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Full Length Research Paper

Critical Incident Technique: A methodology to study information used by informatics companies

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Information and Communication Technologies have changed the way society perform businesses. Information has become pivotal to the success of organizations. The Informatics companies are the current force behind such changes and are at the forefront of such revolution. They not only drive change, but they are the first to feel its impact. Management of such companies is left to deal with fragmented, sparse, rare access to external information. Environmental Scanning is a process in which an organization searches its surroundings in order to obtain vital information to be used for competitive gain (e.g. innovation, new products and services, etc.). This research proposes the use of the Critical Incident Technique as an adequate methodology for the study of Environmental Scanning to study Information use practices by managers of companies from the Informatics sector. The Critical Incident technique proved valuable and adequate for exploratory research that seeks context-rich insights on events and their impacts on people and organizations.

Key words: Environmental scanning, competitive intelligence, business processes, strategic decision-making, critical incident technique, research methodology.

INTRODUCTION

The knowledge Society brought about by the Information and Communication Technologies (ICTs) is highly dependent on Information, its analysis and use. This new-gained importance of information has drastically changed all activities both of people and businesses. Particularly, these changes have enhanced the role information as essential to the survival of the organization (Castells, 1999). Informatics companies are at the very core of such dynamic sector, and are primary vectors of transformations; thus, these organizations feel first, and with a higher degree of impact, the consequences of this highly competitive, complex and dynamic context, full of changes and uncertainties.

In order to obtain and manage the information needed for the survival in this new, complex environment, Choo (2006) tells us about strategic information: that which attains the maximum performance and managerial function when used in competitive information management. Such information, which will be used by the organization to create competitive knowledge, must be obtained, analysed, stored, communicated and managed.

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Environmental Scanning (ES), the process of actively searching for competitive information from the complex environment in which the organization is immersed, is one of the strategies managers can use. The importance of ES has long been established (Aguilar, 1967), and has since been used by professionals and scholars (Daft et al., 2006). What has changed is the pace with which ES processes and research is needed. However, traditional ES studies (Daft et al., 2006; Hambrick, 2006; Culnan, 2007) require extensive use of questionnaires with several subjects, and extensive analysis. There is a need for research methodology to aid scholars and practitioners to better understand managers in their information seeking and use behavior to inform design of Information System to support such task.

This article proposes the Critical Incident Technique (CIT) as a methodology to conduct research on Environmental Scanning. The proposed use of the CIT as a methodology allows for faster, more flexible and valuable insights, as it goes to the core of the ES episode: its motivation, manner and consequences. The CIT was used to research Informatics companies to assess their information behavior as related to competitive information. The choice of the informatics industry is due to the fact that such industry is on the forefront of the changes, thus requiring a higher frequency of ES and

research. The use of CIT proved easy to use, and effective and robust. Its use allowed the identification of some trends: the technological sector was the most monitored by the researched companies; the managerial role of entrepreneur was predominant among the executives; and the information gained was used in the creation of new products and to generate new businesses. Scholars and practitioners can use CIT to perform ES studies, and design IS to support ES for competitive gain with less resources, without compromising the quality of the study.

The remainder of this article briefly discusses the changes brought about the ICTs, and the need for Environmental Scanning as a means to obtain competitive information for organization survival. Also, it presents the CIT as a methodology to aid scholars and practitioners to study managers in their information seeking and use behavior. The results of the ES research are presented. The proposed CIT methodology is then used to assess the Environmental Scanning behavior of Informatics companies, and the results of its use are further presented.

NEED FOR STRATEGIC INFORMATION: ENVIRONMENTAL SCANNING

The transformations caused by the ICTs are not simultaneous, and certainly not equal: several groups, communities and even countries do take advantage of such new opportunities; a process, which, in turn, leaves entire societies, excluded (Sörj, 2003).

Organizations appear and survive, in many cases, due to external factors. Regardless, they are not alone in the environment: hence, external monitoration of such factors is paramount for the organization to thrive. The information obtained from events, regulation, trends, is used to guide future actions, such as response to external threats and opportunities (Albright, 2004). According to Daft et al. (2006), the high level of uncertainty interferes in the frequency of information needed.

