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ENVIRONMENTAL SCANNING IN ORGANIZATIONS: FROM SOURCES OF INFORMATION TO UNCERTAINTY MANAGEMENT

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1. INTRODUCTION

Organizations today are looking for ways to develop a better understanding of the competitive landscape, which is becoming more aggressive with the high volume of information about competitors and consumers available in different sources, mainly the internet. In an innovation economy where change is constant, companies must deal with uncertainty through information management (Ahlskog *et al.*, 2017). Information can provide advantage for companies when used for anticipating and reacting to changes inside and outside of their industries. If companies can identify these changes early, they have the opportunity to assess them and think what they mean to their business (Nikolaos & Evangelia, 2012).

The concept of environmental scanning has its roots in an attempt to understand the external environment. For this, companies started to adopt Competitive Intelligence (CI) practices in 1980 as a response to new demands of a globalized market (Prado & Campos, 2018). Although the name suggests, CI doesn't look only for competition, but for all factors involved in business environment, such as the acquisition and interpretation of data from markets, customers, competitors, megatrends, among others (Scip, 2020). In CI process, data and information are turned into actionable intelligence, what demands a constant update of new data and new information to support new decisions (Nikolaos & Evangelia, 2012).

Currently, internet provides a way to acquire information at low costs with a vast amount of data available, which allow to almost any company and any decision maker to identify needs for changes (Søilen, 2017). This process of data acquisition is known as environmental scanning (ES) (Choo, 2001). Companies of different sizes do environmental scanning, what differs is if the process happens thought formal or informal ways, and how the firm uses the data/information collected. This subject is getting a lot of attention because technological development allows greater opportunities to firms monitoring and understand their context. Besides, ES activities help organizations to adapt their products and services to customer preferences in the ever-changing business environment (Nyuur *et al.*, 2015).

Given this, we aim to construct a body of knowledge on the environmental scanning process. To this, a systematic literature review was carried out, in order to understand how this concept is explored in the literature and what is its state of art. Our main objective is to identify how literature studied the environmental scanning process during last decade (2010-2019) in order to understand which themes are explored and if the literature has changed during these years. More specifically, this paper aims to identify what knowledge was constructed regarding environmental scanning and information sources during this time period. This research is important because when compiling literature, the fragmented findings from several authors are put together and compared, what implies in a wide understanding about what has been done and what still should be done.

2. THEORETICAL BACKGROUND

The concept of environmental scanning states that companies can obtain competitive advantage when they acquire, treat, and analyze data and transforms it into information useful for decision making (Rajaniemi, 2007). Every change in external environment shows signs and messages that the organization must be aware to sense it. Academics and practitioners use the term environmental scanning (ES) to refer to the act of actively monitoring the environment in order to learn, get data, and transform it into information and knowledge that

can improve and guide the decision-making process for answering effectively to those changes (Choo, 2001).

As pointed by Ansoff (1975), many companies fail to anticipate when so-called "strategy surprises" occur: urgent and sudden changes in the company's perspective, which can lead to possible threats to the business and also miss many opportunities. In the author's view, the scanning process helps the organizations in avoiding surprises, identifying threats and opportunities, gain competitive advantages and improve the long and short-term planning. The same problem identified by Ansoff in 70s still happens today. Rajaniemi (2017) indicates that strategic planning is frequently done without proper knowledge of the competitive environment.

Organizations with different strategies develop different manners to get information considering market uncertainty and complexity (Choo, 2001). Companies must scan to be able to pay more attention to the environment so they can learn from the trends and changes identified. Furthermore, this type of attitude is fundamental for large companies, since they deal with an increasing complexity both internally and externally. In relation to small companies, the scanning is worthwhile, even if it is carried out by informal sources (Rohrbeck & Bade, 2012).

The importance of analyzing possible threats and opportunities is due to the fact of taking risks by acting too early and not having enough information or taking too long and falling behind the competition (Ansoff, 1975). However, at the same time information can help organizations to anticipate competitors moves, guide a new product development or improve organizational learning, there must be an awareness about the usefulness and relevance of the information collected and analyzed, because wrong or manipulated information can damage the companies (Duan *et al.*, 2020).

