological centres	Under 10	1.73	1.015	3.087**
	Between 11 and 50	2.18	1.064	
	Between 51 and 250	2.50	1.191	
	More than 250	2.50	1.225	
Public organisations	Under 10	1.80	1.186	3.313**
	Between 11 and 50	2.30	1.278	
	Between 51 and 250	2.76	1.173	
	More than 250	2.39	1.118	
External consulting	Under 10	2.00	1.365	8.138***
	Between 11 and 50	2.31	1.259	
	Between 51 and 250	3.13	1.212	
	More than 250	3.39	1.196	
F3: External sources				
Fairs and exhibitions	Under 10	3.19	1.558	1.479
	Between 11 and 50	3.73	1.096	
	Between 51 and 250	3.72	1.198	
	More than 250	3.72	1.208	
Customers and suppliers	Under 10	3.93	1.143	0.137
	Between 11 and 50	3.90	0.943	
	Between 51 and 250	4.03	1.045	
	More than 250	4.00	0.953	
Specialised publications	Under 10	3.58	1.259	1.464
	Between 11 and 50	3.72	0.958	
	Between 51 and 250	3.97	0.883	
	More than 250	4.04	0.751	
Internet	Under 10	3.87	1.332	0.057
	Between 11 and 50	3.78	1.109	
	Between 51 and 250	3.84	0.884	
	More than 250	3.83	0.868	

Notes: $*p < 0.1$; $**p < 0.01$; $***p < 0.001$

Table VI.
ANOVA for information
sources and firm size

This phenomenon might be explained by the resource constraints for information gathering faced by smaller firms (Golde, 1964). Given the almost infinite number of situations and events, each of which could provide potential material for environmental scanning, firms must decide where to allocate their limited scanning resources (Choudhury and Sampler, 1997; Walters *et al.*, 2005). On the other hand, well-equipped information systems in large companies provide major opportunities for obtaining added value through holistic use of the available information sources (Levy *et al.*, 2002).

Interestingly, in our sample there were no significances among external sources (Factor 3) at all, because all four sub-groups ranked the information sources forming this factor with the highest mean averages. This holds true almost independently of firm size. In other words, external sources appear to be the most essential ones for information research within the small business sector. This phenomenon was previously described by other scholars (Churchill and Lewis, 1983; Mohan-Neill, 1995; Pineda *et al.*, 1998).

5. Concluding remarks
5.1 Conclusions
Taking into account the relevance of environmental scanning for firms that face tough competition in global markets, our findings show that firm size really matters in the use of environmental scanning practices and in choosing the respective information sources. With regard to scanning practices, their importance augments with increasing firm size. Smaller firms do not scan as broadly and as frequently as their larger counterparts do.

Our results also point towards a positive relationship between the exploitation of the broad range of potential information sources for scanning and firm size, which particularly holds true for impersonal and institutional information sources. Of interest is the empirical evidence that external information sources are equally used by larger and smaller firms. Thus, they appear to be the most relevant source for information research within the small business sector. These insights, taken together, suggest that reduced scanning practices and fewer information sources may place small firms at a competitive disadvantage relative to large companies.

5.2 Implications
This research has several implications for theory and practice. From a theoretical perspective, our study is a contribution to the literature on organisational size and environmental scanning. It explores the phenomenon of scanning practices and the use of information sources within the SME sector, which to date is relatively absent from scientific scrutiny. In order to fill this void in the research by empirical evidence, we performed a cross-sectional study in the Portuguese context. In this respect, we demonstrated important differences in behaviour between smaller and larger businesses, so that the existing knowledge on environmental scanning in large companies cannot simply be applied to SMEs.

Regarding the practical perspective, the outcomes of our study have major implications for SMEs' strategies and public policies. We will go on to mention some of these implications. In doing so, we bear in mind particularly the case of Portuguese firms and their environment, which was the basis of our research.

First, as the "size effect" (being a large company) contributes to an increase in environmental scanning practices, SMEs are urged to adopt inter-firm strategies that favour firms' resizing, in order to achieve a critical mass to operate in competitive markets. In this way, building up scanning and information networks among SMEs can be an important measure. In this context, a policy of clusters orientated to the global marketplace plays a key role insofar as it requires a high and efficient level of strategic management of information.

Second, globalising business activities and the on-going internationalisation call for a greater proactivity in environmental scanning. This is obviously a challenge for SMEs, demanding greater ability in terms of strategic thinking and environmental scanning capacities associated with access to international markets.