However, it is rather costly, complex, time consuming process, that of obtaining, analyzing and using of information in adequate manner. In order to obtain the information they need, organizations may use Environmental Scanning (ES): the acquisition and use of information from external events; the use of such information would assist managers to take actions (Aguilar, 1967:1). The use of ES allows organizations to obtain information that will help them achieve some sort of competitive advantage. The organization uses such knowledge to formulate competitive strategies to survive (Porter, 1986). These informations are part of the decision-making process and part of the information management process, which will help the organization to innovate, create new products, services, actions etc. Scholars and practitioners should better understand the specificities of the organization to support such process.

The ES process begins with identification of the needs of the organization; then data is collected from the environment. The information is then analysed and shared; it would be used in a future action (that is the focus of ES is to focus on future impact on the organization (Stoffels, 1994)). This use of the external information will allow the organization to create new products and services, and take new actions to address the needs of the environment. Such behavior alters the external environment, completing the cycle.

ES guides the process of strategic planning of the organization. However, the external environment is often complex and dynamic; the information is not organized; the sources of information are diverse and dispersed; the information about events is usually ambiguous, among other things: all of these problems contribute to a high degree of uncertainty (Choo, 2001). Hambrick (2006) tells us that different dominant environmental requirements existing in each industry may determine the relation between the ES activities of managers, and their organizations' strategies. Culnan (2007) complements by saying that frequency was positively related to accessibility and complexity. Therefore, an ES study would aid scholars and practitioners to better understand the information needs and use of managers, to inform design of IS to support such behavior, so that they can take actions to gain competitive advantages.

Some variables that may be used in an ES study

An ES study may choose to gather data on a gamut of variables: source, sectors, information use, information behavior, roles played by the actors, etc. Traditional ES research would, then, require specific questionnaires for each choice. The proposed use of CIT as a methodology makes the research easier, because the data-collecting phase is non-dependent on the framework of theoretical background and variables to be used in the analysis. For example, this sub-section presents some of the variables that will be used during the analysis phase: but it could be just as well that a different set of theories, hypothesis and variables are used.

Among the components of the external environment, Barbosa (2002) enumerates the sectors: *Client*, one of the most important ones, capable of generating new businesses, new demands, new markets, new actions that will, in turn, require adequate reactions from the organization; *Competition*, the other organizations vying for a spot in the sun; *Economic* sector, represented by those factors related to the economy in general, and the specific market of the organization in particular; *Regulatory*, represented by the class organisms and by the government, that, by putting in place new procedures, rules and regulations will also prompt the organization to adapt; the *Technological* sector, that might bring a new

equipment, a new process, system or product, an innovation that comes to alter the way the organization should act; *Socio-Cultural sector*, that represents society in general in all its demands, trends, preferences, etc. This is to say, the organization is immersed in an external environment that can be analysed by sectors, the monitoring of which may bring information for competitive advantage.

Gómez (2003) presents three modalities of manifestation of an information action: i) information action of *mediation* – when an action is tied to the goals of another action; the actors are Functional Social Subjects; the activities are Multiple Social; and it is used to transform the natural or social world. ii) *formative* information action – the action is geared towards the information not as a means, but as a finalization; the actors are Experimenters Social Subjects; the activities are those of innovation; it is used to convey the knowledge needed to transform the world. iii) *relational* information action – aims at intervening in another action of information; the actors are articulators of social subjects, and also reflexive; the activities are social monitoring, control and coordination; it is used to transform the information and the communication that guide the collective action.

As for the managerial decision roles, Mitzemberg (1973) proposes a model of use of information that contemplates several sources. The manager who is a *monitor* of information is the manager who seeks and receives informations from several sources in order to better understand the organization and its environment. Combined with her managerial role, she/he can assume four decision roles: i) *Entrepreneur*: Initiates projects to improve the organization (e.g. start a new business, create a new product, explore a new opportunity or solve a problem, among others). ii) *Resource allocator*: control the distribution of resources, according to specific needs, including technological and informational resources. iii) *Extraordinary situations manager*: is responsible to manage unexpected, important events. iv) *Negotiatior:* deals with big negotiations with other organizations and individuals.

From the discussion so far, the importance of a methodology is to aid managers in their ES processes. The next section presents the CIT as one such technique to aid scholars and practitioners to study behavior needed in the design of IS to support adequate information seeking, and use by manager for competitive gain.

