Universidad Ramon Llull

DOCTORAL THESIS

Title	**Competitive Intelligence Expenses: Organizational Characteristics and Environmental Contingencies**
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ABSTRACT

This research project focuses on measuring several organizational and environmental characteristics and linking these variables to the company's efforts invested in competitive intelligence (CI). This study sets out to test empirically if nine organizational characteristics and eight environmental conditions have positive impact on CI expenses. In addition, the effects of the eight environment characteristics on the relationship between organization and CI expenses are studied. Organizations are analyzed focusing on their Strategic Business Units (SBUs). A quantitative methodology is used. Data was collected from 223 CI practitioners in order to test the hypotheses.

The results show that one organizational variable "SBU technology innovation" is significant and has a positive impact on CI expenses, although descriptive analysis shows that another four variables are related to CI expenses. In addition, three organizational variables are not positive related to CI expenses. Regarding the eight environmental variables, two are significant and have a positive impact on CI expenses. These are "industry technology innovation" and "regulatory constraints". Descriptive analysis shows that only one of the other six variables of the environment, is not positive related to CI expenses. With regard to the contingency effect of the eight environmental characteristics on the relationship between the nine organization variables and the CI expenses, it has not been possible to prove the moderating effect although descriptive analysis does show some effects.

The results of the study allows any company to establish whether there is a need to devote resources to CI based on the organizational and environmental conditions of each firm. Those firms which have similar conditions to the ones shown to be significant, may have a need to establish a CI function.

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Chapter 1: Introduction

1.1 Purpose

The purpose of this research is concerned with the influence of nine organizational and eight environmental characteristics which are related to the Competitive Intelligence (CI) expenses. CI expenses are defined as the total amount of economic resources that the CI function needs to cover annually. The items included in the expenses are: CI personnel salary, clerical support, operating supplies/equipment, education and training, travelling, external database, outsourcing (consulting and research).

Until now, exploratory studies and anecdotal observation showed a potential relationship between organizational and environmental characteristics and CI

expenses. However, these studies did not provide empirical evidence to show which variable have a positive impact on CI expense.

The nine organizational characteristics are: Marketing Innovation, Technology Innovation, Vertical Integration, Product Portfolio, International In-house Sales Force, Direct International Presence, Growth, Decline and Size. The eight environmental variables are: Marketing Innovation, Industry Technology Innovation, Regulation Constraints, Industry Alliance, Globalization, Rivalry Intensity, Industry Growth and Industry Decline. In addition, the study focused on environmental contingencies upon the relationship between organization variables and the expenses allocated to the CI function.

The research focuses on three main questions:

- Do eight organization's strategic business unit characteristics affect CI expenses?
- Do nine environmental characteristics affect CI expenses?
- Are environmental characteristics contingent upon the relationship between the organization characteristics and CI expenses?

Each of the above broad questions is divided into specific questions attached separately to a single characteristic. Therefore, the total number of questions includes nine sub-questions on the organization, eight questions on the environment and eight questions regarding the contingencies.

1.2 Structure of the manuscript

The discussion starts with the definition of a theoretical background (Chapter 2). This chapter introduces several schools and theories. It describes which of them supports

and/or is connected to CI. Chapter 3 carries out a review of existing literature related to this study. The review focuses on environmental scanning first and on competitive intelligence secondly. In addition, it describes the components of the CI expenses. Chapter 4 proposes a framework in which seven elements could affect CI and therefore the CI expenses. Moreover, a classification of the main characteristics of the CI function will be proposed to provide understanding of what factors are related to which characteristics. Chapter 5 reviews the literature specifically related to the organizational and environmental characteristics that influence the CI expenses. This chapter is an extension of the literatures and theoretical background. Chapter 6 describes the research proposition used in the study. The chapter provides a list of the three broad hypotheses and specific hypotheses. Chapter 7 deals with the methodology used to test the hypotheses. It also describes the statistical techniques used and the reason behind the decision to use the Mann-Whitney U test instead of multiple regression analysis or others. This part also describes the research process and the two steps that were adopted to test the hypotheses. Chapter 8 shows the result of the pilot study which will be followed by the final research. Chapter 9 discusses the final results of the research. It includes the theoretical as well as the practical implications. Main conclusions are also provided in this chapter.

1.3 Reasons for starting this study

Anecdotal observation shows that companies in similar industries can be very different in terms of the resources devoted to understanding the external environment. Companies can have very sophisticated competitive intelligence functions whilst, in contrast, others can have very few developed across the entire organization (Comai, et al. 2005). One of the interests of this study is why this happens and what variables might influence the decision to invest, or not, in CI. Specifically, the study is interested

in measuring which organizational and environmental variables are related to CI expenses.

It is generally agreed that firms require selected actionable information, called "intelligence", to improve the strategic decision-making process (Porter, 1980, p.72; Sammon, et al. 1984; Fleisher and Bensoussan, 2003). Competitive Intelligence (CI) is defined in different ways but the one of the most useful definitions came from Prescott and Gibbons (1993) who stated "a formalized, yet continuously evolving process by which the management team assesses the evolution of its industry and the capabilities and behavior of its current and potential competitors to assist in maintaining or developing a competitive advantage". The collecting of intelligence from the general and competitive environment is done in order to avoid surprises, detect early risks and opportunities (Ansoff, 1980) and improve the strategic and tactical decision-making process (Porter, 1980, p.74; Sutton, 1988). The strategic planning process will positively benefit from the type of information collected from the environment (Fahey and King, 1977; Montgomery and Weinberg, 1979; Choo, 2001a). Several research projects indicated that external scanning operations and CI are positively linked to organization performance (Miller and Friesen, 1977; Dollinger, 1984; Daft, et al. 1988; Olsen, et al. 1994; Elenkov, 1997b; Ahituv, et al. 1998; Prescott, 2001, p.1; Analoui and Karami, 2002; Garg, et al. 2003; Suddaby, 2004; Hughes, 2004; Pontes, 2005).

An increase in the uncertainty of the business environment affects the capacity to gather and obtain information. Several authors (Boyd and Fulk, 1996; Miree, 1999; Miree and Prescott, 2000; Choo, 2001a; Raymond, et al. 2001) studied the relationship between environmental characteristics and CI activity. These studies demonstrated a positive relationship between the two. For instance, those organizations that perceive a higher level of environmental uncertainty tend to be more active in scanning behavior (Choo, 2001b). In order to cope with environmental changes, firms usually develop strategic and tactical models and information to help them formulate adequate policies. Intelligence refers to the ability in coping with external changes and adapting the organization to the environment according to the strategic objectives of

the firm. Pfeffer and Salancik (2003) long studied the dependency of an organization regarding his external environment and the effects produced from the external context on the organization.

However, CI practices can be operated in different ways and there are several differences in the method companies use the information. Firms also differ in the system they adopt to acquire intelligence and in the degree of resources they devote to it. For instance, Aguilar (1967), in his seminal work on environmental scanning, identified four different processes. More recently, empirical studies (APQC, 1999, 2000, 2001, 2003; Comai, et al. 2005; Comai, et al. 2006) revealed different types of CI activities with different focuses and priorities.

For many firms, the environmental scanning activity is done informally (Jain, 1984; Keegan, 1974) even though high-performing firms tend to adopt more regular scanning activities (Daft, et al. 1988). Sawka (2006) observed that about thirty percent of US companies did not have a systematic CI process. For instance, Hamrefors (1998a, 1998b) introduced the concept of spontaneous environmental scanning based on his survey of four Swedish organizations. The study demonstrated the existence of 4 types of scanning activity, the identification of which may help the establishment of an organized scanning model (Hamrefors, 1998a). Other studies showed that there are organizations which do not have a competitive intelligence function at all. For instance, about fifty percent of Catalan multinationals did not have a formalized CI function (Tena and Comai, 2004a). CI function is defined as a formalized, organized, structured process of information flow which produces a coordinated intelligence function. The issue as to the reason for or factors behind the adoption of a CI process may be studied by looking into the difference between countries (Wright and Calof 2006; Viviers, et al. 2005). These studies showed, for instance, that a country culture may have some influence on the resources and the nature of CI. From this particular perspective, the study is cross-industry and focuses on countries in the west in order to get a global understanding of which variable is positively related to CI expenses.

Although a large amount of literature was measuring the perceived uncertainty of the environment and links it to scanning behavior (Aguilar, 1967; Hambrick, 1982; Daft et al. 1988, Sawyerr 1993; Boyd and Fulk, 1996; Ahituv, et al. 1998; Ebrahimi, 2000a; May, et al. 2000; McGee and Sawyerr, 2003), very limited studies were describing which variables are specifically related to scanning or environment or to CI activity (Hambrick and Abrahamson, 1995; Raymond, et al. 2001). In addition, there is a large number of exploratory studies and anecdotal observations that were not tested empirically. The study aims to fill this gap by providing empirical evidence for the relationship between nine organizational and eight environmental variables and CI expenses. In addition, the study looks at eight contingencies which have not been studied empirically in CI.

1.4 Relevance of this Study

This study may be relevant for at least four reasons. Firstly, until now, no studies have been conducted to empirically test the relationship between organization and environment characteristics and CI expenses. Almost all previous studies connected expenses to the type of CI process, but not to the variables that have a positive impact to CI expense. Others discussed the frequency, scope or types of scanning behavior without disclosing what level of monetary resources are devoted to it (Garg, et al. 2003).

Secondly, this study discusses the role of the organization characteristic instead of looking at environmental conditions as the only factor affecting a CI function or scanning behavior. Additionally, environmental conditions are treated as contingencies upon the relationship between organizational conditions and CI expenses. In other words the study wants to test the moderating effect of the environment on the relationship between organization characteristics and CI expenses. This aspect has not been studied previously.

Thirdly, this study was conducted with CI practitioners who work for a firm or who are are in charge of running a CI function at their own firm. Literature showed that the vast majority of studies focusing on environmental scanning used CEOs, executives and decision makers to evaluate any related information collection process (Yasai-Ardekani and Nystrom, 1996; Elenkov, 1997b; Correia and Wilson, 1997 and 2001; Weerawardena, et al., 2006). CI practitioners may be the most appropriate source for evaluating CI expenses but they are harder to identify in the firm and less accessible from data bases (Badr, et al. 2006; Wright, et al. 2009).

Finally, the study focused on strategic business units (SBUs) rather than on the entire organization. In multinational companies the CI function can be allocated to just one SBU, to several or to a corporate function (Comai, et al. 2005). Thus specifying which SBU has a positive impact to CI expenses, may reduce generalization and provide specific empirical evidence.