Additionally, the concept of environmental scanning is present in the literature of strategic management, under different terms. Two of the most contemporary approaches to strategy include scanning the environment as key factor that can explain how organizations change, adapt, and transform to gain competitive advantage. The capabilities based view (Teece, Pisano & Shuen, 1997) and the organizational agility view (Nagel & Dove, 1991) has the sensing capability as one of its micro-foundations (Teece, 2007), which "includes the identification, development, and calibration of technological opportunities, customer needs, and strategic challenges" (Teece, 2020). In this sense, the ES concept is a part of broader approaches to strategy and can explain issues about change and competition.

2.1 Environmental systems and sources

An organization that intrudes actively into the environment is one that allocates substantial resources for information search and for testing or manipulating the environment. A passive organization on the other hand takes whatever environmental information comes its way and tries to interpret the environment with the given information (Choo, 2001). Environmental Scanning is the way in which organizations and individuals within organizations learn about and make sense of their environment. ES may or may not be part of some formal system, involves both passive observation and active gathering of information and is conducted at various levels in organizations (Robinson *et al.*, 2020).

There are several ways to have an environmental scanning system: (i) outsourced, how to buy analyzes and services, or subscribe to periodicals or newsletters that are less personalized or (ii) internal to the organization itself, happening informally, in the day by day (Lesca & Caron-Fasan, 2008). There are two sources organizations can use for ES: external

and internal. While using external sources, an organization looks for information originated outside, for example, in customers, competitors and government publications. When using internal sources, an organization gives more importance to data and information originated withing the company, for example, in internal reports and studies, subordinate staff and board members (Aldehayyat, 2015). Robinson & Simmons (2018) identified that each combination of information source and subtype has unique characteristics.

Figure 1: Environmental Scanning modes

Mode	Why Chosen?
Personal external	Seen to provide high quality information, usually from individuals working at customer or competitor organizations. More heavily relied upon smaller organizations, perhaps because the pool of internal individuals was small.
Personal internal	Also seen to provide high quality information. Mostly used in the medium and larger companies with sufficient numbers of employees in external-facing roles. In general, organization size appeared to drive whether personal sources were internal or external in nature.
Impersonal external	General availability to all companies in a given sector drove the use of these sources, usually industry intelligence reports or databases. Frequently seen to have limited value and not to be sufficiently focused to guide decision making. Therefore, general availability was a more important consideration than information quality in this case.
Impersonal internal	Use limited to large companies due to sufficient internal resources being available for formal report generation. These reports were produced by using some form of personal source to augment information from impersonal external sources.

Source: Adapted from Robinson & Simmons (2018).

According to this model, there are several sources of information gathering for the environmental scanning process. Due to complexity in competitive environments, companies often need to develop combination of several modes of ES to continuously be able to identify and respond to changes in the market.

3. METHODS

This paper aims to identify how literature studied the environmental scanning process during last decade (2010-2019) in order to understand what themes are explored and if the literature has changed during these years, and more specifically, this paper aims to identify what knowledge was constructed regarding environmental scanning and information sources during this time period. So, this twofold objective demands two different approaches. The first approach used was to search in Scopus database for the term “environmental scanning”, filtered to studies from the last decade and in the Business and Management field. The papers were identified, and their metadata downloaded. Papers metadata were used as input for the VOS software to create a keyword co-occurrence map.

Considering the second objective, the most suitable method is the development of a Systematic Literature Review (SLR). According to Kitchenham (2004), a SLR seeks to identify, evaluate, and interpret, in a formal way and using rigorous methods, materials that are relevant to the topic, research problem or phenomenon of interest to the researcher. RSLs allow a broader view, being able to overcome the limitations of primary studies, aggregating results from large samples, producing results of much greater power and reliability (Petticrew & Roberts, 2006).

This is an empirical research that uses published papers as unit of analysis to summarize the existing literature and to identify gaps in the literature to suggest future

research ideas. Kitchenham (2004) suggests that for the development of an RSL, a planning stage is necessary, in which the need for a systematic review is established and the research protocol used is detailed. A second stage, conduction, includes the identification and selection of studies, evaluation of the quality of the selected materials, extraction, and monitoring of data and finally, a synthesis of the data.

Regarding the SLR protocol, the search step attempted to identify the bigger amount of papers as possible related to the research question, so the terms resulting from previous literature analysis were combined (Figure 2) in Scopus database engine (signed for University of São Paulo) in june/2020.