CRITICAL INCIDENT TECHINIQUE

Flanagan developed CIT in 1947 in the American Insitute for Research, where it was used to derive critical requirements. Flanagan (1954) describes the technique as a set of procedures used to collect observations of human behavior that would be, then, used to solve problems.

The technique can be easily extended to the understanding of human behavior to solve problems, to elicit requirements for a system and other areas, thus providing grounds with which to conduct studies of users and uses of information. In this case, the CIT is considered as a set of flexible procedures that can be tailored to the needs of research (both scholarly and practitioner) by adequacy to the theoretical background and the study's methodology.

An incident refers to a complete and observable human activity capable to be used in inferences and actions. It is critical when it occurs in situations where the intention is clear, and the consequences are well defined in its effects (Flanagan, 1954, p. 327). Flanagan identified five steps to be followed in the technique:

1) To determine the overall goal of the study (that is a description of the topic or the research). This description does not need to be complex, but it should be clear enough to allow a posterior analysis. For example, in the case of this article: the use of external information for executive decision-making. This step is essential to the planning and evaluation of the study.
2) To plan and to specify how factual incidents, in consonance with the study goal, are to be collected. For example, for this study, subjects will be asked how a critical incident brought in external information, and how such information was used in a new action, a change of course or action by the organization, in a decision-making process.
3) Data collection: In this study, data was collected through personal interviews focused on ES. There is a choice whether the event will be observed directly (in real time) or whether it will be recounted by memory. Consideration should be given to the period of the data collecting: once, as is the case of our study. This one-time collection suited better our intention to gather the behavior of the organizations' executive as they obtained and used external information for decision-making. Alternatively, data collection can span over a period of time (e.g. weekly, monthly etc.), to coincide with a cycle, to allow the observation of trends. Flanagan suggests that the incident be objective, in order to be valid, and he defines objectiveness as*"[…] the tendency of a certain numbers of observers, independently, to report the same incident"* (Flanagan, 1954, p. 327). Such definition may not apply to all cases, however, given that the incident may be particular and specific. There is no specific rule as to the amount of data to be collected. The validity of the critical incident in this study is its own existence: it is a fact that altered the course of the organization, or generated a new action, etc., being, therefore, vital in itself.
4) Analyse data: Data analysis should be summarized and described in as efficient and practical manner. In our study, the CIT was used within a framework of ES, with

concepts to be used in the analysis. Such framework allowed researchers to formulate observable categories with which to generate knowledge.
5) Interpret data: Data should be interpreted based on the theoretical framework used by the methodology.

The CIT focuses on an incident considered important; it tries to recreate the events (paths) that preceded the event, and the consequences that followed from the incident. It is a technique widely used in studies to determine needs, such as the assessement of requirements of systems (Carroll et al., 1993). The technique has also proven adequate for studies of information seeking behavior, and it has been used in studies of uses and needs of information (Aguilar, 1967; Keegan, 1974; Auster and Choo, 1993).

The CIT is used in the present study to analyse complete sequence of acquisition and use of information from the external environment, and the use of such information on actions by the organization. The technique was also valuable in understanding some of the cognitive aspects of the process.

RESEARCH METHODOLOGY

The research was performed with 12 Chief Information Officers (CIO) from private organizations of the ICT sector in Belo Horizonte. Four of the companies were small businesses (less than 100 employees, and income of less than US$ 10,000,000.00/year); four were medium companies (with between more than a 100 and less than a 1,000 employees and income between US$ 10,000,000.00 to less than US$ 20,000,000.00/year); four were large companies (more than 1,000 employees and income of more than US$ 10,000,000.00/year). All respondents had at least a Bachelor's in Eletrical Engineer, Business or Informatics. Three of the respondents had a Master's degree. The average working time with the company (in various capacities) is 14 years. Each interview lasted in average of one hour, and was performed at the respondent's office. The interviews were recorded and transcribed later for analysis. The results on Part I show the responses from the questionnaire. The results are presented in their frequency aspects and each question allowed for more than one choice. The results presented here were edited for clarity and objectiveness.