1.5 Contributions

This research makes three main contributions.

- Firstly, the results of this study provide the CI community with an understanding of which organizational and environmental variable has a positive impact to CI expenses. Understanding these variables may help a company to evaluate its circumstances and justify potential investments in development of the CI function. Thus, companies can use the organizational and the environmental characteristics shown in this work, evaluate them and verify whether the level of investment tallies with the results of this work. Current expenses can then be adjusted accordingly.
- The second contribution takes place when a company uses the results of this study to benchmark itself against the overall outcome and can identify potential

blindspots. Since the framework proposed in this study establishes nine organizational and eight environmental variables that influence CI expenses, these can be taken into consideration with regard to the establishment or the development of a CI function. For instance, those companies which have not yet invested in CI as much as others can induce SBU decision makers into thinking about their situation and seeing/appreciating the value of CI. In particular, if these companies are very innovative in the technology field they should have a CI function in place because this variable was shown to be significant. In addition, those companies that are in an industry with strong regulatory constraints need also to invest in CI. On the other hand, companies that already have a CI function but also a benchmark result showing lower CI expenses with respect to the mean, could improve their own CI capabilities by allocating more of resources to CI.

- Finally, the study creates an initial list of organizational and environmental variables from which other studies can develop additional contributions and add knowledge to this particular topic.

Chapter 2: THEORETICAL BACKGROUND

A review of literature has provided very few satisfactory theoretical frameworks to explain how Competitive Intelligence (CI) is related to theory (Aguilar, 1967; Sammon, et al. 1984; Herring, 1988; Simon, 1997; Tyson, 1998; Hamrefors, 1998a, Calof, 1999; Lackman, et al. 2000; Escorsa and Maspons, 2001; Choo, 2001a; Correia and Wilson, 1997 and 2001; McGonagle and Vella, 2003; Savioz, 2004; Badr, et al. 2004; Hannula and Pirttimäki, 2003; Tena and Comai 2001 and 2003; Comai, 2003; Michaeli, 2006; Comai and Tena, 2006; Pirttimäki, 2007; Wright, et al. 2009).

The lack of a connection with CI to theory was also discussed by Barendregt (2010). However, several studies attempted to fill this knowledge gap by means of discussion about theory and schools (Dishmann and Calof, 2007). Mansor, et al. (2008), discussed the link between the resource-based view and information and stated "information as

key resources for any organization". Pellissier and Nenzhelele (2013) stated by referencing Muller (2006a) that "competitive intelligence evolved from economics, marketing, military theory, information science and strategic management". Perhaps the most interesting and current contribution to this perspective was made by Wright (2011) who linked four theories and schools to "behind Intelligence-Based Competitive Advantage". The four theories and schools discussed by Wright were: intellectual capital generation, the resource-based view, the sense-making school of decision making and organizational learning. Economics, social psychology and marketing were discussed by Robertson and Heil (2006), organization learning by Ghoshal (1987, p.341), Weerawardena, et al. (2006) and Zhang, et al. (2011), resource dependency theory by Miree (1999) and cognitive and network approach by Pirttilä (1997). In addition, Kirschkamp (2008) reviewed psychological theories and the contingency theory for studying how early warning is used by executives in medium-sized companies. Heuer (1999) adopted a clear cognitive psychology in his review of information analysis techniques applied to the intelligence field. On the other hand, Hambrick (1979, p.9-17) introduced several theories which have been used to support the environmental scanning practice: for instance; the open system theory, organizational environment alignment, bounded rationality, environmental enactment or environmental scanning. Hubert (1982) discussed different pieces of literatures dealing with information system behavior, such as psychology, social psychology and organization theory, for instance. On the other hand, Lenz and Engledow (1986) discussed five perspectives which could be potential frameworks for understanding the structure of an organizational environment. The five models are: industry structure model, cognitive model, organizational field model, ecological and resource dependency model.

The connection of CI with strategic management is also described by authors who made significant contributions by showing how important competitive intelligence is in management and social science (Ansoff, 1965, 1975, 1980, 1990; Porter, 1980; Mintzberg, 1989; Drucker, 1994, 1997). A special mention must be given to Porter.

Bernhardt (2003, p.4) stated that “Any discussion regarding intelligence and its role in business strategy and the strategy process of the firm rests on […] the propositions advanced by Professor Michael Porter”. Porter is considered a pioneer in the application of economic theory in order to understand competitors and industries (Porter, 1980, 1985). In addition, Porter (1980, p.72) discussed the importance of CI in strategy. He emphasized that a good or sophisticated competitor analysis requires more than just gathering data from industry. He suggested adopting a structured process called “intelligence system” for converting data obtained from external sources into intelligence. Ansoff (1975) also discussed the importance of collecting weak signals from the environment with the aim of anticipating changes in an industry or competitors. Drucker (1994) stated that information is a key asset for bringing knowledge into the organization. He also suggested that companies need to look more frequently at the external environment since they rely too often on internal sources (Drucker, 1997). Mintzberg, (1989, p.18), asserted although managers scans continuously the environment based on personal contacts they need to share this information within their organizations.

Definitely, the literature about CI shows that there are several perspectives adopted to link CI to theories and management schools and practices. Perhaps, recent theories may help to better explain this management practice as the one that were discussed by Mintzberg, et al. (1998) who provided a very exhaustive list of different streams of theory and schools in management. Although, many Schools and Theories can be discussed and the link with CI explored, the selection of theories and schools provided in this chapter are the ones with the strongest connection and which are the basis for the research proposition put forward in Chapter 6. In other words, the purpose of this chapter is to explore the link between Competitive intelligence and management theories and Schools, however in the context of this work. Based on this review, five different streams of theory and schools in management were identified and they are:

1. Resource-based View,
2. Resource Dependency Theory,

3. Contingency Theory,
4. Institutional Theory,
5. Industrial Economics.

This chapter summarizes existing literature and points out its relationship with CI. The purpose of this chapter is to introduce several theoretical schools in management which are directly and indirectly related to competitive intelligence (CI). For instance, Kirschkamp (2008) used a contingency-based approach for studying competitive intelligence and early warning. Yasai-Ardekani and Nystrom (1996) stated that "Environmental scanning is important because organizations operate as open systems that depend upon their environments for resources and legitimacy" and this may have some connection with the resource dependency theory.

In order to accomplish this, the first section describes the key components which could be considered the basis for any CI function. This stage of the analysis was concerned with the description of the characteristics of the CI function. The second part introduces five theories or schools in management, which explore the potential connections between CI and the theoretical perspectives. Subsequently, the discussion considers the components of the CI function in order to introduce the possible implications of each theory for CI. The third part postulates that the CI function has the capacity to influence the firm and therefore produce organizational changes. A final conclusion of the chapter is provided.

2.1 The components of the CI function

A competitive intelligence function may be defined as an organized set of tangible and intangible resources and capabilities which produce actionable intelligence through a process of gathering, analysis and distribution of information about the environment which, when incorporated into the strategic decision making process, should generate

a significant advantage for the organization (Tena and Comai, 2003; Ghannay and Ammar, 2012). Whilst several definitions of CI were suggested to date (Prescott and Gibbons, 1993), the above definition includes the idea that the intelligence function is an integrated element of any organization or at least informally incorporated in the firm. To create an effective and efficient CI function, organizations must organize different types of resources and capabilities into a formalized process. The outcome will be the establishment of a set of specific competences focused in such a way as to help managers make better decisions and improve the organization's response to environmental changes. Considering that a CI function is made up of human sources it is possible to assert that there are three main groups or assets that play a key role in the intelligence process (Comai, 2003).

1) The CI group - The CI group consists of a team of specialized CI personnel and coordinators who are committed to perform a number of key tasks. Whether the function is an independent unit or merely part of a department, it can be seen as a subsystem of the entire organization. For instance, the CI subsystem helps the organization make the right organizational changes and adjustments, according to the opportunities and threats detected by the environmental scanning activity (Daft, 1989, p.12-14).
2) The Decision Makers – Decision makers play an important role in the understatement of the external environment (Pfeffer and Slancik, 2003). It may have an active role in the entire CI process (APQC, 2003), participation (Kokkinis, 2005, p.215) and influence (Correia and Wilson, 1997 and 2001). The outcomes of a CI function may depend on decision maker needs (Herring, 1999) their perception and the resources which are devoted to CI. Once decision maker intelligence needs are defined (Ashill and Jobber, 2001), the CI group can provide the right intelligence to the right person. However, a prerequisite of a good CI function is that decision makers need to perceive the tangible or intangible value of the intelligence. The CI function depends on the resources

provided to it by the management and steering group (Comai, et al. 2005) as well as top management commitment (Stanat, 1990; Prescott and Bhardwaj, 1995; APQC, 2000).

3) The Organization - The CI function may also depend on the tangible and intangible assets available within the organization. Financial, human and information technology resources may be critical to the development of the ongoing CI function. CI functions are built on strong internal networks which add value not only to the information gathering process but also to the analysis activity. For instance, a company may adopt a decentralized CI function (APQC, 2000) which enhances collaboration across intelligence operational departments. Good practices companies show that the organization's values and beliefs are adopted by the CI process and reflected by CI protocols. Furthermore, anecdotal evidence shows that a CI function is characterized by the type of organization. For instance, companies which manufacture technological products develop specialized R&D scanning behavior (APQC, 2001), while consumer or mass market product firms focus on marketing CI. These last two were suggested by Correia (1996), who argued that individual and organizational nature are factors which influence scanning activity.
4) The environment – The type of industry may influence the scope of CI function. For instance, Xu, et al. (2003) found that the perception of UK executives differs widely from industry to industry and this affects the way in which managers scan the environment. In contrast, (Aguilar, 1967) did not find any difference. The work developed by Comai, et al. (2005) showed that companies devoted different resources to the CI function and the expenses are not entirely affected by the size of the organizations or industry. Industries such as aerospace, pharmaceuticals, information technology and telecommunications, for instance, have the highest expenses. The companies in these industries maintained high CI expenses during recession periods according to Fuld & Company (2013) or

were, at least able to adopt processes that were less likely to be used by smaller size companies (Correia and Wilson, 2001).

As discussed so far, these components have different roles in the CI function. Thus, a separate discussion is suggested for the study of the relationship between the components, which are the variables of the CI function. The CI function will be virtually non-existent without all three components. Figure 1 shows this relationship.

