RELATIONSHIP BETWEEN ENVIRONMENTAL SCANNING AND STRATEGIC ORIENTATION

ABSTRACT

Different authors explore the relation between a firm's environmental scanning and its strategic orientation. This research considers these two constructs to assess the perception of professionals related to scanning activities in their organizations. A survey was used as research method. Data are analyzed by using descriptive statistics, non-parametric and multivariate analysis. Miles and Snow (1978)'s typology is used as a frame of a firm's strategic orientation. The results indicate a relationship between external scanning and strategic orientation: the formal search for information stood out more in analytical and prospector organizations and informal search, in reactive and defensive ones.

Keywords:

Competitive Intelligence; Organizational Strategy; Organizational Environment; Scanning; Strategic orientation

INTRODUCTION

Scanning the competitive environment is a critical activity for the performance of organizations (Antia; Hersoford, 2007) and the alignment with their environment is the most significant predictor of organizational performance (Zhang, Majud, Foo, 2012). However, it is an activity that is difficult to implement (Lim, 2013), as events that affect the future of organizations may occur anywhere and in many ways (Aguilar, 1967). The interest in the factors that influence the way how the external environment is monitored is related to this difficulty, which remains a challenge for organizations. Nevertheless, firms that develop a competitive prediction capability achieve greater improvements in profitability and stock price performance (Lim, 2013).

A significant number of scanning initiatives are discontinued after their implementation, and or even not implemented (Lesca; Caron-Fasan, 2008; Akhavan & Pezeshkan, 2014). Organizations search for information to pursue their strategic goals and when the scanning method proves to be effective for this purpose, they are more likely to last (Choo, 2002). Therefore, the way how firms scan their environment affects their performance (Pryor et. al., 2019).

This study explores the factors that influence how organizations monitor their external environment, that is, how they collect and select information to reduce uncertainties and increase the quality of decisions. A critical factor is the strategic orientation or the strategic choice of a firm, that is, the way an organization's top management chooses to compete. Top management teams rely on scanning, by scanning the competitive environment (Danneels and Sethi, 2011). The way top executives understand their competitive environment influences the way they scan the competitive environment, which in turn influences the strategic choices of the firm (Pryor et al., 2019).

In this context, this research investigates the relationship between strategic orientation and scanning. To describe these constructs, we use the perception of professionals who perform activities related to scanning and monitoring in the organizations. The objective of this research is as follows:

- To identifying how organizations choose to compete in the business environment – what Porter (1980) called generic strategy and Miles and Snow (1978) called strategic orientation – and the relationship between strategic choice and strategic scanning and scanning of their environment .

In other words, the question is whether the organization's strategic choice and the self-positioning of the organization shapes how the organization, and especially its top management, monitors and scans the competitive environment.

LITERATURA REVIEW
SCANNING THE ENVIRONMENT

Environment scanning means the acquisition of information about events outside the organization's environment to generate the knowledge needed to support top management in guiding the future course of the organization (AGUILAR, 1967; CULNAN, 1983; CHOO, 1999, 2002).

One of the first significant studies on scanning was developed by Aguilar (1967) and many of the subsequent studies supported his concepts (ZHANG et al., 2010).

In the study of scanning, many authors use typologies that simplify multiple causal relationships into a few, easy-to-remember categorized profiles, combining complexity and parsimony (Fiss, 2011). Although Delbridge and Fiss (2013) see a decline in the typological theories in academic journals like Academy of Management Review, Snow and Ketchen (2014, p.231) rebut this view by mentioning the interest there is in using typologies: "In the early stages of a scientific discipline's development, typological classification is beneficial because the systematic ordering of a phenomenon's core elements provides the initial building blocks for theory development." Finally, a renewal of studies emerges from new qualitative comparative analysis (Wagemann et. al, 2016; Milles, 2017).

Aguilar's (1967) typology of scanning modes, characterized in Table 1, was used as a basis for many studies because of its simple and exhaustive criteria for proposing four modes based on the efforts to obtain information. When efforts are made, there is a demand for information that may be formal or informal; otherwise there is only a casual view of information, which may not be directed to a specific subject or conditioned to a relevant subject. Denning (1973) characterized this typology as a scale on which the way information is acquired moves from a totally casual to a structured mode as efforts increase. Formal search is the most structured scanning mode. Other typologies, such were proposed like Fahey and King's (1977)'s continuous mode and Jain's (1984)'s proactive mode, similar to Aguilar's formal search.