The research is exploratory in character, developed with the aim to provide a general overview about how external information is used by the organizations for competitive advantage. This type of research is used when it is hard to state precise and operational hypothesis on the chosen theme, and it serves as basis to develop, clarify and change concepts and ideas in order to better define the object of study and to formulate robust working hypothesis (Ariboni and Perito, 2003).

The interview format was based on "focused" interview, described by Merton and Kendall (1956) and Judd et al. (1991 cited in Auster and Choo, 1993) as a type of interview where the respondent has previous knowledge of the subjects to be discussed. These types of interviews find echo in "priming supraliminal", a type of priming where the subjects are aware of the stimuli, without, however, know its intention. "Priming" is the activation of mental representations used to influence subsequent cognitive behavior (Bargh and Chartrand, 2000). Thus, primimg was used during a discussion with the CIOs about the idea that Aguilar (1967) tells us that a change in the external environment creates the demand for information seeking about events; these informations would be used in the decision-making process.

Then the CIT was used on eight CEOs, in an average of a 15 min interview: the respondents were asked to narrate a "critical incident", one that has had an impact on them, the organization, their actions etc. towards a change for competitive advantage. The results of the responses is presented in Part II. For the Critical Incident research, the following information was given:

"The 'Critical Incident' to be studied should be complete, recent, with clear consequences. The personal interviews are conducted to focus the discussion on critical incidents where acquisition and use of external information occurred. Specifically, you should relate a critical incident of information received from the external environment as to answer the following question: 'Please try to remember of a recent incident in which you received information about a specific event or trend in the external environment – information that led you and/or the organization to a new initiative, or a change in directions, priorities, or to some significative action. Please describe the incident in sufficient details to allow me to visualize the situation'".

As stated, this study is theoretical and exploratory in nature (that is to propose a new use of the CIT as a research methodology for ES): thus, the empirical research served as a proof of concept (that is the proposed used is valid). The results of the empirical research are generalizable as to the use of the proposed methodology.

RESULTS

Part I: Environmental scanning of informatics organizations

The following is an edited transcript of the questionnaire, and the analysis, as per the ES concepts presented earlier.

Most of the organizations see themselves as cutting-edge, although only half of the large companies studied declared themselves competitive. The organizations are considered to be immersed in a highly competitive, dynamic and complex environment. It is important to notice that the high demands put on them by the environment impacts the organizations' need to be always innovating, and all respondents said they need better information systems to help them in this goal. The aforementioned result is corroborated by the fact that the respondents considered the external environment competitive and dynamic, and that they need to invest heavily on new internal infrastructure, and on the products and services they offer. The information the organization seeks is centered on the technological sector. As for its dynamicity, the technological sector was considered the most important, the most monitored and the most dynamic. Such findings should be used to implement effective information seeking and use processes, as well as the implementation of IS for production processes that would scaffold innovation within the company.

The researched organizations demonstrated a high degree of knowledge in their area, but claimed they had difficulties to obtain information when something "new"

appears. The need for learning is constant. This is a clear call for information dissemination and knowledge creation systems, to aid professionals in their task to attain and maintain a high level of expertise in their area of work. As for the internal infrastructure the small organizations tended to classify themselves as organic (a more loose hierarchy and structure); other organizations considered themselves as mechanicists (highly hierarchical structure). Organic organizations rely more on informal systems and they require IS that present information in a timely manner. Mechanicist organizations require more structured IS.

The respondents considered the Client as the most important sector, followed by the Regulatory sector. The Technological, the Regulatory and the Client sector were the most monitored sectors. Smaller companies depend more on the technologies and innovations for their survival, hence, the ES performed on this sector is higher; as for the larger companies, the Client is considered the most important. In total, all the organizations reported that the Technological sector was the most dynamic, followed by the Competition and the Regulatory sector – government still play a big part on the organization's daily lives: a general "complaint" was that the organizations wanted more freedom to better perform in such a competitive environment. Special consideration should be given to implement IS for customer relations and governmental activities.