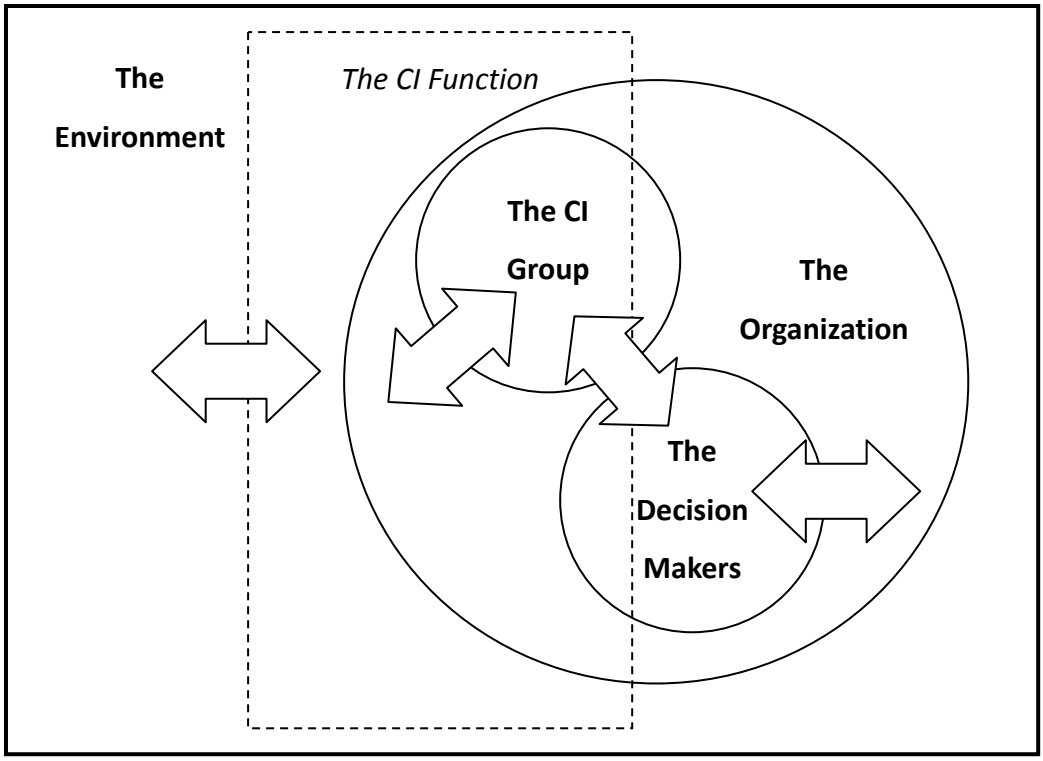

Figure 1 - The three components of a CI function.

Figure 1 shows the components of a CI function, which consists of the following elements: the CI group (responsible for producing intelligence), the decision makers (who apply the intelligence), and the organization (which creates the internal network and information sources). The interaction between the three groups and the CI

function can be analyzed separately. However, the mutual interaction of the three components may produce different outcomes. Selznick (1948) emphasized the separated roles of the individual and the organization, although recognized later (1952) that these separate sources may have a positive strength together. For instance, a positive decision maker's perception with regard to the value of CI and a large number of available internal resources may result in a better and faster establishment of the CI function. Porter (1980, p.72) also argued that top management can significantly mobilize CI efforts by requiring specialized CI products for its planning process. This will result in more support for CI from the manager and enhance CI organizational culture.

2.2 Competitive intelligence and management theory and schools

As shown in the introduction to this chapter, a review of literature suggested that little attention was paid to the reviewing of which theory supports CI or at least which one is the most influential. This study was interested in current practitioner's tools for gathering a better understanding of the external environment.

The section investigates how different theories can be applied to the analysis of the CI function and its components. Daft (1989, p.23) asserts "A theory is a description that explains how organizational characteristics or variables are casually related". This chapter sheds an interesting light on how different theories include the information scanning behavior in their perspective, but may not furnish a description regarding the nature of the intelligence function and its components. Moreover, it is important to consider the time frame in which the studies made by Hubert (1982) and Lenz and Engledow (1986) were carried out, which were not taken into consideration few of the most recent perspectives, such as the Institutional and the Resource Based View theories. This analysis was concerned with describing the contribution made by the

theories to the CI function. Rather than identifying a theory as a tool for responding to the environmental changes, as discussed by Lenz and Engledow (1986), this chapter was concerned with analyzing how a theory is a source of knowledge which can enhance the CI function in an organization.

As discussed, the CI function is the result of three key components, which will be separately analyzed under each perspective. The following section introduces five theories which are considered the bases for the theoretical background of the CI function. Figure 2 summarizes the five theories discussed in this chapter.

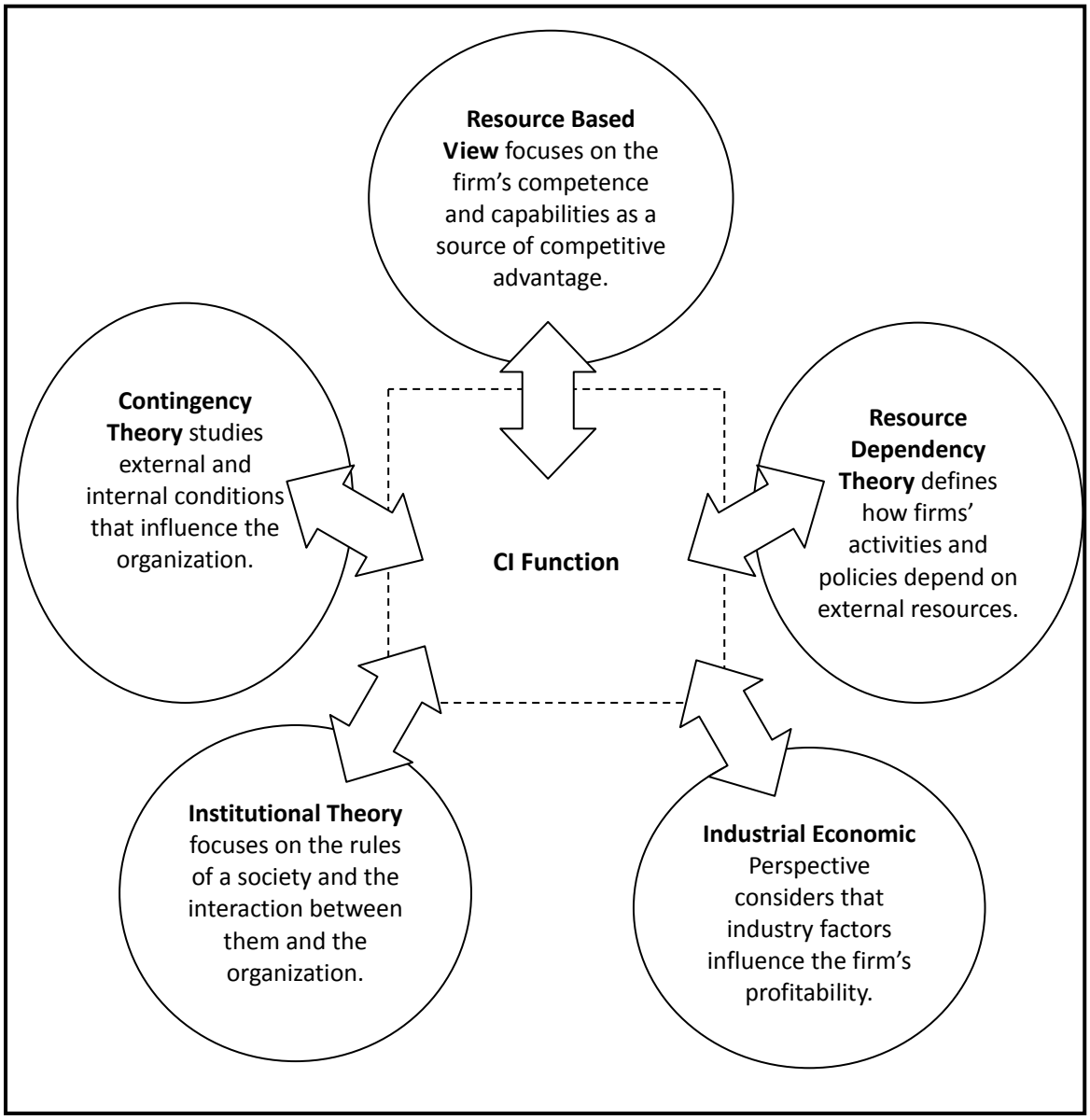

Figure 2 - The different theoretical perspectives and the CI function.

2.3 Resource-Based View

The resource-based view (RBV) considers that all kinds of stable internal tangible and intangible assets are sources for the organization strategy and performance (Penrose, 1959, Daft, 1983; Wernerfelt, 1984; Barney, 1991; Barney, et al. 2001). The RBV suggests that a firm will sustain its competitive advantage through internal resources (Barney, 1991; Grant, 1991) and the external environment will play a minor role. Barney (1991) discussed four empirical indicators of stable resources which allow competitive advantage to be sustained: value, rareness, imperfectly imitable and non substitutable. These characteristics can classify the internal resources of a firm as unique and therefore a possible source of differentiation and competitive advantage. According to APQC (2003, p.25-26) "the resource-based view of an organization emphasizes the uniqueness of each organization's strategy" and therefore, internal resources would represent the main sources of profitability.

According to Mintzberg, et al. (1987, p.276) the resource-based theory in strategic management was initially suggested by Wernerfelt (1984), who discussed how a resource-based perspective granted a competitive advantage. Wernerfelt (1984) described a resource as "anything which could be thought of as a strength or weakness of a given firm". An extension of the RBV, based on the unique idea of managing resources, can be seen with Grant (1991, p.136), who introduced the capabilities. He argued that "the firm is essentially a pool of resources and capabilities, and theses resources and capabilities are the primary determinants of its strategy" (Grant, 1991, p.133).