Table 1: Aguilar's Scanning Modes

Source: Adapted from Aguilar (1967, p. 19-21)

Viewing		Search	
Undirected	Conditioned	Informal	Formal

• Information obtained at random • Lack of a specific need for information • General exposure to information of the environment • Various sources and types of information • Recognition of the relevance of information is vague • Exploration of the environment • Signals of change in the environment	• Information obtained at random • Attention to a particular type of information • Direct exposure to information • Evaluation of the meaning as soon as the information is found • Indication of when more intense scanning is required	• Intentional effort to obtain information • Search for specific information • Does not know how to find the information beforehand • Unstructured search • Use of multiple sources (readings, conversations, etc.)	• Intentional effort to obtain information • Search for specific information • Planning • Procedures • Methodologies • Basis for strategic decisions

Miles and Snow (1978) proposed four types of organization according to the resulting strategic orientation: defenders (conservative), prospectors (innovative), analyzers (operate efficiently) and reactors (respond poorly to changes in the environment) which is widely sited in strategy and management literature since its publication (Yushikuni and Albertin, 2018), as it "it views the organization as a complete and integrated system and presents a particularly useful theoretical framework for analyzing the ways in which organizations dynamically interact with their environments" (McDaniel & Kolari, 1987, p. 20)

Daft and Weick (1984) later proposed a model for classifying organizations according to how an organization's top management interprets information gathered from the environment to make decisions and defines actions. They suggested the existence of a relationship between the scanning mode and the strategic orientation of organizations, based on the typologies of Aguilar (1967) and of Miles and Snow (1978), respectively. Daft and Weick (1984) employed two dimensions to explain how organizations formulate knowledge about the environment. The first dimension is how analyzable top management considers the environment to be, and the second is how much the organization actively seeks information by allocating resources. These dimensions gave rise to four modes of interpretation of the environment: **undirected viewing,** for reactive organizations that obtain information at random; **conditioned viewing,** for defensive organizations that routinely use information that has been helpful in past problems; **discovering,** for analytical organizations that rationally seek to know the environment through the formal search for information; and **enacting,** for prospector organizations that seek to transform the environment through innovation and are more characterized by the informal search for information.

STRATEGIC ORIENTATION AND ENVIRONMENTAL SCANNING

Strategic orientation refers to how an organization uses strategy to adapt and/or change aspects of its environment to a more favorable alignment, being a synonym for strategic choice (Manu; Sriram, 1996). According to Porter (1980), strategic choice refers to the alternative that best relates the organization to the opportunities and threats of the external environment. In a simplified way, strategic orientation characterizes how the organization's top management chooses to compete in the business environment, also being a synonym for competitive strategy (Morgan; Strong, 1998).

Strategic orientation is usually examined under a classificatory approach to group strategies according to a conceptual basis, giving rise to generic strategic types. According to Herbert and Deresky (1987, p. 135), "a generic strategy is a broad categorization of strategic choices that can be widely applied to any industry, any type or size of organization, etc." Porter (1980) proposed a classification based on cost leadership, geared towards efficiency and cost control; on differentiation, geared towards offering something unique to the market; and on focus, geared towards costs or differentiation focused on a specific portion of the company's sector of activity.

Several authors have explored the relationship between the company's strategy and its scanning mode. Many studies use Miles and Snow's (1978) typology (Anwar and Hasnu 2016, Frambach et al. 2016, Lin et al. 2014, Hambrick, 1982; Zajac & Shortell, 1989; Sim & Teoh, 1997; Vorhies & Morgan, 2003; Desarbo, Benedetto, Song, & Sinha, 2005), and is considered one of the most used approaches strategic behaviour of organizations studies (Yanes-Estévez, García-Pérez and Oreja-Rodríguez, 2018).

Miles and Snow (1978) made unproven speculations about the existence of a relationship between the prospective, defensive and analytical types of strategic orientation and the scanning activities of organizations. They suggested that prospector organizations focused on innovation monitor the environment more broadly than defensive ones focused on efficiency. Several studies then explored and tested the typology proposed by them.

Daft and Weick (1984) speculated on the relationship between the types of strategic orientation of Miles and Snow (1978) and the scanning modes proposed by Aguilar (1967). They suggested that active organizations with analytical strategic orientation, which adopt successful innovations from the leaders, employ a more formal and structured scanning mode than organizations with prospective strategic orientation, which lead by innovation. However, these authors did not empirically explore their conceptual proposals.

Hambrick (1982) investigated the relationship between strategy and the emphasis of scanning on specific sectors of the environment, using a sample of 17 organizations and Miles and Snow's (1978) typology of strategic orientations. No evidence was found that strategy alone influenced the emphasis of scanning on specific aspects of the environment.

Hrebiniak and Joyce (1985), in a conceptual approach, proposed that organizations with defensive or cost leadership strategic orientation perform scanning activities to find immediate solutions to lower costs or improve margins. Organizations with prospective or differentiation strategic orientation, in turn, perform scanning activities in an undirected manner, looking for opportunities.