Figure 2: Search terms and numbers of papers

Search	Terms combined	Papers
01	TITLE-ABS-KEY("environmental scanning" AND "large compan*" OR "large business" OR "large enterprise")	5
02	TITLE-ABS-KEY("environmental scanning" AND "SME")	27
03	TITLE-ABS-KEY("environmental scanning" AND "case study")	73
04	TITLE-ABS-KEY("environmental scanning" AND "information source")	38
	Total:	143

Source: Authors (2020).

In order to analyze just papers with high adherence to the research problem, all the 143 papers found were saved into a Scopus list and filtered by some criteria, as being registered in Business and Management field, being an article and being published in journal, from 2010 to 2020. After all this filtering steps, 48 papers left. Metadata of the 48 papers resulting from the searches were submitted to the StArt software to a manually selection.

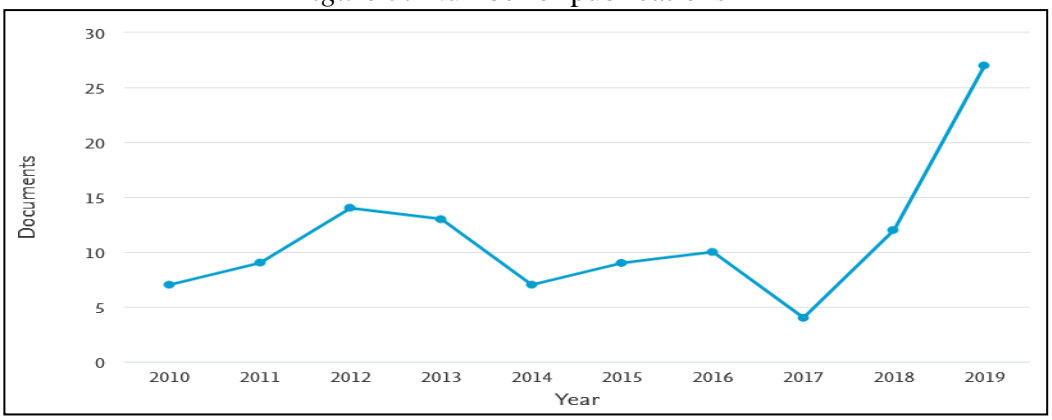
Selection step is complex and involves several phases (Kitchenham, 2004). With StArt technological support, we initially read papers title and abstract in order to select those ones that have environmental scanning as the main focus of analysis. From this reading, 28 papers were discarded. The 20 papers remaining were fully read. We observed from the reading that the environmental scanning theme is also very popular among other areas besides Business and Management, mainly Health and Chemistry, but especial attention must be paid because in these areas the term has different meanings. Due to this, we discarded another 9 papers due to the lack of adherence to the theme of environmental scanning. From this step, 11 papers were selected to be analyzed in the RSL, and a content analysis was performed (Krippendorf, 1989).

4. RESULTS AND DISCUSSION

4.1 General overview about the main topics

The first published paper in Scopus was in 1974. Since then, a lot of research has been done about organizations and the concept of environmental scanning. Since this paper aims to analyze literature from last decade, we selected articles in the period of 2010-2019. For a general, Figure 3 indicates the amount of papers published in the area in last decade.