2.3.1 Implications of the RBV for the CI function

The CI function aims to create intelligence by combining several activities and resources. Hughes (2005) explored the link between CI and the RBV as sources of competitive advantage. As discussed previous, these resources can be acquired internally. For instance, anecdotal evidence show that in the aviation and defense industry the CI function is highly internally based. This case shows that even if the main purpose is for reasons of confidentiality, an internally focused CI function may be able to achieve a world class status. General wisdom considers that the majority of the information can be obtained from internals human sources (Fuld, 1988). Intelligence may be seen as the key value that is added to raw data and information which is available in the environment. The way in which this information is gathered, captured, classified, analyzed, disseminated and stored in the company makes the intelligence, and therefore the value, especially unique. One way of identifying and studying the capabilities if a CI function, would be to adopt the "value chain" proposed by Porter (1984). The parallelism of a CI function, defined as an independent organization in the firm, helps to understand the various capabilities of an intelligence unit. A CI function can be seen as the architecture of CI capabilities or competences which are able to perform complex activities (see, for example, Grant, 1991, p.147) and create a link between CI, strategy and performance thanks to the individual resources of the firm (Hughes, 2005, p.8).

Anecdotal evidence shows that some firms are better organized than others. From an internal perspective this phenomenon does not depend on the type of industry in which a company operates but rather on the way that CI is managed and how well internal resources are being orchestrated in the organization. The RBV includes intangible assets such as information and knowledge processes, for instance, as well as tangible assets such as personnel, technology, budget or equipment (see Prescott and Bhardwaj, 1995 and Comai, et al. 2005). These resources need to be managed in the most appropriate way.

The RBV can provide interesting thoughts. The CI function can be seen as an organized system of specific tangible and intangible assets which contributes to the firm's performance. Information systems are part of the organization. The CI function can influence decision makers by adopting internal intelligence in a proactive way. In this way CI may be perceived as a resource within the organization and thus the CI function creates a certain dependency. Ghoshal (1985, p.31) argued that "every organization today requires a system, either formal or informal, for effective information management". The need for an internal resource which is able to organize the information in one of the most appropriate practices in CI. Norton (2004, p.249) suggested that an intelligence process is able to allocate scarse resources for improving the decision making process.

2.3.2 RBV and decision makers and as a source of information

The RBV provides an interesting perspective on how organizational resources should be used as a source of knowledge. CI managers are an important ingredient in company resources. The more CI specialists collaborate with decision makers, the more information will be converted into actionable intelligence (APQC, 2003). The way in which decisions are taken will significantly affect the competitive performance of the organization.

There is no direct reference in RBV literature to how internal resources can be used as sources in the scanning activity. However, it can be asserted that the main concept of the theory is based on the use of internal sources as a main advantage to the organization. From the point of view of information, it was considered that internal information networks are highly important to the CI process. General wisdom considers that the majority of information is held by firms or organizations, and that internal networks are intelligence assets (Fuld, 1988, p.43-48; Gilad and Gilad, 1986). Thus, organizational internal networks may be a significant source for obtaining knowledge about the environment and industry.

2.4 Resource Dependency Theory (RDT)

The resource dependency perspective indicates how organizations depend on the external environment for the resources they need in order to succeed or survive. Pfeffer and Salancik (1978, p.258) asserted that "to survive, organizations require resources". Therefore a key issue for top management is the external dependency of their organization. This perspective was adopted and developed by scholars belonging to the resource dependency school as Pfeffer (1972), Pfeffer and Salancik (1978), Boyd and Fulk (1990), Daily and Dalton (1994a, 1994b), Gales and Kesner (1994) or Hillman, et al. (2000).

On the other hand, RDT also discussed the possible reduction of external dependency. The control of this dependency by the external environment may be achieved in several ways. As resources are produced by organizations, collaboration and vertical integration may be a strategy for controlling the limited number of resources available in the environment.

2.4.1 Implications of RDT for the CI function

Daft, (1989, p.11) noted that there are two types of organizational system. The open system is where organizations depend on the external environment in order to subsist. In contrast, the closed system will be an independent organization which includes all types of resources. Daft (1989, p.11) also observed that a system is "a set of interacting elements which acquires input from the environment, transforms it, and discharges output into the external environment". This definition reflects the dependency of an organization on the environment for both input and output boundary spanning.

The intelligence function of an organization consists of the activities which, as an open subsystem, require different types of external resources. Any CI function needs human and non-human resources, such as, information specialists, financial capital, information technology or data, for instance, in order to produce a capable system (Comai, et al. 2005) which can be obtained from the market. Therefore, CI, like any organized set of resources, will have its own particular external dependency. An issue that discussed up to now in the field of CI is the use of external vendors and agents and the ideal balance between the external and internal resources for CI (Prescott and Bhardwaj, 1995, p.7; Collins, 1997, p.135; Fiora, 2002; McGonagle and Vella, 2003, p.191) and how this decision may affect the development of the CI function (Comai, 2005). Moreover, the effectiveness of a CI function may depend on the quantity and the quality of available information and other resources. In countries where information is not available or hard to acquire, the CI function operates in a different way to those countries where information is well-organized and well-distributed. Thus, the impact of the CI function in the organization may be reflected in overall performance.

In knowledge and information intensive environments, the provision of external resources creates a certain dependency. Ghoshal (1985, p.30) observed that the high rate of scanning process adoption is due to "the increasing awareness of the importance of the organizational-environmental independencies".

The establishment of a CI function in the organization allows an understanding of what resources are available in the environment. Part of the function can be obtained from the external environment. For instance organizations can outsource part of the intelligence sources which contribute more to the value of the organization. Several organizations include external vendors to accomplish strategic decisions or simply to gather information.

A formal CI function may also create a dependency on information. CI helps to reduce manager limitations by enhancing the organization's resource input in the form of

useful information. Pfeffer and Salancik (2003, p.75) stated that the “decision maker does not know what he needs, only what is available in the market”. Information is considered a key determinant for reducing decision maker uncertainty and misunderstanding of the environment. Good specialists are able to understand business needs using various approaches which significantly reduce business dissonance

2.4.2 RDT and decision makers and as resource of information

Pfeffer and Salancik (1978) stated that if decision makers fail to understand the changes in their environment, they may also fail to adapt the organization to the new changes. RDT points to the potential role of the organization in misunderstanding the external environment. Pfeffer and Salancik, (2003, p.62-63) discussed the fact that there are three environmental levels. The first two of these describe the system of organizing players and transactions whilst the third type of environment is the kind of environment perceived by managers. This discussion introduces management perception and the actions that are taken under these constraints. “Important elements of the environment may be invisible to organizational decision makers, and hence, may not be considered when they are determining organizational action” (Pfeffer and Salancik, 2003, p.62).

The resource dependency theory discussed how external information may have a significant impact on the extent to which the organization is dependent on its external environment. “The environmental perspective calls for the need for information on the environment” (Pfeffer and Salancik, 1978, p.270). The authors, moreover, discussed the limitations of the old method of scanning the environment. They criticize, for instance, the limitations of the practice which focuses, for example, on just one area, rather than on the areas which are potential threats, as well as the divergence between decision maker needs and the information covered by the function.

Studying the resources that are critical for a company could be potential objectives of a CI function. For instance, gathering intelligence about the labor market may be key for companies like those that are in the consultancy or temporary job industry. Moreover, studying the type, nature and source of organization interdependency may also be the main focus for CI. These relationships between players can be focused at the competitive level (Pfeffer and Salancik, 2003, p.41) or at the macro level where decision makers lobby policy makers, for instance (Baron, 1997). A relationship between players can be crystallized with the interchanges of tangible and/or intangible resources which produce a comprehensible network. De Wit and Meyer (2004) observed that there could be potentially eight types of relationship between direct and indirect actors in each environment. Therefore, as Pfeffer and Salancik (2003) suggested organizations learn about the relationship between players for the purpose of controlling their interdependency. Information allows a better understanding of the network and therefore possible inter-organization dependency.

The resource dependency theory justifies the implementation of a type of system which is capable of providing information about the external environment. Pfeffer and Salancik, (2001, p.48) suggested that information and knowledge are the basis for controlling external resources and interdependency.

2.5 Contingency theory

Coined by Lawrence and Lorch (1967, p.209), the contingency theory considers that an organization and its subsystems may be contingent to external and internal characteristics. This means, for example, that one or several organizational variables may depend on other variables. Galbraith (1973) emphasized these concepts using two main assumptions: (1) there is no single best way to organize and (2) any one organizing method is not equally effective. These two assumptions were adopted as a main foundation for the contingency theory.

Moreover, Kast and Rosenzweig (1973) argued that “the contingency approach attempts to understand the interrelationships within and among organizational subsystems as well as between the organizational system as an entity and its environments. It emphasizes the multivariate nature of organizations and attempts to interpret and understand how they operate under varying conditions". The idea is that there is no single best way of designing the organization and thus any organization must “fit” into the environment. Several studies adopted this perspective for studying the interdependency of the firm with the external environment (Lawrence and Lorsch, 1967; Donaldson, 1984; Ghoshal and Nohria, 1989). Organization theory applied the concept of contingency in order to find answers regarding what kind of organization is most suited to the different environments (Daft, 1987, p.24).

Contingency was also extensively used to study these factors, be they internal or external, which are connected to improved performance. Several studies included information as an important contingency factor in the competitive advantage of the firm (Smith et al. 1991). Weill and Olson (1989) suggested a framework (Figure 4) interested in applying the contingency theory to the marketing information system. (MIS).

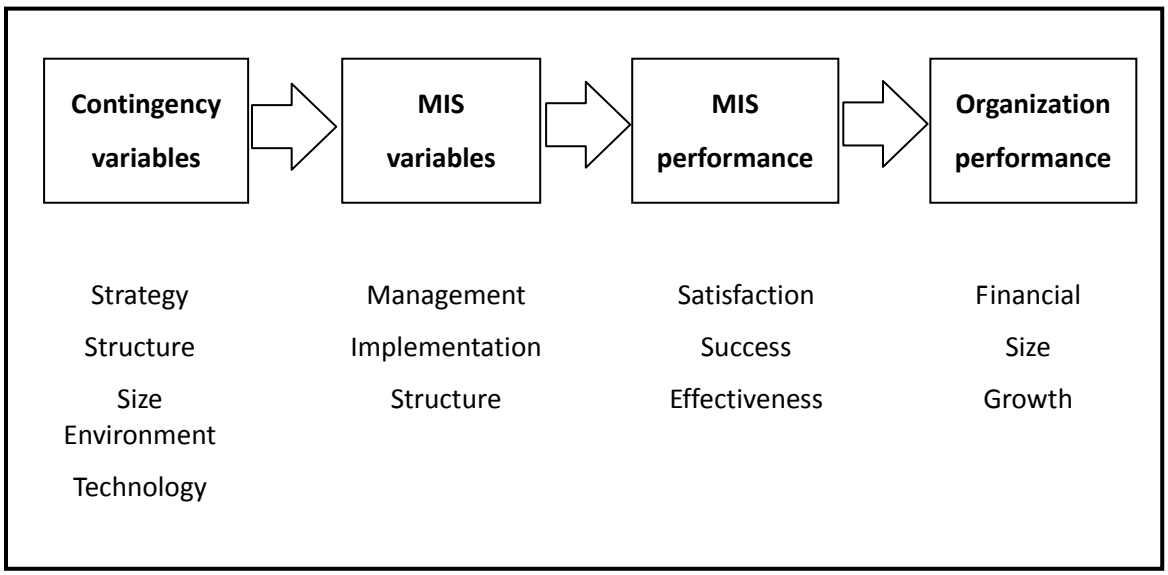

Figure 3 - Contingencies variables and Marketing Information System.
Source: Weill and Olson (1989, p.63)

The idea of considering the CI as an organizational subsystem suggests that the function may depend on both the external environment and the internal environment. In other words, the CI function may be contingent to both organizational variables and their competitive environment variables. Therefore, an understanding of these contingencies may critical to the success of the CI function.