Subramanian et al. (1993) investigated the relationship between strategic orientation and scanning in 68 Fortune 500 organizations. They employed the typology of strategic orientations proposed by Miles and Snow (1978) and the primitive, ad hoc, reactive, and proactive evolutive scanning modes proposed by Jain (1984). Evidence was found that prospector organizations have the most advanced scanning systems, followed by analytical and defensive ones.

Cartwright et al. (1995) investigated 74 organizations to evaluate the relationship between strategic orientation and the perceived usefulness of scanning. They employed Miles and Snow's (1978) strategic orientation typology and a classification of scanning modes based on Fahey and King (1977). They concluded that prospecting and analytical organizations perceived greater utility in continuous scanning mode than defensive and reactive organizations. Scanning in the form of a unique project, with the specific purpose of delivering information, was perceived as useful regardless of strategic orientation.

Yap et al. (2012) used the typology of Miles and Snow (2003) to investigate the relationship between scanning and strategic orientation in 93 companies from various sectors in Malaysia. They found evidence that analytical organizations, compared to defensive ones, monitor the technology and economic sectors more closely, and also make more use of the information obtained to provide a basis for strategic decisions.

Blackmore and Nesbit (2012) explored Miles and Snow's model in small and medium Australian enterprises and were able to identify prospectors, defenders and analyzers through a cluster analysis.

Fis (2011) explored the typology of Miles and Snow (2003) based on 205 high-tech companies.

More recent literature like Ingram et al. (2016) explores the relationship between strategy and firm's performance. The authors studied 96 firms in Poland among different sectors. The authors identified Miles and Snow strategies in Polish companies, identifying that Prospector and Analyzer strategic types indicate slightly higher performance than Reactor and Defender types.

Anwar and Hasnu (2017) also explore firms in Pakistan observing that defending and analyzing strategies perform better than the prospecting strategies.

Other authors explored the relationship between environment scanning and the generic strategies proposed by Porter (1980). Jennings and Lumpkin (1992) investigated the relationship between scanning and strategic orientation in 49 organizations in the savings and loan industry. They concluded that, when scanning, organizations with a differentiation strategy focus on opportunities and customers, whereas organizations with a cost leadership strategy focus on competitors.

Kumar et al. (2001) conducted a study with 159 hospital executives to investigate the relationship between strategic orientation, scanning and performance using Porter's (1980) generic strategies. They concluded that, in organizations with differentiation strategies, scanning is focused on opportunities, and in organizations with cost leadership strategies, the focus is on threats. Organizations that manage to align the focus of scanning with strategic orientation report better performance.

Walters et al. (2005) investigated the relationship between strategic orientation and scanning in 64 small businesses, also using Porter's (1980) generic strategies. They found evidence that companies with differentiation strategies place greater emphasis on scanning market sectors than companies with cost leadership strategies.

The typologies developed by Miles and Snow (1978) and Porter (1980) remains among the most widely cited and tested strategic orientation models (Ingram et al. 2016, Liyanage and Weerasinghe, 2018).

As the typology of Miles and Snow (1978, 2003) has been applied in several previous studies relating strategy to scanning mode in various sectors of activity, this study is based on their typology.

In the literature, we found the studies listed below based on generic strategy typologies to assess the existence of a relationship between the scanning mode and the strategic orientation of organizations:

The table below summarizes the main studies analyzed and their conclusions.

Table 2: Studies on the relationship between environmental strategy and scanning

Authors	Model Used	Empirical Investigation	Conclusions
Miles and Snow (1978)	Strategic orientation and Scanning	Speculation only	Prospector organizations focused on innovation monitor more broadly than defensive ones
Hambrick (1982)	Model based on Miles and Snow (1978)	Exploration of different sectors	Found no evidence of a relationship between strategy and scanning
Daft and Weick (1984)	Model based on Miles and Snow (1978)	Conceptual model proposal	Analytical organizations use a more formal and structured scanning model than prospector organizations
Hrebiniak and Joyce (1985)	Model by Miles and Snow (1978)	Conceptual article	Defensive organizations perform scanning to reduce costs and prospector organizations look for opportunities
Jennings and Lumpkin (1992)	Generic strategies (Porter, 1980)	49 organizations in the credit industry	Relationship between generic strategies and scanning mode
Subramanian et al. (1993)	Model based on Miles and Snow (1978); Jain (1984)	68 organizations found in *Fortune* magazine	Prospector organizations have the most advanced scanning systems, followed by analytical and defensive ones
Cartwright et al. (1995)	Miles and Snow (19878); Fahey and King (1977).	74 companies	Prospectors and analytical organizations perceived greater utility in the continuous scanning mode than defensive and reactive ones
Kumar et al. (2001)	Generic strategies (Porter, 1980)	159 executives in the hospital sector	Companies focused on differentiation monitor in search of opportunities, and cost-leadership companies focus on threats
Walters et al. (2005)	Generic strategies (Porter, 1980)	64 companies	Greater emphasis on scanning by companies with a differentiation strategy
Yap et al. (2012)	Miles and Snow (1978)	93 companies in various sectors of Malaysia	Analytical organizations, compared to defensive ones, monitor the technological and economic sectors more closely
Anwar and Hasnu (2015)	Miles and Snow (1978)	307 Pakistani Joint Stock firms from 12 industries	Identify that companies studied use hybrid strategies and that defending and analyzing strategies perform better than procpecting strategies
Ingram et al. (2016)	Miles and Snow (1978)	96 companies in different sectors in Poland	Identify that prospectors and analysers performed slightly better the defenders and reactors