As for the sources of information, several were used (e.g. technical congress, contacts with other CEOs, etc.), with an emphasis on the Internet. The Internet was the primary source of information for the small companies, and it was considered to be of constant use and reliable. It was used for several activities: contacts in general, and with customers and suppliers in particular, sharing of information, working tool, among others. In order to obtain external information, two of the organizations declared that they explicitly perform an ES process, with resources allocated for such; the other organizations used an *"ad hoc"* process, where information was found mostly in trade associations. Government call for bids was cited as a means to generate meaning, complemented by personal interpretation and internal discussion. 91% of the respondents shared information, which is interesting because, although the researched organizations do not see themselves as performing ES, it seems that the complexity of the ICT sector impels them to use external information. These fidings show a need for a more structured ES process.

The respondents mostly used the external information obtained in direct action, as relevant for: daily activities; improvements on products and services; client support; development of action plans, new opportunities; executive decision-making; performance analyses and benchmarking and innovation. This gamut of uses demonstrates the importance of external information. The Internet was cited as being relevant and of quality; the Client was considered to be relevant, of quality and trustful.

The respondents said that the factors that prompted their external information seeking behavior were: a need for a decision and for a new strategy; new clients; legislation; demand, and survival. The large companies questioned said that they expose themselves to directed information (they know, *"à priori"* the type of information they are seeking). The smaller companies did not seek specific information. As for the manner, the large organizations responded that they perform a formal search for external information, in a deliberate effort. The other organizations performed mostly informal external information seeking.

All the respondents cited the professional and career gains as being a motivating factor to seek external information (e.g. to keep update with the technological innovations, to be *au par* with the market and its complexities, to be able to constantly evolve and to continue to be able to contribute to the organization's competitive force, among others).

Part II: Environmental Scanning – Research using Critical Incident Technique

The following is an edited transcript of the reported critical incident, and the analysis, as per the ES concepts presented earlier.

Incident 1

"The origins of our company was thus: we had, as students, to develop an information system for the Software Engineering class. At the same time, we were participants of the State Jeep Rally racing circuit. One of the problems in the circuit was the control of information during the races (such as time, placing etc.). It used to be that racers had to wait for long periods after the race to get the results. We then combined both needs and developed an information system to control the races, from timing, to ranking etc. This system was well received by all the members of the Rally organization. And they presented the system to all the other organizations from each State. This led to a real boost in our own organization, with increase in demand, contacts etc. We are now expanding the organization in order to provide other products and services to this niche".

In this critical incident, the very creation of the organization occurred due to a need that existed in the external environment – Source of demand and resources.

Sector that was monitored: The Client in the external environment was the sector that primed the need for the entrepeneurs to develop a system and create the organization around it.

Source of information used: The Client was also the source of information used to obtain the information.

Action mode: The information action was formative, for innovation, and the creation of a new product and organization.

Managerial role: The managerial role was that of Entrepreneur, in the creation of a new product and organization to address a specific demand.
Use of information: The information was used directly in the creation of a new product, a new organization. As seen, this company relies heavily on the client, and on innovation. These characteristics are aligned with the informatics sector, and reinforce the need of adequate IS.

Incident 2

"This (the use of external information) occurs all the time in our organization, for example, when we see an advertisement of a new company that is going to build a plant in our vicinity, and that might become a potential client in need of our products and services. Additionally, we always look to the public sector, where there might be a public eliciting of products and services".

This instance shows that the organization actively seeks out external information in order to act. For this organization, a change (such as a new company) triggers the search for new information and prompts new actions.

Sector that was monitored: The sectors Client and Technological (in which the organization is immersed) in the external environment were the sectors that prompted the need for new information and action.
Source of information used: An external documental source (advertisement) was used to obtain information. Government purchase editals were also monitored.
Action mode: The information action was relational, to coordinate actions in the organization to serve customers, and address the needs and oppurtunities that were discovered.
Managerial role: The managerial role was of entrepeneur to obtain a new customer/business.
Use of information: The information was used directly in the acquirement of a new customer/business, to make contact with a new organization regarding the possibility of a new business opportunity. This company exemplifies the use of ES information used for competitive gain actions. Scholar and practioners should study such practices to derive knowledge and best practices to be replicated.