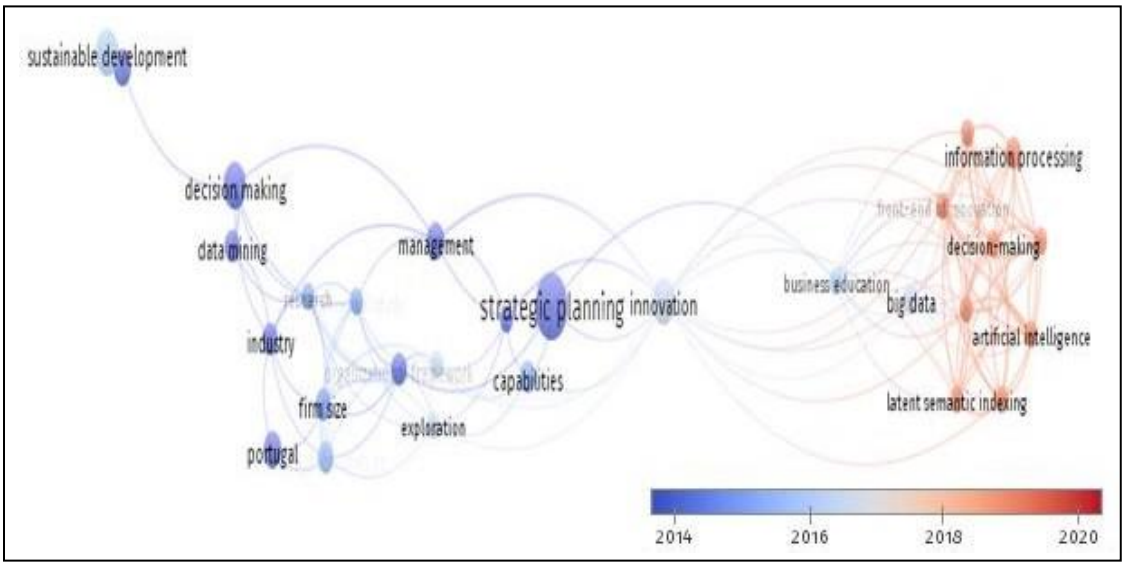
Figure 3: Number of publications



Source: Authors (2020).

Since 2010, environmental scanning literature has ups and downs, but this behavior changed in 2019, rising to almost 30 papers published in the year. This indicates that researchers are turning their attention back to this concept. Figure 4 is a co-occurrence map generated through the VOS viewer software that will help to understand what happened with the research in last decade and that subjects were studied. The co-occurrence map uses papers keywords to create links among them based on the number of documents they occur together. The bigger the circle and its label, the more that keyword has occurred.

Figure 4: Main themes studied in environmental scanning literature over the years



Source: Authors (2020).

There are two different clusters in literature, which means two different focus of analysis. The blue one is made by papers that studies the organization and the strategic aspects related to environmental scanning, as it can be seen in the words: “strategic planning”, “capabilities”, “exploitation”, “firm size”, “decision making” and others. This cluster represents the core of the decade publications, once papers from this cluster are mainly since 2010 to 2017/2018. The other cluster, red, is made by keywords that indicate a technological approach to environmental scanning, such as “big data”, “artificial intelligence”, “information processing” and others. Publications from this cluster are more incipient as compared to the blue cluster, since they gained more volume in the last years. This changing in the studies focus maybe is an explanation for the expansion of publications after 2018.

4.2 Systematic Literature Review

Figure 5 describes the papers selected for the SLR. These papers were selected according to the quality steps described in the methodological procedures proposed by Kitchenham (2004).

Figure 5: Selected papers

Title	Authors/ Year	Journal
Perceived uncertainty and use of environmental information in decision making: The case of the United Arab Emirates	Abu-Rahma & Jaleel (2019)	Int. Jour. of Organizational Analysis
Organising environmental scanning: Exploring information source, mode and the impact of firm size	Robinson & Simmons (2018)	Long Range Planning
Study of the information sources features and its effect on managers' environmental scanning behavior	Bahmani et al (2017)	Int. Jour. of Information Science and Management
Foresight capabilities and SME product/service adaptiveness: The moderating effect of industry dynamism	Nyuur *et al.* (2015)	International Jour. of Foresight and Innovation Policy
Environmental scanning in business organisations: Empirical evidence from a Middle Eastern country context	Aldehayyat (2015)	Management Research Review
The strategic planning of SMEs in Malaysia: A view of external environmental scanning	Cheng *et al.* (2014)	International Journal of Business and Society
Environmental Scanning Practices of Travel Agent Companies in Singapore	Zhang *et al.*, (2013)	Asia Pacific Jour. of Tourism Research
Exploring problem finding in a medical device company	Nilsson (2012)	Measuring Business Excellence
Information sources for environmental scanning: Do industry and firm size matter?	Haase & Franco (2011)	Management Decision
Scanning practices and information sources: An empirical study of firm size	Franco *et al.* (2011)	Jour. of Enterprise Information Management
A cross/cultural analysis of intellectual asset protection in SMEs: The effect of environmental scanning	Bérard & Delerue (2010)	Jour. of Small Business and Enterprise Development

Source: Authors (2020).

As previously said the main objective of this paper is to understand how authors are producing knowledge about environmental scanning. In an attempt to answer this objective, we extract some some information from each paper, including: (i) main objective; (ii) methodology; (iii) contributions; (iv) future research suggestions. These can be seen below in Figure 6.