Yanes-Estévez, García-Pérez and Oreja-Rodríguez, 2018	Miles and Snow (1978)	90 SME mostly from service sector	Concludes that it is not possible to fit SME in one pure strategy and they adapt to respond to uncertainty
Cassol et al. (2019)	Miles and Snow (1978)	368 MSE of service sector	Found predominance in use of analytical strategy and a smaller number of companies with reactor strategy
Sollosy et al. (2019)	Miles and Snow (1978)	503 firms in USA	Found relation from entrepreneurial, engineering and administrative to the four strategy types os Miles and Snow.

Based on the literature review, this study analyzed the relationship between strategic orientation and scanning through the perception of professionals related to scanning activities in the organizations they serve, seeking to identify a closer view of what happens in the practice of scanning in organizations.

METHODOLOGY

A quantitative approach was adopted employing descriptive and explanatory survey. The target population consisted of professionals involved with scanning activities in the organizations which they serve. We investigated their perception of scanning mode and strategic orientation, as well as on the relationship between them. The respondents to the online questionnaire were captured through the platform LinkedIn®, with more than 7,000 professionals registered in Competitive Intelligence (CI) groups. The characteristics considered were: being part of departments such as Intelligence, Marketing, Strategy, Sales, R&D, among others (Jain, 1984; Calof & Wright, 2008; Lesca & Caron-Fasan, 2008; Qiu, 2008) and activities associated with scanning as described in the professional's registration on LinkedIn®. In addition to posting the link to the online questionnaire in LinkedIn® groups, we analyzed the registrations of 1,589 professionals and sent individual invitations to 478 of them. We selected them because LinkedIn is a widely use professional database where it is possible to find a large number of professionals related to environmental scanning and strategy. Through a printed form, a questionnaire was administered to 38 professionals in a CI event and in two MBA classes.

The data collection instrument consisted of a questionnaire, in which the construct *scanning mode* was assessed through 15 questions based on Daft and Weick (1984), Aguilar (1967), Fahey and King (1977) and Jain (1984) and formulated into a five-point Likert scale, 1 being the degree for total disagreement and 5 for total agreement. Only the informal search (IS) and formal search (FS) scanning modes were investigated based on the assumption that organizations that have professionals related to scanning activities are active, according to Daft and Weick (1984), as they deliberately search for information in the environment. The agreement with each question is associated with IS or FS, as shown in Table 3, and this block of questions was preceded by the sentence: *"In your company, scanning the Business Environment is an activity characterized as:"*.

Table 3: Questions to identify the scanning mode

Questions		Scanning
V01	- occasional	IS
V02	- exploratory, as it seeks more hypotheses than confirmations	IS
V03	- focused on qualitative information (e.g. perceptions, motivations, etc.)	IS
V04	- not directed to specific information, being similar to a radar (like going fishing - I throw the hook, but I don't know which fish will come)	IS
V05	- searching for signs that anticipate opportunities and threats	FS
V06	- formal and managed by a specific department(s)	FS
V07	- planned and systematic	FS
V08	- directed to specific information, asking objective questions (like a shot that hits a bull's eye - aiming at a clear target)	FS
V09	- focused on quantitative information	FS
V10	- using data generated by information management systems	FS
V11	- regular (frequency is annual, monthly, etc.)	FS
V12	- focused on clearly determined sources of information (customers, competitors, etc.)	FS
V13	- searching for trends and statistical projections	FS
V14	- aimed at data collection (uses questionnaire, forms, etc.)	FS
V15	- generating non-routine studies and special reports	FS

The construct *strategic orientation* was assessed through questions adapted from the scale of Conant et al. (1990) to classify the respondents' organizations into the types suggested by Miles and Snow (1978, 2003). These questions were based on four dimensions of the problem of entrepreneurship of the adaptive cycle to the environment, namely: product/market domain, successful attitude, growth and scanning, and also in the planning dimension of the administrative activity.

HYPOTHESES DEVELOPMENT

Two hypotheses can be proposed regarding the causal relationship between scanning mode and strategic orientation.