Incident 3

"I am an Engineerer, and my company works with computerized printing systems. I have a vast practical knowledge of the importance of document control. It is very important for all companies, and mostly important for those of the ICT sector to maintain strict control of their technical documents, such as manuals, blueprints etc. Once I attended a sector conference, and one of our suppliers presented a talk about a new process for document management. This new product immediately struck me as one that would be adequate for the document management of my clients. This process is called GED (GerenciamentoEletrônico de Documentos – Eletronic Document Management). We were able to offer such service not only to our existing clients, but we were able to engage new customers. The income generated from such service was such that I started a new company focused on this new opportunity".

This instance also shows that the organization's owner actively seeks out external information in order to act (namely, through constant contact with technological innovations, and active participation in congress, seminars etc. to seek new information). The use of the information obtained was direct, with a high degree of impact on the organization's course of action, given that it generated a new product/service, that was very successful and led to the creation of an associated organization solely focused on that niche.

Sector that was monitored: The sectors competition and technological (in which the organization is immersed) in the external environment were the sectors that provided the organization's CEO with information for new services, and, ultimately, a new branch of the organization.
Source of Information used: An external source, in the form of a seminar of new products offered by a supplier of the organization, was used.
Action mode: The information action was formative: it generated a new product/service, and created a new branch of the organization.
Managerial role: The managerial role was of entrepeneur to obtain a new customer/business.
Use of information: The information was used directly in the form of a new product and in the creation of a new affiliated organization. The ability to see opportunities from and for the external environment should be encouraged in informatics organizations.

Incident 4

"Information sharing through an interest group meeting of the Febragan (FederaçãoBrasileira de Bancos – Brazilian Bank Federation) regarding a new computer virus that was causing bank frauds".

The respondent did not make it explicit the details about the incident, claiming confidentiality issues. Neither did she disclose the actions taken by the organization (the Information branch of a Bank conglomerate). The incident seems to indicate, though, that the organization was made aware of a potential threat to its systems, and that preventive actions against possible fraud from external sources could be put into place.

Sector that was monitored: The business sector of the organization (in which the organization is immersed) was monitored.
Source of Information used: An external source in the

form of a sector Event was used to obtain information.
Action mode: The information action was that of mediation.
Managerial role: The managerial role was that of manager of extraordinary events, given that information was obtained about something unexpected, with high degree of potential risk for the organization, which would require prevention measures to be put in place.
Use of information: The information was used directly in the deployment of new mechanisms of protection of the organization's business. The organization should be prepared to act on information that is important to their operations. Employees should have a support system of bringing in innovative ideas to deal with both threats and opportunities.

Incident 5

"The organization […] is constantly monitoring the entire environment, and promoting changes; therefore, it is difficult to cite just one […]".

This response is from a branch manager of a top 10 multi-national organization. Although it dit not give any specifics as to a critical incident, the information use and the changes generated by external information, it made clear that the company uses ES as a routine in the company's daily operation: external information seek, interpretation and use, as well as the ES and the understanding of external events are deemed important and are constantly used by the organization to promote changes. As per the analysis model used in this research, this critical incident may be characterized by its non-materialization, thus making it difficult to derive precise categories, but rather some approximate analysis.

Sector that was monitored: A free interpretation of the response is that all sectors are monitored. *Source of information used:* It may be understood that a variety of sources is actively used.
Action mode: The information action that seems to be predominant is the relational; but the range of actions implied by the response seems to indicate that most action modes are deployed.
Managerial role: The managerial role was the hardest to identify as per the response. Perharps the role of entrepeneur would suit best, given the allusion of use of information to promote changes. *Use of information:* The information was used directly to promote changes.

Incident 6

"The organization […] always searches for new technologies so that it may offer the best service to the public. For example, one of our main goals is to take our services to the cities outside the capital of the State. Therefore, we are in constant search of innovative tools for networks, access, satelites etc. that would allow for easier distribution of services to distant cities".

This response was from the State Informatics Company, responsible for all government Information Systems, technologies and infrastructure. The demand for specific products and services that would allow them to better reach and serve their customer is a motivating factor for the organization to seek information in the external environment for their technical needs.

Sector that was monitored: The technological sector (in which the organization is immersed) was the most monitored.
Source of information used: External technical sources were the preferred source of information seeking behavior.
Action mode: The information action was relational, to coordinate actions in the organization to serve customers, and address their needs.
Managerial role: The managerial role was that of entrepreneur to provide the customers with better services.
Use of information: The information was used directly in the creation of new services for customers.