Figure 6: SLR Selected papers overview

Paper	Objectives	Methodology	Findings	Future research
Abu-Rahma & Jaleel (2019)	Exploring the relationship between perceived environmental uncertainty and scanning activities of firms operating in the United Arab Emirates; studying the influence of accessibility and quality of information sources on the ES efforts of firms in the region; and examining the impact of perceived uncertainty on managerial decision-making and assess	The study uses a cross-sectional research design, with self- administered questionnaires as the main mode of data collection. The sample is made of 153 managers from United Arab Emirates. The data analysis was done by using ANOVA and multiple regression techniques	Perceived environmental uncertainty significantly increases ES efforts, which in turn influence the use of environmental information in decision-making. Perceived source quality influences frequency of ES. Perceived source accessibility on ES is statistically insignificant	Authors suggest that future research can conduct a comparative on cross-cultural management practices. It could be studied the impact of using environmental information in decision-making on actual operational and strategic outcomes of the firm.
Robinson & Simmons (2018)	Analyzing why certain sources of information are chosen over others and what is the impact of choosing these sources for companies	Interviews were conducted with seven companies with different sizes from oil and gas industry, financial services, and a defense industry organization. Transcriptions were analyzed using content analysis	Findings suggest that quality of information source may be less important in explaining source use than previous studies suggest. There is reliance on internal sources, compiled using multiple channels, in larger companies. The patterns of source usage variates across firms' sizes	Authors suggest analyzing organizational variables and contingencies that affect scanning in organizations; also, it could be researched issues about source popularity
Bahmani et al (2017)	The paper aims to explore what information sources were used by company managers for ES and what factors influence this usage	The sample is 48 companies from Iran. Managers answered to a questionnaire. Data was analyzed by descriptive and t-test	From sample, 75% of managers use personal external information sources. There is positive relationship between source quality, reliance and richness and the frequency its used. Managers do not use all sources available.	Paper does not suggest future research ideas

Nyuur *et al.* (2015)	Identifying the ability of SMEs to engage in foresight activities; (the relationship between SME foresight capabilities and their product/service adaptiveness and to analyze the moderating effect of industry dynamism on these relationships	The sample is made of 194 Croatian SMEs from diverse industries. The constructs were measured by Likert scales. The analysis was done by hierarchical regression	ES has a high level of direct impact on SMEs ability to strategically adapt their products/services to the market and customer needs.	Future research can look to examining a comprehensive list of foresight "first-order capabilities" and practices and their impact on SME performance. It could also employ different performance measures
Aldehayyat (2015)	Analyzing the ES and information sources used by Jordanian firms and the relationship between ES and organizational characteristics (firm size and industry type) and organizational performance	The survey was conducted with 125 companies in Jordan. For data analysis, correlation and ANOVA were used.	Larger companies have more scanning activities, while SMEs tend to focus on different sources of information. In small companies there is a greater dependence on information that comes from networks in which the company is inserted.	Further research should examine ES in different Middle East countries and should use face-to-face interviews or focus groups to address the motive of this behavior
Cheng *et al.* (2014)	Investigating how important a formal external ES was to SMEs in Malaysia and analyses how Malaysian SMEs perform the external ES with a model based on previous literature	It was done a cross sectional survey with 108 SMEs from Malaysia. The data was collected. Sample was compound by heterogeneous SMEs	The most important factor from external environment in scanning activities was the Economic, followed by bargain power of suppliers.	Authors just said it was important to research other Malaysian states for a more complete view of the country
Zhang *et al.*, (2013)	Exploring the whole ES process as conducted by travel agent companies in Singapore for coping with environmental uncertainties and investigating their use of a wide range of information sources and barriers encountered, as well as the quality of information as the direct outcome of ES	The study sample is made of 42 travel companies from Singapore. The medium age for companies was 40 years. Data was collected by survey-based questionnaire.	Companies indicate natural, technological, and economic environments as the high strategic uncertainty. Own company's staff were the most frequently consulted source for collecting environmental information. Internet was not so used as expected. Perceived reliability has a positive relation with usage frequency.	Authors suggest future research to analyze how electronic sources could be insert in ES process in travel agencies firms. Also, future studies could explore the kinds of information sources preferred for dealing with different environmental situations