Third, the role of external social networks for SMEs (including those between firms) and internal networks to firms (presupposing an appropriate use of ICT) must be highlighted. Indeed, they improve the dissemination and sharing of information, particularly when related to clients and markets. Through such networks there are greater demands on the firm's portfolio of competences of the firm at different levels of management, especially in the strategic management of information, giving relevance to environmental scanning activities.

Fourth, there is a need to manage economic interactions at their different levels more proactively, with greater interaction between agencies and organisations and better use of international institutions in which SMEs participate. In doing so, some scanning activities will be improved, such as the search for markets, the attraction of FDI and internationalisation; all this requires a greater capacity for treatment and use of asymmetrical information, as well as the development of environmental scanning practices within the SME sector.

5.3 Limitations

Finally, it should be noted that our study has some limitations. First, the findings are taken from the Portuguese context, with its own economic structure and climate. Generalisations should therefore be made with caution. For this reason, we suggest further research to detect geographical differences. Second, our research is based on self-report responses by senior-management members to a questionnaire, which implies subjective components and may result in auto-evaluation bias. Nonetheless, we hope that this study sparks further research interest to explore the phenomenon of environmental scanning within the SME sector, and the combination of the present and future works will surely allow valuable comparisons.

References

Aguilar, F.J. (1967), *Scanning the Business Environment*, McGraw-Hill, New York, NY.

Aldrich, H.E. and Auster, E. (1986), "Even dwarfs started small: liabilities of age and size and their strategic implications", in Staw, B.M. and Cummings, L.L. (Eds), *Research in Organizational Behavior*, Vol. 8, JAI Press, Greenwich, CT, pp. 165-98.

Armstrong, S.J. and Overton, T.S. (1977), "Estimating non-response in mailed surveys", *Journal of Marketing Research*, Vol. 18, pp. 263-4.

Auster, E. and Choo, C.W. (1993), "Environmental scanning by CEOs in two Canadian industries", *Journal of the American Society for Information Science*, Vol. 44 No. 4, pp. 194-203.

Barringer, B.R. and Bluedorn, A.C. (1999), "The relationship between corporate entrepreneurship and strategic management", *Strategic Management Journal*, Vol. 20 No. 5, pp. 421-44.

Beal, R. (2000), "Competing effectively: environmental scanning, competitive strategy, and organizational performance in small firms", *Journal of Small Business Management*, Vol. 38 No. 1, pp. 27-47.

Belich, T.J. and Dubinsky, A.J. (1998), "The integration of market-scanning activities: effects of market distance", *Journal of Business & Industrial Marketing*, Vol. 13 No. 2, pp. 166-85.

Bérard, C. and Delerue, H. (2010), "A cross-cultural analysis of intellectual asset protection in SMEs. The effect of environmental scanning", *Journal of Small Business and Enterprise Development*, Vol. 17 No. 2, pp. 167-83.

Blumberg, B., Cooper, D.R. and Schindler, P.S. (2005), *Business Research Methods*, 1st ed., McGraw-Hill, Maidenhead.

Brüderl, J., Preisendörfer, P. and Ziegler, R. (1992), "Survival chances of newly founded business organizations", *American Sociological Review*, Vol. 57 No. 2, pp. 227-42.

Chen, M.J. and Hambrick, D.C. (1995), "Speed, stealth and selective attack: how small firms differ from large firms in competitive behaviour", *Academy of Management Journal*, Vol. 38 No. 2, pp. 453-582.

Choo, C.W. (2001), "Environmental scanning as information seeking and organizational learning", *Information Research*, Vol. 7 No. 1, pp. 1-14.

Choudhury, V. and Sampler, J.L. (1997), "Information specificity and environmental scanning: an economic perspective", *MIS Quarterly*, Vol. 21 No. 1, pp. 25-50.

Churchill, N. and Lewis, V. (1983), "Five stages of small business growth", *Harvard Business Review*, Vol. 61 No. 3, pp. 30-50.

Cubillo, J. (1997), "La inteligencia empresarial en las pequeñas y medianas empresas competitivas de América Latina – algunas reflexiones", *Ciência da Informação*, Vol. 26 No. 3, pp. 260-7.

Culnan, M.J. (1983), "Environmental scanning: the effects of task complexity and source accessibility on information gathering behavior", *Decision Sciences*, Vol. 14 No. 2, pp. 194-206.

Daft, R.L., Sormunen, J. and Parks, D. (1988), "Chief executive scanning, environmental characteristics, and company performance: an empirical study", *Strategic Management Journal*, Vol. 9 No. 2, pp. 123-39.

Danneels, E. (2008), "Organizational antecedents of second-order competences", *Strategic Management Journal*, Vol. 29 No. 5, pp. 519-43.