Choo (2002) argues that the scanning mode is chosen to provide the necessary information for the organization to pursue the strategies chosen by top management. Daft and Weick (1984) propose that the strategic orientation of the organization is the responsibility of top management and therefore must be associated with the way the environmental conditions are monitored and interpreted. Miles and Snow (1978, 2003) suggest that top management influences the scanning mode according to the elements that seem most critical to the strategy they seek to pursue. The following hypothesis can be formulated:

H1: The scanning mode varies according to the organization's strategic orientation.

Daft and Weick (1984) consider that the interpretation of the environment through *discovery* is consistent with the *analytical strategic orientation*, as top management is more concerned with maintaining the stability of its products and adopting the successful initiatives of market leaders, studying the environment to move cautiously. Thus, they perceive the environment as analyzable and monitor it through formal search (Aguilar, 1967), employing systematic data collection, market research, trend analysis and forecasts. In

contrast, Daft and Weick (1984) consider that the interpretation of the environment through *intervention* is consistent with the *prospective strategic orientation*, as the environment is perceived by top management as inconstant and full of opportunities, favorable for the launch of new products and initiatives. Thus, they consider the environment poorly analyzable and prioritize scanning through informal search, as they do not consider that the environment can be measured or evaluated through logic, not knowing beforehand exactly how to find the information, privileging the information obtained through personal contacts.

The following hypothesis is proposed:

H2: Formal search is a more frequent scanning mode in organizations with analytical strategic orientation than in organizations with prospective strategic orientation.

To test these hypotheses, the non-parametric chi-square (χ^2) statistical technique (Siegel, 1975) was used on the two categorical variables generated from the answers to the questions of the questionnaire. The first variable was *scanning mode,* with two categories: IS and FS. The second variable was *strategic orientation,* with four categories: A (analytical), D (defensive), P (prospective) and R (reactive).

RESULTS

In total, we collected 207 questionnaires, 195 of which were considered valid. Considering that the size and maturity of organizations may influence how organizations do their scanning (Thomas, 1980; Choo, 2002), we chose to only analyze the questionnaires completed by professionals working in large companies, which are those that, according to BNDES's (National Development Bank) annual revenue criterion, reported revenues higher than R$300M (US$73M / €65M). Also, from this group, we selected the organizations with at least 100 employees, which is also a criterion for large companies according to SEBRAE (Brazilian Micro and Small Business Support Service) and with at least 10 years of existence in the market, coming up with a final sample of 120 questionnaires.

Main characteristics of the respondents are as follows:66% of professionals are above 30 years, 60% male, 61% with a postgraduate degree, 36% with at least five years of experience in the organization, 49% in the Intelligence area and 38% holding a management or higher hierarchical position. Main characteristics of the organizations of these respondents are as follows: 97% of the organizations are with more than 500 employees and 83% with more than 20 years of existence in the market. As for strategic orientation, we found a predominance of 44% of analytical organizations, according to the distribution of the respondents' organizations between the four profiles suggested by Miles and Snow (1978, 2003), shown in Table 4.

Table 4: Distribution of Strategic Orientation

Type	n	%
Analytical	53	44.2%
Defensive	27	22.5%
Prospective	21	17.5%
Reactive	19	15.8%
Total	**120**	**100.0%**

Table 5 shows the descriptive statistics of the 15 variables used to assess the scanning mode that is characteristic of the respondents' organizations. Overall, there is a high degree of agreement with the focus on quantitative information (72%) and the use of clearly determined sources of information such as customers, competitors, among others (70%).

Table 5: Descriptive Statistics of Variables

Variables	Mean (n=120)	Standard Deviation	% Degrees 5 and 4 Agreement	% Degree 3 Neutral	% Degrees 1 and 2 Disagreement
V01	2.39	1.22	21%	23%	56%
V02	2.81	1.14	31%	29%	40%
V03	3.15	1.15	40%	29%	31%
V04	2.46	1.24	24%	18%	58%
V05	3.39	1.20	50%	23%	27%
V06	3.62	1.28	61%	16%	23%
V07	3.31	1.28	48%	24%	28%
V08	3.33	1.14	49%	27%	24%
V09	**3.92**	**1.04**	**72%**	**18%**	**10%**
V10	3.20	1.36	49%	19%	32%
V11	3.75	1.28	65%	17%	18%
V12	**3.92**	**1.10**	**70%**	**17%**	**13%**
V13	3.44	1.21	56%	21%	23%
V14	2.81	1.26	33%	24%	43%
V15	3.41	1.22	50%	25%	24%

In order to classify the scanning mode of the respondents' organizations into FS and IS, we employed the statistical technique of cluster analysis, with the non-hierarchical cluster method k-means applied to the 15 variables. As a result, the observations were divided into two groups with 81 and 39 observations, respectively.