Incident 7

"The organization uses ES as a vital part of its process. Recently, we signed a partnership with a supplier to represent their database in our state. Such new offering will allow us to better help our customer in their needs dictated by the ICTs, such as: A strong presence in the Internet/WEB; Easily accessible services for our customer's customer. Business Intelligence; Computer Supported Collaborative tools (to allow the collection, interpretation, storage and distribution of information)".

The respondent, through regular business contacts with customers, became aware of their needs. The organization also noted that a supplier's database was one of the most successful in the market. The organization pursued such opportunity by becoming a partner with the supplier to be the distributor of such database statewide. In this case, it is important to note that the organization, as a sevice provider, is also looking ahead into their customer's customers in order to offer services that will allow all of them to prosper.
Sector that was monitored: The Technological sector (in which the organization is immersed) was the most monitored.
Source of information used: External technical sources.
Action mode: The information action was formative.
Managerial role: The managerial role was that of entrepeneur in the form of new partnership.
Use of information: The information was used directly in the creation of new services for the organization's customers, and their customers.

Incident 8

"Our organization deals with information systems security. There has been an increase on the competition, with a range of new companies, products and services. At the same time, there is an intensification of the use of the Internet for all sorts of activities, therein included the high volume of transactions that are generated by persons and organizations outside the organization (e.g. it used to be that all banking activities were performed by a bank employee; nowadays, the client herself does most of them from her own computer, from anywhere, anytime). This has created an ever-increasing demand for security products and services. We no longer were able to build the necessary tools ourselves. We had to go to the outside environment for new suppliers".

The complexity of the environment led to a movement of external information and partnership seeking.

Sector that was monitored: The technological and the competition sectors.
Source of information used: External technical sources, suppliers, Internet.
Action mode: The information action was formative and relational.
Managerial role: The managerial role was that of entrepeneur.
Use of information: The information was used directly in the creation of new businesses. This company showed the importance of the supply chain in their operations, and the requirement of IS to make use of partners.

Conclusions

This paper aimed at presenting the Critical Incident technique as a methodological tool to aid scholars and practitioners to perform ES research (combined with other techniques, such as a traditional interview, or stand-alone). The results of the research would be used to inform design of IS. CIT is relatively easy, simple, flexible and fast to use; it brings out the real-life experience that is relevant to the study; it enables the development of practical outcomes based on the findings, and it is a proven, clearly defined guideline for data collection and analysis (that is the use of CIT is adequate for exploratory research that seeks context-rich insights on events and their impacts on people and organizations).

The research was conducted with a small sample, to exemplify the concept that the use of CIT is suitable for research about information seeking used by managers of informatics companies. The findings are, therefore, generic in nature. However, the use of CIT proved to be a valuable tool for the researcher to obtain insight as to the ES process the CEO and the organizations used when seeking external information. The respondents had to relate their ES process to an actual case, which provided the research with rich results (specially when combined with other methodologies – the interview, in this particular case). This link between the incident, the strategies and the outcome is paramount to focus the efforts of the organization.

The findings derived from incidents had direct, major effect to some action within the organization. Therefore, the use of the CIT allowed for deeper understanding of the use of the external information obtained by the organization. Such insights can be used to identify trends, issues, and to create a knowledge base for action. The use of CIT is amenable to various data collection approaches and theoretical background with which to analyze the data. As pointed out earlier, the traditional research methodology required a questionnaire, with specific questions (thus limiting the research) and the data-collection phase which lasted for a minimum of 12 h (results as discussed in Part 1). In contrast, the use of the CIT (with results presented on Part 2) was faster, more flexible, and valuable.

However, the task of analyzing the data demands a more careful focus. Some reliability may be lost due to limitations on the generalizability of the findings, lack of accuracy etc. Further investigation should be made in order to turn CIT into a more practical methodology of study.

The ES process, although not explicitly defined and structured within the organization, can be said to have an important role for the daily activities and for the very survival of the organizations. Further research should be conducted to determine how to best incorporate ES into the core of the organizations. Information Systems should be designed to better aid the organizations in the ES. The analysis of the external information, once obtained, is still performed in a very informal, non-structured manner, thus requiring some guidance for the organizations on how to maximize the use of external information.

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