Dillman, D.A. (2000), *Mail and Telephone Surveys: The Tailored Design Method*, Wiley & Sons, New York, NY.

El Sawy, O.A. (1985), "Personal information systems for strategic scanning in turbulent environments: can the CEO go on-line?", *MIS Quarterly*, Vol. 9 No. 2, pp. 53-60.

Eurostat (2009), *European Business: Facts and Figures – 2009 edition*, European Communities, Luxembourg.

Foong, S-Y. (1999), "Effect of end user personal and systems attributes on computer-based IS success", *Journal of Small Business Management*, Vol. 37 No. 3, pp. 81-7.

Ghobadian, A. and Gallear, D. (1997), "TQM and organisation size", *International Journal of Operations & Production Management*, Vol. 17 No. 2, pp. 121-63.

Golde, R.A. (1964), "Practical planning for small business", *Harvard Business Review*, Vol. 42 No. 3, pp. 147-61.

Grant, R.M. (1995), *Contemporary Strategy Analysis: Concepts, Techniques, Applications*, Blackwell, Malden, MA.

Guimarães, R. and Cabral, J. (1997), *Statistics*, McGraw-Hill, Lisbon.

Hair, J.F., Anderson, R.E., Tatham, R.L. and Black, W.C. (1998), *Multivariate Data Analysis*, Prentice-Hall, Englewood Cliffs, NJ.

Hambrick, D.C. (1981), "Specialization of environmental scanning activities among upper level executives", *Journal of Management Studies*, Vol. 18 No. 3, pp. 299-320.

Hambrick, D.C. (1982), "Environmental scanning and organizational strategy", *Strategic Management Journal*, Vol. 3 No. 2, pp. 159-74.

Hewitt-Dundas, N. (2006), "Resource and capability constraints to innovation in small and large plants", *Small Business Economics*, Vol. 26 No. 3, pp. 257-77.

Howell, J.M. and Shea, C.M. (2001), "Individual differences, environmental scanning, innovation framing, and champion behavior: key predictors of project performance", *Journal of Product Innovation Management*, Vol. 18 No. 1, pp. 15-27.

Jain, S.C. (1984), "Environmental scanning in US corporations", *Long Range Planning*, Vol. 17 No. 2, pp. 117-28.

Kagan, A., Lau, K. and Nusgart, K. (1990), "Information system usage within small business firms", *Entrepreneurship: Theory and Practice*, Vol. 14 No. 3, pp. 25-37.

Kaiser, H.F. (1974), "An index of factorial simplicity", *Psychometrika*, Vol. 39, pp. 31-6.

Kaish, S. and Gilad, B. (1991), "Characteristics of opportunities search of entrepreneurs versus executives: sources, interest, general alertness", *Journal of Business Venturing*, Vol. 6, pp. 45-61.

Keegan, W.J. (1974), "Multinational scanning: a study of the information sources utilized by headquarters executives in multinational companies", *Administrative Science Quarterly*, Vol. 19 No. 19, pp. 411-21.

Kobrin, S.J., Basek, J., Blank, S. and La Palombara, J. (1980), "The assessment and evaluation of non-economic environments by American firms", *Journal of International Business Studies*, Vol. 10 No. 1, pp. 32-47.

Lang, J.R., Calantone, R.J. and Gudmundson, D. (1997), "Small firm information-seeking in response to environmental threats and opportunities", *Journal of Small Business Management*, Vol. 35 No. 1, pp. 11-23.

Lesca, N. and Caron-Fasan, M.L. (2008), "Strategic scanning project failure and abandonment factors: lessons learned", *European Journal of Information Systems*, Vol. 17, September, pp. 371-86.

Lewin, Y. and Massimini, S. (2003), "Knowledge creation and organizational capabilities of innovating and imitating firms", in Tsoukas, H. and Mylonopoulos, N. (Eds), *Organizations as Knowledge Systems*, Palgrave, New York, NY, pp. 209-37.

Levy, M., Powell, P. and Yetton, P. (2002), "The dynamics of SME information systems", *Small Business Economics*, Vol. 19 No. 4, pp. 341-54.

Liao, J., Welsch, H. and Stoica, M. (2008), "Environmental turbulence and scanning behavior: the moderating effects of organizational maturity", *Journal of Small Business Strategy*, Vol. 19 No. 1, pp. 15-29.

Matthews, C. and Scott, S. (1995), "Uncertainty and planning in small and entrepreneurial firms: an empirical assessment", *Journal of Business Management*, Vol. 13 No. 3, pp. 231-40.

May, C., Stewart, H.W. and Sweo, R. (2000), "Environmental scanning behavior in a transitional economy: evidence from Russia", *Academy of Management Journal*, Vol. 43 No. 3, pp. 403-27.