Nilsson (2012)	Investigating the implementation and use of a systematic and collaborative approach for ES in a medical device company aiming to identify opportunities for both incremental and radical innovation; identifying what are the challenges when a company uses ES for this purpose.	Data was collected using multiple methods. The author was also a participant of ES project. The data was collected by research annotations, surveys and 11 interviews. The case studied was from a big medical company from Swedish.	According to the author, the study points to the importance of balancing the degree of formalization in the process to motivate different individuals and to create learning and innovation outcomes	Paper does not suggest future research ideas
Haase & Franco (2011)	Exploring the importance of external information sources employed for ES by comparing different industry sectors and firm size	The sample is made of 165 firms from Portugal. Data was collected by surveys with managers. Analysis was done with descriptive statistics and MANOVA	More important than the type of source, it is its accessibility. There is an "industry effect" and a "size effect". Medium companies pay more attention to universities and technological centers. Service sector possesses most sourcing peculiarities	Future research are needed to verify if the findings can be replicated in other countries. Also, there is a need for longitudinal studies
Franco *et al.* (2011)	Understanding if SMEs have ES activities different from large companies and whether SMEs differ in their information research compared to large companies	The sample is made of 165 companies from Portugal and for different industries. The technic of analysis chosen was factorial analysis and ANOVA.	SMEs do not scan broadly. Large companies refer relatively more to sector legislation, annual reports, specific databases, and external consulting. On the other hand, SME make more use of specialized training and public organizations.	Authors suggest replicating this study in other countries to detect geographic differences
Bérard & Delerue (2010)	Examining the mediator role of ES behavior in the capacity of biotechnology SMEs to protect their intellectual assets, the extension it helps and the effect of national culture on ES behavior	The research was done with 123 managers from 14 different countries that answered to an online survey. Multiple regression analysis	ES will influence the capacity to protect core competences. Also, SMEs companies scan more the environment in high uncertainty avoidance, high power distance and collectivism societies.	Paper does not present future research ideas

Source: Authors (2020).

Papers studied ES activities in different countries around the globe: United Arab Emirates (Abu-Rahma & Jaleel, 2019), Iran (Bahmani *et al.*, 2017), Croatia (Nyuur *et al.*, 2015), Jordanian (Aldehayyat, 2015), Malaysia (Hew & Kadir, 2016), Singapore (Zhang *et al.*, 2013), Swedish (Nilsson, 2012), Portugal (Franco *et al.*, 2011; Haase & Franco, 2011) and two of them are cross-cultural (Bérard & Delerue, 2010; Robinson & Simmons, 2018). Regarding to the cross-cultural studies, none of them collected data in South America. These papers focused more on North America and Europe. Although six from eleven studies were done in developing countries, again, none of them studied about South America companies and their environmental scanning behavior.

Authors are studying environmental scanning with different perspectives. Some of them focus on the choice of the information source, especially in what regards the relationship of source quality (Abu-Rahma & Jaleel, 2019; Bahmani *et al.*, 2017; Robinson & Simmons, 2018; Zhang *et al.*, 2013), accessibility (Abu-Rahma & Jaleel, 2019; Haase & Franco, 2011), reliance (Bahmani *et al.*, 2017; Zhang *et al.*, 2013) and richness (Bahmani *et al.*, 2017) and decision making. Also, there are studies about the impact of uncertainty on decision making (Abu-Rahma & Jaleel, 2019; Zhang *et al.*, 2013). Most studies analyze the impact of firm size (Aldehayyat, 2015; Franco *et al.*, 2011; Haase & Franco, 2011; Robinson & Simmons, 2018) and industry type (Aldehayyat, 2015; Franco *et al.*, 2011; Haase & Franco, 2011) in environmental scanning activities.

In literature, studies about the environmental factors scanned by companies are also relevant (Aldehayyat, 2015; Cheng *et al.*, 2014; Franco *et al.*, 2011). Other perspectives are less studied, such as environmental scanning and product/service adaptiveness (Nyuur *et al.*, 2015), industry dynamism (Nyuur *et al.*, 2015), barriers to environmental scanning (Nilsson, 2012; Zhang *et al.*, 2013), innovation (Nilsson, 2012), intellectual asses protection (Bérard & Delerue, 2010) and national culture (Bérard & Delerue, 2010). Regarding to methodological aspects, there is an important point to be stressed: most papers do not aim to offer an inferential view about the research problem, just offering a scarce description about the subject, what brings negative impact in the research area and difficult the understanding about the phenomena. All papers analyzed are empirical. Most papers used a quantitative perspective and collected data by applying survey questionnaires to managers. Some research use Likert scale and measurement items adapted from previous literature to capture constructs like environmental scanning, quality, and others.