In the first group (n = 81), all 11 variables associated with FS have means above three, indicating agreement, and three of the four variables associated with IS have a mean below three, indicating disagreement. In the second group (n = 39), nine of the 11 variables associated with FS have a mean below three, indicating disagreement, and two of the four variables associated with IS have a mean equal to or greater than three. Thus, it is noted that the organizations of the respondents of the questionnaires classified into the first group have predominant characteristics of FS, while those that fall into the second group have characteristics of IS, as shown in Table 6.

Table 6: Means Ordered in Groups

Descending Order by Agreement			Ascending Order by Agreement		
Variables	Group 1 (n=81)	Group 2 (n=39)	Variables	Group 2 (n=39)	Group 1 (n=81)
V12	4.36	3.00	V07	1.97	3.95
V11	4.28	2.62	V14	1.97	3.21
V09	4.19	3.33	V10	2.13	3.72
V06	4.17	2.46	V13	2.31	3.99
V13	3.99	2.31	V05	2.41	3.86
V07	3.95	1.97	V06	2.46	4.17
V05	3.86	2.41	V08	2.49	3.73
V15	3.77	2.67	V03	2.56	3.43
V08	3.73	2.49	V02	2.59	2.93
V10	3.72	2.13	V11	2.62	4.28
V03	3.43	2.56	V15	2.67	3.77
V14	3.21	1.97	V12	3.00	4.36
V02	2.93	2.59	V04	3.00	2.20
V04	2.20	3.00	V01	3.15	2.04
V01	2.04	3.15	V09	3.33	4.19

Variable V03, which associates the search for qualitative information with IS, demonstrates a behavior contrary to what was expected when the questionnaire was prepared, indicating a level of agreement in the FS group with a mean of 3.43 and a level of disagreement in the IS group with a mean of 2.56. The reason may be that respondents generally do not associate this variable with information from informal human sources, but rather with the conduct of field research using qualitative methods to collect information in a planned manner on the perceptions and motivations. For this reason, we decided to associate the agreement with this variable with FS rather than with IS.

Variable V02, which associates scanning with the exploration of the environment, also has a different behavior than expected. Disagreement was expected in the FS group and agreement in the IS group. We obtained almost neutrality in the first group, with a mean of 2.93, and disagreement in the second group, with a mean of 2.56. A possible justification is the fact that the description of the variable in the questionnaire did not provide sufficient clarity for the respondents' evaluation. Due to these results, the search for information in the environment seems to be more associated with the confirmation of hypotheses, regardless of the degree of formality. This variable did very little to differentiate between the groups.

The statistical technique ANOVA (analysis of variance) was used to identify the variables that most contributed to the separation of the two groups. If a variable is able to distinguish one group from another well, it is expected to vary sharply between groups but minimally within a group. Thus, the variables that contributed the most to discriminate between the groups are shown in ascending order in Table 7.

Table 7: F Statistic Values

Variable	F	Sig.	Variable	F	Sig.
V07	133.648	0.000	V14	31.952	0.000
V13	88.292	0.000	V01	27.291	0.000
V06	76.272	0.000	V15	25.826	0.000
V11	71.064	0.000	V09	20.701	0.000
V12	60.547	0.000	V03	17.025	0.000
V05	56.153	0.000	V04	11.990	0.001
V10	51.926	0.000	V02	2.356	0.127
V08	42.818	0.000			

Table 7 shows that only variable V02 does not indicate statistical evidence with a critical level of significance of 0.05 to influence the separation of the groups as expected, in addition to having the lowest value for F statistic (2,356). The four variables that most contribute to the separation of the groups are:

a) planned and systematic (V07);

b) seeks trends and statistical projections (V13);

c) formal and managed by a specific department (V06);

d) regular, with annual, monthly, etc. frequency (V11).

Thus, a higher level of agreement with these variables is considered to indicate a scanning mode that is closer to formal search and a higher level of disagreement with these variables increases the proximity to informal search (Aguilar, 1967; Jain (1984); Daft & Weick, 1984; Chi, 2002).

Companies in the FS group have a scanning activity perceived predominantly as a planned and systematic activity (V07; mean=3.95 for FS companies and mean=1.97 for IS companies; F=133.64, sig=0.000); and they are also perceived as seeking trends and statistical projections (V13; mean=3.99 for FS companies and mean=2.31 for IS companies; F=88.292, sig=0.000). Still regarding these companies, scanning is seen as formal and managed by a specific department (V06; mean=4.17 for FS; mean=2.46 for IS; F=76.27, sig=0.000) and scanning is performed on a regular basis and at regular intervals (V11; mean=4.28; mean=2.62, F=71.06, sig=0.000).