The variety of external environment conditions seems to affect organizations in different ways. Lawrence and Lorsch (1967) described extensively how the different environmental characteristics present organizations with different requirements. For instance, the lack of information was considered one aspect which affects the perception of environmental uncertainty. The importance of congruence, or "fit" between the information characteristics of the organizational environment and the information-processing activity of the firm was a major conclusion of the contingency-theoretic perspective within organizational behavior (Galbraith, 1973; Lawrence and Lorsch 1967).

2.5.1 Implications of Contingency theory for the CI function

As discussed previously, the essence of the contingency theory asserts that the design of the organization and its subsystems should fit with the environment. If we consider the information function as a subsystem of the organization, we can observe that the function may depend on internal and external environmental conditions. A review of literature shows there are several pieces of work concerning the management of environmental information (Child, 1972; Lawrence and Lorsch, 1967), the perception of management uncertainty (Wright and Ashill, 1998) and the marketing information system (Weill and Olson; 1989) that were based on the contingency theory. Moreover, a large number of studies adopted a contingency approach to explain how formal

scanning systems are developed in large corporations (Keegan 1974; Stubbart, 1982; Diffenbach, 1983; Subramanian, et al. 1993) or in small and medium-sized enterprises (Raymond, et al. 2001; Kirschkamp, 2008).

A cursory review of literature revealed that several studies adopted a specialized approach wherever the focus was internal or external. For instance, several studies focused primarily on the organizational characteristics (see Vroom and Yetton, 1973; Stubbart, 1982). Vroom and Yetton (1973), for instance, noted that managers will lead and succeed in taking more effective decisions depending on the amount of relevant information they possess. Wright and Ashill (1998, p.131) asserted that volatibility and diversity of the environment create uncertainty and this it may related to the information needs. Under this perspective it is possible to assert that information gathering will become more important. The normative model of leadership describes how information will be one of the most important attributes in top-quality decisions.

In contrast, other studies were only interested in the external aspect of the organization or in the external environmental. However, both approaches can be included in a unique framework (see Raymond, et al. 2001) for understanding how environmental factors affect the intelligence function. Both are very important indeed. The external perspective focuses on the industry or business variables while the internal perspective converges on the type of organization.

2.5.2 Contingency and decision makers and as a source of information

Contingency was also applied to the understanding of decision maker behavior and their attitude towards the environmental conditions (Daft, et al. 1994; Elenkov, 1997b). Decision makers may also be affected by the type of CI function or environmental scanning process, which provides data and information about the environment.

Contingency theory supports the idea that players are affected by external environments. Thus, business actors are mutually interconnected and their action may

impact on other action whether it is strong or weak as well as immediate or latent. These contingencies are based on players converting them into sources of business information. Contingency may be applied as a source of information or as a source of weak signals. Early warning systems try to define those factors which are related, for example, to an event. These contingencies, therefore, may become the main information source for a CI function. The systematic monitoring of these factors may anticipate environmental changes. Finally, contingency may be categorized under a more generic perspective, such as the environmental school, for instance, as suggested by Mintzberg, et al. (1987). This school has the main premise on the fact that external environmental forces are the primary contributors in the company's strategic process. However, as Daft (1989, p.24) asserts "big mistakes are made when organization contingencies are ignored or not understood".

2.6 Industrial Economics

Industrial economics asserts that environmental conditions are the most important factors when establishing the performance and profitability of a firm. The paradigm discussed by Mason (1939) and Bain (1968) shows that the industry structure will lead to a strategic conduct which is source of performance (see Figure 3). The implicit assumption of the industrial economics perspective is that companies are homogenous in terms of competence and capabilities, and that internal resources are therefore not sources of competitive advantage. For instance, firms which operate within a specific strategic group may have similar industry conditions (Porter, 1980, p.129-132) and may have limited options for its own strategy.

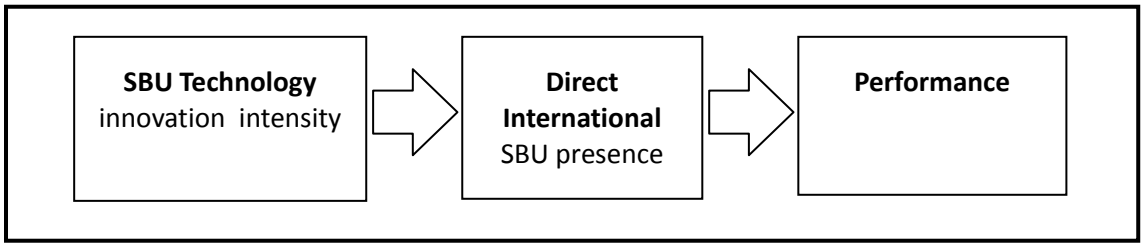

Figure 4 - Bain / Mason paradigm.

Source: Porter (1981, p.611)

2.6.1 Implication of IE for the CI function

The industrial economics perspective has a significant influence on the establishment of the CI function. Any intelligence gathering system is built around the primary focus of where organizations perceive opportunities and threats. A review of literature shows that the competitor is one of the primary objects of an intelligence function, as well as industry and market trends (Fuld, 1988 and 1997; Hussey and Jenster, 1999; Gordon, 2002; Tena and Comai, 2004a and 2004b). Indeed, the CI function is built mainly to gather, analyze and disseminate information from the environment (Prescott and Gibbons, 1993; Ghoshal, 1985) although other scholars included the internal information as being part of the main intelligence function (Hannula and Pirttimäki, 2003; Pickton and Wright, 2006). Developing frameworks which are able to detect and predict potential changes was a key point for the intelligence.

The objective of the CI function is to produce actionable intelligence (Ashton, 1997) and to fit the organization into the environment. The intelligence activity includes the strategic management process and models which make possible the decision making process. The aim of any CI function is to provide knowledge regarding the environment condition so that decision makers can exploit opportunities and reduce risk. Environmental scanning can have implications for the structuring of the organization if it is integrated into the strategy making process (Miller, 1987). Thus, without any type of intelligence or information, the organization will less able to accomplish its business objectives.

2.6.2 IE and decision makers and as a Information source

Industrial economics provided tools for and an understanding of the business that decision makers are managing. A better understanding of the environment will result in improved action (Daft, et al. 1988).

As discussed previously, the analysis of industries and competitors is the main source for understanding the opportunities and threats generated by the external environment (Ansoff, 1980; Boyd, et al. 1996).

2.7 Institutional Theory

Institutions were defined as the formal and informal rules or constraints of a specific society (North, 1990). Institutionalism implanted several social aspects such as norms, law, status, values, codes of conduct, taboos, contracts (North, 1990) and these are "transmitted by several types of carriers" (Scott, 2001, p.48). Institutions play a fundamental role in the organization and its environment. North (1990, p.3) stated that institutions are the "rules of the game in a society". Institutions evolve over time (North, 1990) and can be classified according to three main types: regulative, normative and cultural-cognitive (Scott, 2001, p.52). The regulative, for instance, includes rules, law and sanction while the cultural-cognitive aspect includes common beliefs. Institutions can therefore be tangible elements or, in contrast, intangible constraints in the society and/or the business environment.

Several theoretical and empirical studies in the literature discussed the relationship between institution and organization. For instance, institutional theory studied "the interconnections between an organization and its institutional environment" (DiMaggio and Powell, 1983). This interconnection may show a framework in which players and rules are evolving together in a symbiotic relationship. Each one has a different role in the environment and may also affect the organization differently.

North (1990, p.5) divided the actors into four groups: political, economic, social and educational.

Institutional theory received major attention over the last two decades (DiMaggio and Powell, 1983; North, 1990; Scott 1987, 2001, 2003). Developed from social science it included, to a certain extent, in the economics perspective. North (1990, p.15) suggested that neoclassical economic theory has received additional attention from social science even though "economists have been slow to integrate institutions into their theoretical models".

Institutions may be seen from a broad or from a restricted perspective. For instance, Scott (1987, p.507) indicated that the features of institutional environment contained in the broader environment, which is not included in the task environment, "are important determinants of the structure and functioning of organization". Using the framework described in Figure 2 this part discusses what effects the institutional and the following theories may have on the CI function. Moreover, these theories may present a new interpretation about which resources may be sources of information.

2.7.1 Implications of the institution theory for the CI function

According to Scott (2003, p.119) institutional theory argues that organizations are open systems and the environment therefore has a strong influence on the entire organization. If we accept the idea that the CI function is a subsystem of the organization, it can be asserted that institutions may have a significant influence on CI. For instance, CI needs to apply ethical and legal rules (Fuld, 1995; Nolan, 1999; Ghannay and Ammar, 2012) and these constraints may connect to ethical behaviors. Ethical behavior depends on the culture of the CI group, the organization and the country in which the organization operates (Comai 2003). As previously discussed, the intelligence function consists of an organized set of human and not human resources. Each one is part of the organization and therefore depends on the values and cultures

of that organization as well as the institutions of the environment in which the organization operates (De Wit and Meyer, 2004, p.427). It represents a piece of the entire organization, which shares common values. On the other hand, the CI function may be perceived as an independent organization within the same organization. By extending North´s definition, a specific group of people in a company may have its own values (Comai, 2003). Like the other types of organizations described by North (1990, p.5), the CI group will fall into the economic group, which may have its own role in building, changing or merely adopting internal and external institutional changes. The institutional perspective can therefore be adopted when analyzing the influences and the effects occurring between the institutional constraints and the CI function. Scott (1987, p.501) also discussed that fact that the institutional environment can influence the organization by imposing, authorizing, inducing and acquiring an identical structure. Firms may have to adopt the institutional framework to achieve their strategic objectives and profitability. Intelligence may contribute to the strategic analysis of the institutional environment. Scott (2001, p.213) supported the idea that the institution should not only be perceived as an entity but also as a process. This observation emphasizes the role of the intelligence group in gathering the knowledge about the changes in the institutional frameworks.