Moati, P. and Pouquet, L. (1997), *La Diversité des Logiques Productives dans les PMI*, Cahiers de Recherche sur CREDOC, Paris.

Mohan-Neill, S. (1995), "The influence of firm's age and size on its environmental scanning activities", *Journal of Small Business Management*, Vol. 33 No. 4, pp. 10-21.

Ngamkroeckjoti, C. and Speece, M. (2008), "Technology turbulence and environmental scanning in Thai food new product development", *Asia Pacific of Marketing and Logistics*, Vol. 20 No. 4, pp. 413-32.

Ngamkroeckjoti, C., Speece, M. and Dimmitt, N.J. (2005), "Environmental scanning in Thai food SMEs: the impact of technology strategy and technology turbulence", *British Food Journal*, Vol. 107 No. 5, pp. 285-305.

O'Connell, J.J. and Zimmerman, J.W. (1979), "Scanning the international environment", *California Management Review*, Vol. 22 No. 2, pp. 15-23.

Ogunmokun, G.O. and Ng, S. (1999), "Environmental scanning practices and export performance in international marketing: a study of Australian exporters", *International Journal of Management*, Vol. 16 No. 1, pp. 9-21.

Pearce, J.A., Chapman, B.L. and David, F.R. (1982), "Environmental scanning for small and growing firms", *Journal of Small Business Management*, Vol. 20 No. 1, pp. 27-42.

Peters, M. and Brush, C. (1996), "Market information scanning activities and growth in new ventures: a comparison of service and manufacturing businesses", *Journal of Business Research*, Vol. 36 No. 1, pp. 81-9.

Pfeffer, C. and Salancik, G. (1978), *The External Control of Organization. A Resource Dependence Perspective*, Harper & Row Publishers, New York, NY.

Phanuel, D. (2004), "Faible mobilisation des réseaux dans les PME-PMI", *Problèmes Economiques*, No. 2864, pp. 33-44.

Pineda, R.C., Lerner, L.D., Miller, C. and Phillips, S.J. (1998), "An investigation of factors affecting the information-search activities of small business managers", *Journal of Small Business Management*, Vol. 36 No. 1, pp. 60-71.

Piore, M. and Sabel, C. (1984), *The Second Industrial Divide*, Basic Books, New York, NY.

Premkumar, G. and Roberts, M. (1999), "Adoption of new IT in rural SMEs", *Omega*, Vol. 27 No. 4, pp. 467-84.

Qiu, T. (2008), "Scanning for competitive intelligence: a managerial perspective", *European Journal of Marketing*, Vol. 42 Nos 7/8, pp. 814-35.

Raymond, L., Julien, P.-A. and Ramangalaby, C. (2001), "Technological scanning by small Canadian manufacturers", *Journal of Small Business Management*, Vol. 39 No. 2, pp. 123-38.

Reis, E. (1997), *Estatistica Multivariada Aplicada*, Edições, Silabo.

Rogers, M. (2004), "Networks, firm size and innovation", *Small Business Economics*, Vol. 22 No. 2, pp. 141-53.

Sawyerr, O.O. (1993), "Environmental uncertainty and environmental scanning activities of Nigerian manufacturing executives: a comparative analysis", *Strategic Management Journal*, Vol. 14 No. 4, pp. 287-99.

Sawyerr, O.O., Edbrahimi, B.P. and Thibodeaux, M.S. (2000), "Executive environmental scanning, information source utilisation and firm performance: the case of Nigeria", *Journal of Applied Management Studies*, Vol. 9 No. 1, pp. 95-115.

Smeltzer, L.R., Fann, G.L. and Nikolaisen, V.N. (1988), "Environmental scanning practices in small business", *Journal of Small Business Management*, Vol. 26 No. 3, pp. 55-62.

Strandholm, K. and Kumar, K. (2003), "Differences in environmental scanning activities between large and small organizations: the advantage of size", *Journal of American Academy of Business*, Vol. 3 Nos 1/2, pp. 416-21.

van Wyk, R.J. (1997), "Strategic technology scanning", *Technological Forecasting and Social Change*, Vol. 55 No. 1, pp. 21-38.

Walters, B.A., Priem, R.L. and Shook, C.L. (2005), "Small business manager scanning emphases and the dominant logic of the business-level strategy", *Journal of Small Business Strategy*, Vol. 15 No. 2, pp. 19-32.

Younger, A. (1990), "Q-SHARE® – A share of TQM", *TQM Magazine*, Vol. 5 No. 2, pp. 275-8.

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