As a confirmatory procedure for the result of the cluster analysis, we used discriminant analysis, a multivariate statistical technique. In this study, the dependent variable is the scanning mode to be classified as FS or IS, and the independent variables are the 15 variables.

The FS group indicates a centroid with a positive value of 1.15, and the IS group indicates a centroid with a negative value of -2.39, showing that both groups have reasonable separation. As a final result of the discriminant analysis, we obtain a discriminant function that shows the dependent variable as a linear combination of the independent variables. According to Hair Jr. et al. (2006), the importance of each variable for the separation of the groups can be assessed by means of the correlation coefficients between the independent variables and the discriminant function, called discriminant loadings, shown in Table 5 in descending order of numerical module.

Table 8: Discriminant Loadings

Variable	Cor. Coef.	Variable	Cor. Coef.	Variable	Cor. Coef.
V07	0.638	V05	0.413	V15	0.280
V13	0.518	V10	0.397	V09	0.251
V06	0.482	V08	0.361	V03	0.228
V11	0.465	V14	0.312	V04	-0.191
V12	0.429	V01	-0.288	V02	0.085

As in the cluster analysis, variable V07, which evaluates the planning and systematization of scanning, is the most prominent in the separation of observations, with a correlation coefficient of 0.638. Variable V02 indicates almost no correlation, confirming its minor importance in the separation of groups. The association of variables V01 and V04 with informal search was also validated, these variables being the only ones with a negative correlation with the discriminant function. Another confirmation was the association of variable V03 with formal search, given the positive correlation with the discriminant function.

The cutoff value for the data of this study was calculated at -0.62. Thus, all discriminant scores above this value were classified into the FS group and the others into the IS group. Comparing the classification of the 120 observations from the sample by the discriminant function with that obtained by the cluster analysis, it was found that in the FS group there was a 98.8% degree of correctness of the discriminant function (80 out of 81) and in the IS group this number was 94.9% (37 out of 39). This result shows that there is a clear separation between the two groups, indicating quite different characteristics.

Finally, to test the proposed hypotheses, the relationship between scanning mode and strategic orientation was verified by applying the non-parametric statistical test χ^2. The operationalization of this test consisted of the use of categorical variables on nominal scales obtained in the previous steps and the classification of each observation of the sample into FS and IS occurred according to the group in which the observation was included in the cluster analysis.

Table 6 shows the cross distribution of frequencies of these variables with three lines in each cell, which correspond to the obtained count, the expected count (into brackets) and the percentage in the column, respectively.

Table 9 - Strategic Orientation and Scanning Mode (χ^2 test)

		Analytical	Defensive	Prospectof	Reactive	Total
	Count	41	16	16	8	81
FS	Expected count	(35.8)	(18.2)	(14.2)	(12.8)	(81)
	% in the column	77.4%	59.3%	76.2%	42.1%	67.5%
	Count	12	11	5	11	39
IS	Expected count	(17.2)	(8.8)	(6.8)	(6.2)	(39.0)
	% in the column	22.6%	40.7%	23.8%	57.9%	32.5%
	Count	53	27	21	19	120

		(53.0)	(27.0)	(21.0)	(19.0)	(120.0)
Total	Expected count	(53.0)	(27.0)	(21.0)	(19.0)	(120.0)
	% in the column	100.0%	100.0%	100.0%	100%	100%

Applying the χ^2 test, we obtained a value of 9.492 for the Pearson's Chi-Square statistic, with significance of 0.023 for 3 degrees of freedom. Thus, the null hypothesis of the χ^2 independence test between the variables scanning mode and strategic orientation was rejected with a critical level of significance of 0.05, leading to the _acceptance of the first hypothesis_ of this study:

H1: The scanning mode (formal or informal search) varies according to the strategic orientation of the organizations (defensive, prospector, analytical, reactive).

Table 7 shows the cross distribution of the variables scanning mode and strategic orientation, but limited to analytical and prospector organizations.

Table 10: Scanning Mode and Strategic Orientation A and P

		A	P	Total
	Count	41	16	57
FS	Expected count	(40.8)	(16.2)	(57.0)
	% within the column	77.4%	76.2%	77.0%
	Count	12	5	17
IS	Expected count	(12.2)	(4.8)	(17.0)
	% within the column	22.6%	23.8%	23.0%
	Count	53	21	74
Total	Expected count	(53.0)	(21.0)	(74.0)
	% within the column	100.0%	100.0%	100%

Applying the χ^2 test, we obtained a value of 0.012 for Pearson's Chi-Square statistic, with significance of 0.914 for 1 degree of freedom. Thus, the null hypothesis of the χ^2 independence test between the variables was accepted with a critical level of significance of 0.05, leading to the _rejection of the second hypothesis_ of this study:

H2: Formal search is a more frequent scanning mode in organizations with analytical strategic orientation than in organizations with prospective strategic orientation.