5. DISCUSSION

Most of the papers analyzed focus on developing an understanding of the strategic process thought different sources of information that companies can use (Aldehayyat, 2015; Bahmani *et al.,* 2017; Franco *et al.*, 2011; Haase & Franco, 2011; Robinson & Simmons, 2018). This line of discussion gives emphasis to the ways and tool companies use to scan the environment and its implications with firm size and other factors.

These researches show that companies have different interests while performing environmental scanning activities. As pointed by Aldehayyat (2015), in Jordan, firms place more emphasis on scanning environmental, political, and technological forces than on elements close to the organization, such as customers and suppliers. However, in Malaysia, Cheng et al (2014) findings suggest that economical factor is the most scanned, followed by bargain power of the suppliers. As stated above, the research about environmental scanning is segmented to specific countries or cities, what does not allow a broad perspective about this theme. Future research should study what environmental characteristics make some factors more attractive

than others considering cross-cultural researchers, for macroregions, as the economic blocks, for example. Also, it would be relevant if studies analyzed the impact of the COVID-19 virus pandemic in the emphasis of the environmental scanning behavior.

Regarding the favorite source for ES, it is indicated that firm size and industry sector do have influence in this choice. As pointed by Aldehayyat (2015), SMEs do not have the necessary infrastructure to collect information in the same way as large companies. Besides that, large companies have more scanning activities, smaller companies tend to focus on different sources of information. Haase e Franco (2011) results indicate that smaller firms underuse some relevant sources and frequently employ sources are "customers and suppliers", "internet" and "specialized publications". According to Franco et al (2011) as large organizations use information sources more intensively to scan the environment, SMEs with reduced scanning practices and fewer information sources may face competitive disadvantages.

In a similar way, Nyuur *et al*. (2015) evidenced how companies use information for environmental scanning foresight and what kind of capabilities enhance foresight. The results of the study have endorsed that foresight capabilities, specifically, environmental scanning, developing network ties, analyzing, industry dynamics, have a direct impact in SMES ability to change and adapt. Also, we highlight the research of Nilsson (2012), which explained the role of collaboration and its importance for ES, and its implication with organizational learning and innovation outcomes. In this sense, these articles expand the discussion on sources of information for ES to a broader topic of how companies can use such ES capabilities to learn, innovate, change, and adapt in faster changing markets. This line of research is more aligned with the strategic content literature than to strategic process, and is more prescriptive, with implications that can help practitioners to develop ES strategies.

Still lined up with the strategic content approach, we highlight another line of research in the literature that focus on an outcome of environmental scanning, which is the management of uncertainty (Abu-Rahma & Jaleel, 2019; Zhang *et al*., 2013). In an economy of innovation where changes are constant and firms face a lot of uncertainties about the industry, market, clients, technologies and finance, this line of research argue that a way to reduce this uncertainty is thought ES activities. The findings of Zhang *et al*. (2013) discovered a positive relationship between the amount of information obtained and scanning frequency with the perceived strategic uncertainty. The work of Abu-Rahma & Jaleel (2019) indicate that scanning activities should be more extensive and frequent when perceived uncertainty is high and indicates the potential value of timely market research to assess demand, gather consumer feedback and respond to changing needs of the customers. Uncertainty can also be decrease when ES activities are done though collaboration with other firms (Nilsson, 2012). In this sense, ES can be used as a tool to manage uncertainty.

6. CONCLUSIONS

This paper identified how literature studied the environmental scanning process during last decade (2010-2019) to understand what themes are explored and if the literature has changed during these years. In last years, lot of studies about technological aspects and new techniques regarding environmental scanning emerged. Also, this paper identified what knowledge was constructed regarding environmental scanning and information sources during this period. The main results indicate that information sources still arouse the interest of researchers and that many works sought to understand whether there was a relationship between the size of the company and the sector in which it operates with the information sources it uses for environmental scanning.

This paper has as main limitation the use of just one database (Scopus) for the systematic literature review, which we believe is justified since Scopus is one of the most rigorous databases, which ensure that the papers selected are from good peer reviewed journals. We suggest that future research is needed to understand how environmental scanning practices happen around the world, because most of the papers analyzed presents a regional view of the phenomena. Also, there is a need to look at the literature and understand other perspectives, like cognitive and technological aspects. We recommend a broader and more applied perspective, to understand ES in relation with other concepts.

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