The institutionalization of the CI function may have an important influence on the organization. As discussed previously, a CI function is represented as a system in which different kinds of resources interact together and generate a formalized process. Under the institutional perspective, it can be asserted that the CI function addresses several constraints, such as ethical rules applying to the gathering of information, protocols on security information or corporate policy on how to secure business activities, for example. MacDonald and Blenkhorn (2005), for instance, supported the idea that an intelligence culture institutionalization will benefit the whole CI process, resulting in tangible benefit. Thus, CI may influence the behavior of the entire organization as well as the decision making process when, for instance, the CI function is entirely integrated

into the decision making process (Tena and Comai, 2003) or partially**,** as suggested by APQC (2003).

A superficial CI function may not have any influence on the entire organization. In contrast, integrated CI functions develop a different kind of consciousness with regard to the value of information. The institutionalism of the CI function may also characterize the entire group of specialists performing the different tasks. Moreover, the knowledge procured by the information system will allow any organization to fit better into the environment. Thus, an institutional-oriented CI also procures a better organizational framework.

Moreover, the CI function may have external repercussions. For instance, when the CI function becomes more institutionalized in those companies which adopted CI at an early stage, it may influence other organizations to adopt the same framework. Professional associations serve as a gateway for sharing experiences and models between members. Intelligence procured from external bodies such as trade associations, market research agencies, etc. can change the rules of an industry. Scott (2001, p.138) argues that "commercial fields are often shaped by the existence of various types of information-gathering systems in business, which provide objective information to all field participants about field activities". The detection of opportunity and the dissemination of this knowledge can also attract new competitors coming from other business.

2.7.2 Institutions and decision makers and as sources of information

According to Scott (2003, p.138), any one organization will operate in a kind of institutional environment. Thus, the Institutional perspective may influence managers in the decision making process. For instance, Elenkov (1997a) discussed institutional environment as being a variable to give Bulgarian decision makers the perception of strategic uncertainty. Institutions are also affected by decision maker perceptions or

biases. North (1990) devoted a significant amount of time to human behavior and the cognitive processing of information and the perception of uncertainty. If a decision maker perceives the institutional environment to be a threat or opportunity, he may attempt, as consequence, to minimize the threat or use the opportunity. He argued that decision makers interpret the external environment by adopting their own personal framework which will lead to a personal construct of the reality. Therefore a rational behavior pattern cannot be predicted under this perspective. For instance, Boeker (1989), who studied how 53 semiconductor companies were affected by the institutional environment, found significant differences in their strategies.

The gathering of information on institutions and their various changes may be important issues for the organization. “Institutional environments are multiple, enormously diverse and variable over time" (Scott, 1987, p.507-506). From this perspective, a monitoring system would be able to scan the institutional environment and detect changes, which may provide valuable insights, at an early stage. Institutional intelligence is related to the acquisition of significant information regarding institutional constraints whose changes may provide opportunities and threats for the organization. The intelligence activity is primarily interested in understanding the possible implications that change in an environment, whether it is perceived as an institution or not, may have for the organization. North (1990, p.5) observed how institutional constraints affect organizations, when studied using the neoclassical economy theory, and how organizations create institutional changes. This circular relationship between institutional constraints and organizations may increase the attention of those firms and organizations which are directly and indirectly affected by institutional changes. Those organizations which are more sensitive to external constraints should align themselves to the bodies which control the kind of constraint to which they receive more business implications (Edelman, 1992). Early constraints can be detected by using different sources of information. Scott (2001, p.96 and p.129) suggested professional bodies and trade associations for example, or the interrelationship between professional and political lobbyists.

The attention of institutional theory and its constraints may give a new perspective about how the firm and the CI function should operate. It gives a new insight about where opportunities may rise. It also reduces the risk from the institutional environment which firms should consider in their formal programs. Institutional theory also offers a framework in which CI is adapted and influenced at the same time. When the analysis of the institution is formalized, then the risk is also reduced. North (1990, p.22) stated that institutions help to reduce uncertainties because "the structure of change has been institutionalized".

2.8 Conclusion of Theories and Schools

As discussed, the various theories differ in their perspective of how organizations formulate their strategies in order to achieve a dominant position in relation to the competition or to build their competitive advantage. These perspectives may describe how decision makers and the CI group behave within the organization, in order to produce the CI function, as well as how the established CI function can have different repercussions within the organization. Table 1 resumes the main implications of the five theories for CI. While, the RBV explores the strengths and the weaknesses of a firm, the industrial economic school focuses on the opportunities and threats generated/produced by the external surroundings (Barney, 1991). Both perspectives, however, are interested in defining the primary sources of firm profitability. These ideas received the attention of several authors in order to ascertain which factors are more closely related to the performance of a firm. Industrial economics perspective is quite a contrast with that of the RBV which assumes that firms are heterogeneous in a specific industry (Barney, 1991).

Each theory plays an important role in CI. It is possible to argue that the CI function may have a certain influence on the organization. In order to discuss this, the previous theoretical scheme will be used, which establishes which elements influence significantly the CI function. Figure 5 shows the possible reversed influences of the CI function on the three components: the organization, the decision makers and the CI group when the function is becoming institutionalized within the organization.

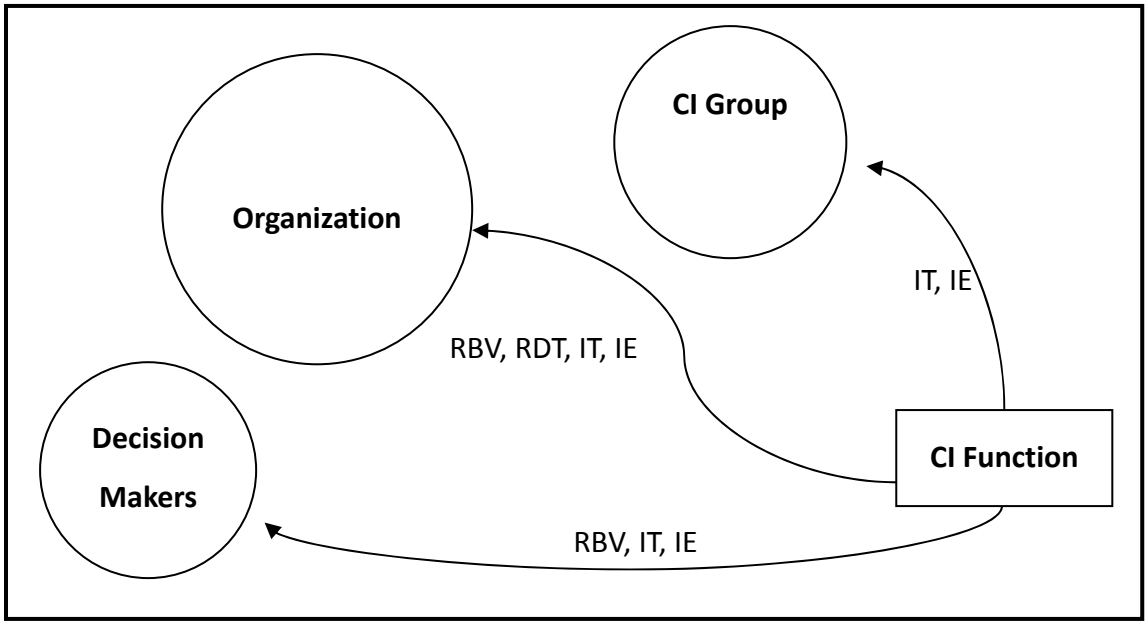

Figure 5 - CI function and its influence.

Additionally, anecdotal evidence suggests that theories may carry different weights at different stages. For instance, a company which is at the initial stage of CI displays a major dependency on external resources. In contrast, those organizations that used CI for a longer period of time recognize the value of internal resources. Organizations are very interested in obtaining knowledge from primary and secondary sources. This leads to the Resource Dependency Theory. However, when CI is introduced into the company as a function, managers understand the importance of internal resources not only as primary sources but also as a resource for developing new and creative competitive

action and strategies. Networks are built to enhance the entire intelligence process. Thus the resource based view is becoming increasingly significant. As the CI function evolves and achieves a more sophisticated stage during the learning process regarding the value of CI, decision makers may enhance their awareness of the key trends of the external environment. Once the CI function is institutionalized, values and rules are adopted throughout the organization.

This process leads us to assert that CI helps to obtain an external focus and to analyze the environment using enhanced critical thinking. This links CI function to the industrial economics. Finally, once the CI function is more formalized in the company, institutional theory will then adopt an interesting role in it. Processes are understood and the organization accepts the key role played by the CI function in the organization itself and in the daily tasks of the people working there. The contribution of the five theories to the specific research topic can be summarized as follows:

- Institutional Theory: Several environmental constraints were considerate as being contingencies upon the CI resources invested in an organization. Some institutions may be derived from the external environment as regulation intensity or internal, such as culture, virtualization or hierarchy level.
- Resource Dependency Theory: The level of resources available in the environment as well as their intensity may affect the level of external resources invested; for instance the technology intensity of an industry.
- Resource-Based View: The organizational characteristic offers support to CI. A source of resources can be seen in company size, number of business units or growth intensity.
- Industrial Economics: Industrial economics may be connected to the need to scan the environment which may be supported, by, for instance, rivalry intensity or the globalization intensity of an industry.

- Finally, contingency theory affects in the sense that CI is a consequence of being in business environment.

The following chapter will review specific literature focused on environmental scanning and competitive intelligence.