This result can be supported by Miles and Snow (1978, 2003) when they suggest that analytical firms, being hybrid, also have a prospector profile.

FINAL CONSIDERATIONS

In this study, we analyzed 120 mature and large organizations described by their scanning professionals in relation to how they search information in the external environment and how top management chose to compete in the market. Considering the scope of the subject, the contribution was to bring the perspective of the people who are involved with scanning in practice. We also sought to contribute by bringing back and analyzing theoretical models that were only partially tested in previous studies and that proposed to describe and explain how organizations monitor their external environment. These models provided a basis for the

construction of scales to operationalize the verification of the existence of a relationship between the scanning mode and the strategic orientation of organizations, which is the main objective of this study.

The first finding is the predominance of formal search to monitor the environment, with 67% of observations. This result is in line with Thomas (1980), who argues that large organizations tend to implement more structured scanning systems that are compatible with strategic planning needs. The results also show a predominance of analytical organizations, with 44% of observations. In organizations such as the ones investigated, it can be assumed that this strategic orientation is in fact the most common, since in general they have a consolidated core of products/markets and are cautious with innovations due to the inertia generated by their size and maturity. However, it must be admitted that a further theoretical approach is required to support this conclusion. We also find a predominance of formal search, with 77%, in the analytical organizations, which is higher than the expected 67% in the sample if the strategic orientation and scanning mode were independent. This result is consistent with Daft and Weick (1984), who suggest that active organizations with analytical strategic orientation employ a more formal scanning mode. They interpret the environment through discovery, considering the environment analyzable through methods such as market research and statistical analysis of trends and forecasts to support an analytical formulation of strategies.

The second finding corresponds to a more discreet occurrence of prospector organizations, with only 17%. This result may also be due to the maturity and size of the organizations, which supposedly led to the predominance of analytical ones. However, the frequency of formal search observed among prospector organizations is 76% and, similar to the analytical organizations, it is higher than the expected 67% if there were no relationship between the two constructs. This result is not in line with Daft and Weick (1984), who suggest that prospector organizations interpret the environment through intervention and therefore adopt a more informal search for information. However, according to Miles and Snow (1978, 2003), prospectors seek to widely monitor the conditions and events of the environment, looking for opportunities for innovation. Considering the current globalized scenario, the significant increase in the breadth and complexity of the environment may be demanding more sophisticated methods and techniques that large innovative companies can support seeking to predict trends by collecting anticipative information such as weak signals.

The last finding is the occurrence of defensive strategic orientation in 22% of observations and of reactive strategic orientation in 15%, with informal search being more prominent in these two groups. In the model of Daft and Weick (1984), these strategic orientations are associated with passive organizations and again, size and maturity may have influenced the use of efforts to collect routine information of the environment, characterizing a search-like scanning mode. There is also a greater tendency for informal search in these two groups when comparing the observed and expected frequencies if the two constructs were independent. It should be noted that Miles and Snow (1978, 2003) consider that the defensive ones monitor the environment, but with a restricted focus.

Other studies have explored different aspects of the relationship between scanning and strategic orientation. Hambrick (1982) found no evidence of relationship, having used a sample of only 17 organizations as previously mentioned. Jennings and Lumpkin (1992) noted in their study, conducted with 49 organizations, that according to the orientation by cost or differentiation (Porter, 1980), companies focus on competitors, in the first case, or on opportunities and customers, in the second case. Kumar et al. (2001) and Walters et al. (2005) came to similar conclusions. In this study, we chose to explore the strategic orientations according to Miles and Snow (1978, 2003). The same was done in the study of Yap et al. (2012) who also identified a relationship between environmental scanning and strategic orientation in a study exploring 93 companies.

This study is also consistent with Subramanian et al. (1993), who also found evidence of the relationship between environmental scanning and strategic orientation. They identified that prospector organizations have the most sophisticated scanning systems, followed by the analytical and defensive ones.

For further studies, we suggest investigating the contribution of formal search and informal search to the performance of organizations. In the literature, there is a concern about the excessive formality of scanning activities that could lead to a reduction in creativity, which is a crucial element to interpreting information and developing future perspectives. Thomas (1980) argues that systematized approaches to scanning should be designed so as to develop the executives' creativity to allow them to cope with future changes in the environment. Kahaner (1997), in turn, comments that one of the most difficult tasks of scanning is to predict what will happen in the future and that quantitative information, in general, describes the past. He therefore suggests that unstructured information such as rumors and comments should also be part of the scope of scanning. We consider that the results of this study lead to the question of how effective formal search is in predicting the future, since it was strongly associated with the analyses and statistical predictions that may divert the attention from strategic surprises or disruptions (Ansoff, 1975).

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