Table 1 - Competitive Intelligence and Theories

Schools	***Main assumptions***	***Key Elements to observe***	***Main Implications for CI***	***Main References***
Institutional	- Institutional constraints affect organizational behavior. - Organizations change the constraints.	- Formal and informal rules (e.g. law, contracts, rules or norms). - Organizations (political, economic, social and educational).	- CI Groups have their own norms and rules which may affect the firm. - Decision makers have their own perspective (mental constructs, taboos etc). - One CI function objective is to observe institutional rules and organization.	DiMaggio and Powell, 1983); Scott (1987, 2001 and 2003); North (1990).
Resource Dependency theory (RDT)	- Organization depends on external limited resources. - Organization tends to control resources to reduce their dependency. - Organization is seen as open system - External resources are those that most contribute to the firm's performance.	- External resources. - Social players. - Relationship between organizations (networks) - Decision makers' perceptions. - Power and control of the external environment.	- External resources are essential to the management of a CI function. - Information and knowledge is considered a fundamental tool for controlling the external environment. - CI should focus on the critical external issues which allow an organization to survive. - CI reduces decision makers' uncertainties and their misunderstanding of the tangible environment.	Pfeffer (1972); Pfeffer and Salancik (1978); Boyd and Fulk (1990); Daily and Dalton (1994a, 1994b); Gales and Kesner (1994); Hillman, et al. (2000).
Resource-Based View (RBV)	- Organizational internal resources are those which procure competitive advantage. - Companies are heterogeneous due to the resources used/gathered or the structure should be contingent.	- Internal resources and capabilities.	- Internal resources are part of the CI function just as the CI function is a resource for the organization. - CI is a source of competences and capabilities.	Penrose (1959); Daft (1983); Wernerfelt (1984); Barney, (1991); Grant (1991). Barney, et al. 2001).

Industrial Economics	- The external environment is the source of competitive advantage. - Companies are homogenous. - Industry structure determines the conduct of the firm which relates to performance.	- Analysis process. - Environmental analysis. - Industry structure.	- The main objective of the CI function is the external environment. - Opportunities and threats may be detected by the CI function. - CI has a key role in understanding the industry.	Mason (1939); Bain (1968); Porter (1980 and 1981).
Contingency	- Organization is a contingency on external and internal environments. - There is no single universal organization structure that fits with its environment. - Effective Organization and subsystems have to “fit” with the environment.	- Organization design - Environmental characteristics.	- CI function and structure is a contingency on organizational, decision maker and environmental characteristics. - There could be different CI functions that could best serve for understanding environmental characteristics.	Lawrence and Lorsch (1967); Galbraith (1973); Kast and Rosenzweig (1973); Donaldson, (1984); Weill and Olson (1987); Smith et al. (1991)

Chapter 3: LITERATURE REVIEW

3.1 Introduction

This chapter reviews several pieces of specialized literature with the aim of understanding the most significant works and studies available in environmental scanning and competitive intelligence and the main thinking in the two fields. Since its inception, the intelligence process was proposed under many different headings, such as Competitive Intelligence, Competitor Intelligence or Technical Intelligence (Bégin, et al. 2008).

First of all, the review focuses on "environmental scanning" introduced by Aguilar (1967) which it is still used in recent papers describing the information acquisition process in the organization. The review describes the focus and variables of the

environment that the scanning activity will take into consideration. The second part of the chapter focuses on specialized CI literature. An exhaustive review of CI literature was developed by Dishman, et al. (2003) and included any study and work produced by scholars; books, chapters and articles devoted to the Competitive Intelligence field. A review of the references included in the study carried out by Dishman, et al. (2003), showed that CI is a very broad subject. Several topics, specializations, techniques as well as case studies were described by a large number of scholars and professional people. In addition, the chapter section dedicated to CI also provides a review of the marketing intelligence (MI), Business Intelligence and technical Intelligence.

In the following sections a chronological structure is used to explain the most significant study found.

3.2 Terms in Journals: a quantitative look

Any state of the art review of a specific topic needs to start by identifying the body of literature to be used in the analysis and discussion. To accomplish with this task, it has compared two commercial databases: Scopus and ScienceDirect. Both databases shows similar results based on similar or identical search syntaxes.

In order to retrieve the most significant amount of research carried out on the particular subject, several keywords are used. This work is crucial as Competitive Intelligence can be expressed in many ways and therefore there are many variances in the terminology used by CI practitioners as well as scholars. According to Pirttimäki (2007; p.93) these definitions may suggest that each term has a different breadth of scope regarding information. For instance, strategic intelligence (Montgomery and Weinberg, 1979) may be embedded in the strategic planning process at corporate level. In contrast, competitor intelligence (Fuld, 1995) narrows down to competitor

capabilities and competences. The following Table shows a comparison between the various search results and application of the same search strategy.

Table 2 - Nº of records in commercial Database

Terms	***Scopus**** ***Nº Documents***	***ScienceDirect*** ***Nº Documents***
“Competitive Intelligence” OR “Inteligencia competitiva”	966	57
“Competitor intelligence”	29	10
“Marketing Intelligence” OR “Market Intelligence” OR “Inteligencia de Marketing” OR “Inteligencia de Mercado”	255	40
“economic intelligence" OR “intelligence economique” OR “Inteligencia económica”	35	2
“Techno* Intelligence” OR "tecnology watch" OR “Inteligencia tecnológica” OR “Vigilancia tecnológica”	104	26
“Environmental scanning” OR “Environment scanning” OR “scanning the environment”	293	87
Total:	1683	222

(*) TITLE-ABS-KEY ("term used") AND DOCTYPE (ar) AND SUBJAREA (mult OR arts OR busi OR deci OR econ OR psyc OR soci). (**) TITLE-ABSTR-KEY ("term used")[All Sources(Biochemistry, Genetics and Molecular Biology,Business, Management and Accounting)]. [Accessed: 30 August 2015]

Although Scopus and Science Direct are two of the leading databases for scholars, they do not include all existing material on the subject. Articles written in Spanish and Portuguese are found in other directories such as open source SCIELO. For instance, Dishman, Fleisher and Knip (2003a, b and c) in their article “Bibliography of Key Competitive Intelligence Scholarship” showed that the available material on CI can be divided into several categories: Scholarly articles, Books, Book chapters and Practitioner pieces. In addition, Menezes (2005) did an exhaustive review for CI literature written by Brazilian authors. Thus any review of literature may need to take

into consideration additional sources in order to identify significant contributions. Therefore, it was reviewed the following sources which unfortunately were not included in one single database:

- Strategic Competitive Intelligence Professionals (SCIP), former Society of Competitive Intelligence Professionals, represents the leading North American based association for CI practitioners globally since 1986. The association published numerous articles, studies and books.
- Journal of Intelligence Studies in Business[1]. This online digital journal published 48 articles between 2011 and 2015.
- The "Competitive Intelligence Review" was the reference for scholars between 1990 and 2001[2].
- Spanish magazine: "Puzzle – Revista de Inteligencia Competitiva"[3]
- SCIELO[4] – database of Spanish and Portuguese scholars.

As mentioned earlier, there are several variances in the terms used in competitive intelligence. In addition, CI is not the only term since each language may have its own term. Anecdotal evidence and a review of literature demonstrated that CI may be translated or related to: "Inteligência Competitiva" in Portuguese (Tarapanoff, 2001; Braga and Gomes, 2004; Cardoso, 2005; Menezes, 2005; Tarapanoff, 2006; Capuano, et al. 2009), "veille strategique" or "veille technologique" or "Intelligence economique" in French (Jakobiak, 1992 and 2006; Lesca 1994; Bégin, et al. 2008; Lesca, et al. 2012), "Vigilancia tecnológica" and "inteligencia competitiva" in Spanish (Tena, 1992; Palop

[1] [Available at: https://ojs.hh.se/index.php/JISIB/issue/archive - Accessed: 13 September 2015]
[2] [Available at: http://onlinelibrary.wiley.com/journal/10.1002/(ISSN)1520-6386/issues - Accessed: 13 September 2015]
[3] [Available at: http://www.latindex.ppl.unam.mx/index.php/browse/browseBySet/26221?key=P&p=1 – Accessed: 13 September 2015]
[4] [Available at: http://www.scielo.org/php/index.php?lang=en – Accessed: 13 September 2015]

and Vicente, 1999a and 1999b; Tena and Comai, 2004c; Massón-Guerra, 2005; Durán Machicado, 2015), "Strategische Wettbewerbsvorteile" in German (Michaeli, 2006) and finally "omvärldsanalys" in Swedish[5]. However, it is possible to assert that the majority of scholarly works were written in English. French, Spanish and Portuguese probably count for the minority next to English, thus the review of literature was focused principally on documents written in English.

3.3 Environmental Scanning

Environmental scanning received significant attention during the 70s and 80s. Aguilar (1967) was perhaps the first author to deliver a significant piece of work on this subject. Aguilar (1967, p.1) described environmental scanning as a search for "information about events and relationships in a company's outside environment, the knowledge of which would assist top management in its task of charting the company's future course of action". According to Ghoshal (1985, cap. 2), "environmental scanning is the activity by which organizations collect external information about their environments." He also argued that "Scanning is implicitly or explicitly recognized as the mechanism that initiates the organizational adaptation process".

Scanning is likely to be a process focused on gathering new information (Collings, 1968). Albright (2004) noted that "Environmental scanning may lack of defining how to add value to the data as the activity more or less formalized relies on data collections and sourcing". In addition, Ghoshal (1985, p.31) stated that "the term scanning is usually to denote the activity of information" which "encompasses the first steps of the cycle".

[5] [Available at: https://ojs.hh.se/index.php/JISIB - Accessed: 06 December 2015]

3.3.1 Environmental characteristics and its relationship upon environmental scanning

Environmental scanning is developed when there is a need to understand better the business environment and depends mainly on certain conditions. According to Yasai-Ardekani and Nystrom (1996) "Environmental scanning is important because organizations operate as open systems that depend upon their environments for resources and legitimacy".

Daft, et al. (1988) asserted that scanning mode and frequency is related to the perceived strategic uncertainty of the sector. Ebrahimi (2000a), and McGee and Sawyerr (2003) also demonstrated the positive relationship between environmental uncertainty and scanning behavior. Yasai-Ardekani and Nystrom (1996) demonstrated several factors influencing the scanning mode and frequency. Liao, et al. (2008), for instance, showed that in general, environmental turbulence has a positive relationship with information seeking activities. Lawrence and Lorsch (1967, p.27) stated that uncertainty consists of three components: (1) the lack of clarity of information, (2) the long time span of definitive feedback and (3) the general uncertainty of casual relationship. The level of perceived uncertainty may also relate to the type of environment (Duncan, 1972).

Numerous studies adopted sample companies as being representative in testing several assumptions (Thomas, 1980; Diffenbach, 1983; Subhash, 1980; Yasai-Ardekani and Nystrom, 1996; Boyd and Fulk, 1996; Ahituv, et al. 1998; Raymond, et al. 2001). For instance, Diffenbach (1983) found that over 75 percent of "Fortune 500" American firms adopted a formal analysis process for their external environment. Others, like Subhash (1984), defined the level of progression of environmental scanning of 186 companies. Some studies can also be found closely related to the CI discipline. For instance, Schultze (1997 and 2000) developed an ethnographic study of a Fortune 500 company's CI department.

Environmental conditions may have a significant influence and impact on the firm. Godiwalla, et al. (1980) find that “the levels of difficulty experienced in accomplishing a firm's objectives and goals depend upon the perceived nature of complexity, unpredictability and dynamism of the firm's strategic environments”.

In addition, the perceived level of uncertainty in the environment is not the only dimension used in scanning literature. Daft, et al. (1988, p.129) analyzed the rate of change and complexity as components of the perceived strategic uncertainty. The authors also showed that perceived strategic uncertainty will increase in sectors with greater strategic importance. An increase in the perceived strategic uncertainty of the environment on the part of CEOs is shown to be positively correlated with scanning activities (Daft, et al. 1988; Sawyerr, 1993) even though the two studies showed differences in degree. On the other hand, Boyd and Fulk (1996) stated that the level of perceived complexity will not help developing a scanning behavior. Organization impact was suggested by Tao and Prescott, (2000), rate of changes by Daft, et al. (1988) and Elenkov (1997a), hostility and heterogeneity by Ghoshal (1985, p.40).

A large part of literature was dedicated to the perception of environmental change (see, for instance, Specht, 1987; Daft and Parks 1988; Yasai-Ardekani and Nystrom, 1996; Choo, 2001b; Correia and Wilson, 1997), turbulence (Raymond, et al. 2001), dynamism (Lozada and Calantone, 1996), managerial discretion (Hambrick and Finkelstein, 1987; Hambrick and Abrahamson, 1995) or uncertainty (Sawyerr, 1993; Lozada and Calantone, 1996; Jennings and Jones, 1999; Raymond, et al. 2001; McGee and Sawyerr; 2003) as potential contingencies for scanning behavior or the market-learning process (Weerawardena, et al. 2006). The rate of change was also used as an indicator of the level of scanning frequency and information use. Uncertainty can be defined as a combination of other variables in the environmental sector, as suggested by Daft and Parks (1988), who combined importance, complexity and change.

Eisenhardt (1989), for instance, observed that in high-speed environments in which decisions must be made quickly, managers use more information than in those

environments in which decisions are made slowly. However, fast-changing environments may also negatively affect scanning activity. Marceau and Sawka (1999) observed that "fast moving telecom world, traditional measures and estimates cannot capture external factors that influence corporate performance". The following table summarizes the dimensions used by the authors reviewed previously when analyzing the environmental condition and scanning behavior in firms.

Table 3 - Dimensions used by authors

Dimension	***Main authors***
Uncertainty	Duncan (1972); Daft, et al. (1988); Sawyerr (1993); Yasai-Ardekani and Nystrom (1996); Jennings and Jones (1999); Tao and Prescott (2000); Ebrahimi (2000a); Raymond, et al. (2001); McGee and Sawyerr (2003); Kirschkamp (2008); Sund (2013).
Change (rate of)	Daft, et al. (1988); Eisenhardt (1989); Lozada and Calantone, (1996); Elenkov (1997a); Marceau and Sawka (1999); Robbins and Coulter (2005); Kirschkamp (2008).
Importance	Daft, et al. (1988); Xu, et al. (2003); Kirschkamp (2008).
Complexity	Duncan (1972); Godiwalla, et al. (1980); Culnan (1983); Daft, et al. (1988); Boyd and Fulk, (1996); Yasai-Ardekani and Nystrom (1996); Ebrahimi (2000b); Robbins and Coulter (2005); Kirschkamp (2008).
Dynamism	Duncan, (1972); Godiwalla, et al. (1980); Ghoshal (1985, p.40); Garg, et al. (2003).
Stability	Xu, et al. (2003).
Turbulence	Raymond, et al. (2001); Liao, et al. (2008).
Hostility and/or Heterogeneity	Ghoshal (1985, p.40).
Unpredictability	Godiwalla, et al. (1980).
Impact (on the organization)	Tao and Prescott (2000).

Several types of scanning practices were defined. Aguilar (1967) stated that environmental scanning practices can be formal or informal and Fahey and King (1977)

noted that the process can be irregular, regular and continuous. The relationship between the type of scanning behavior and the environmental conditions was studied by Daft, et al. (1988), who identified different modes, and by Elenkov (1997b, p.116) who observed that "the relationship between scanning and performance does not appear to be unidimensional". He also studied the relationship between the type of environmental scanning and the profitability and product growth of Russian companies.

A final remark must be devoted to the fact that the nature of the sector or a particular industry has certain effects on the perception of executives (Daft, et al. 1988; Correia, 1996; Correia and Wilson, 1997 and 2001; Xu, et al. 2003) and the way that they process the information (Kokkinis, 2005, p.209).

3.3.2 Organizational Characteristics and Environmental Characteristics

The environment is not the only or principal factor affecting the scanning activity of a firm. The characteristics of the organization may also influence scanning behavior, however, a very limited number of studies focused on this topic (Liao, et al. 2008). Hambrick (1981) studied the effect of a firm's strategy on the scanning process and scanning behavior. Liao, et al. (2008) demonstrated that the age of a firm also has an impact on the frequency with which competitor information is scanned.

Studies made to date also look at the combination of environmental and organizational conditions. Garg, et al. (2003) noted that scanning frequency was affected by the use of internal and external sources and by the type or environmental conditions. In addition, studies discussed the fact that industry (Miller, 1993) or country (Miller, 1992; Wright and Calof, 2006) may have a certain amount of influences on manager perception of environmental uncertainty and the way in which the scanning behavior is performed. For instance, Miree (1999), based on several case studies in three industries, observed

the relationship between industry regulation and the intensity of competitive rivalry and the CI activity.

3.4 Competitive Intelligence

Competitive intelligence has a long history going back to the end of the 1960s with the work put forward by Greene (1966), Kelly (1968) and Cleland and King (1975) during the 1970s. The authors made specific reference to collection of military intelligence. Although these studies were proposing how to use intelligence in business, some of them such as Greene (1966) also referred to military practices. Possibly, ever since Porter (1980) used the term "intelligence" as a key resource to be included in any competitor analysis process, it became more evident in management. He considered that a competitor intelligence system is an organized mechanism made by several functions to ensure complete competitor analysis (Porter, 1980, p.41-44).

Competitive intelligence is defined in a variety of ways but perhaps the most useful definition is derived from the following statement:

- It is "a formalized, yet continuously evolving process by which the management team assesses the evolution of its industry and the capabilities and behavior of its current and potential competitors to assist in maintaining or developing a competitive advantage" (Prescott and Gibbons, 1993).

Definitions which place emphasis on the scope of CI activity:

- "CI is the process by which organizations gather and use information about products, customers, and competitors, for their short and long term strategic planning." (Ettore, 1995)

- CI means “a systematic process initiated by organizations in order to gather and analyze information about competitors and the general socio-political and economic environment of the firm” (Vedder, et al. 1999).

Definitions which emphasize how CI brings value to the company:

- “The information process through which companies prospectively monitor their environment in order to create opportunities and to reduce their uncertainty” (Lesca, 1994).
- “CI allows a company to understand itself better, avoid surprises, identify threats and opportunities, and gain competitive advantage by improving planning and decreasing reaction time” (Cappel and Boone, 1995).contingency
- “BI is defined as an information process that contains a series of systematic activities driven by the specific information needs of decision makers and the objective of achieving competitive advance” Pirttimäki (2007, p.92).
- CI involves the legal collection of information on competitors and the overall business environment. The knowledge gained from this information is used to enhance the organization’s own competitiveness (Ghannay and Ammar, 2012).

Definitions which underline CI as a process:

- “Intelligence is the analytical process that transforms disaggregated competitor data into relevant accurate and usable strategic knowledge about a competitor’s position, performance capabilities and intentions” (Sammon, et al. 1984, p.91).
- “. . . the product of collection, evaluation, analysis, integration, and interpretation of all available information that may affect the survival and success of the company. Well-interpreted information, provided by a properly designed intelligence function, can be immediately significant in the planning of corporate policy in all of its fields of operations”. (Eells and Nehemkis, 1984, p.75).
- “A competitor information system is a process of gathering competitor data from various sources both inside and outside the organization, transforming them into

timely, pertinent and meaningful information and holding it within a well-structured system." (Kotler, 1997).

- "The art and science of preparing companies for the future by way of a systematic knowledge management process. It is creating knowledge from openly available information by use of a systematic process involving planning, collection, analysis, communication and management, which results in decision maker action." (Calof and Skinner, 1998)
- CI is a business practice which involves a systematic process of needs identification, information and data collection, analysis and distribution of actionable insights to provoke a significant impact on the organization (Tena and Comai, 2004a).

Definitions which define CI focusing on variety of resources used:

- "Competitive Intelligence is the use of public sources to develop information on competition, competitors and the market environment" (Vella and McGonagle, 1988; p. 1).
- Competitive Intelligence is a "refined product that deals with some aspect of the internal and/or external environment" (Cartwright, 1993; p.4).

Taking into account all the different approaches suggested, it is important to stress, that CI, as we interpret it in this text, is deliberate and formal. It is carried out with continuity and is widely recognized within the organization which practices it. There is no doubt that each of these definitions has its own viewpoint, although they may all fall into one general one. All of the above prompts us to suggest that:

> *Competitive Intelligence (CI) is a systematic process, recognized and accepted throughout the organization, for the search, selection, analysis and distribution of information about the environment in order to gain substantial competitive advance (Tena and Comai, 2004a).*

Table 4 summarizes the key components relating to the various definitions.

Table 4 - CI Components and main references.

Components or features	***Main References***
Scope	Porter (1980); Vella and McGonagle (1988); Prescott and Gibbons (1993); Lesca (1994); Calof and Skinner (1998); Vedder, et al. (1999); Rouach and Santi (2001).
Process and Structure	Porter (1980); Sammon, et al. (1984), Prescott and Gibbons (1993); Kotler (1997); Calof and Skinner (1998); Belich and Dubinsky (1999);
Resources, Internal and External Information	Vella and McGonagle (1988); Kotler (1997).
Added value, Anticipation of the Environment and Reduction of Uncertainties	Sammon, et al. (1984); Lesca (1994); Prescott and Gibbons (1993); Prescott and Gibbons (1993); Pirttimäki (2007, p.92); Ghannay and Ammar (2012).

3.4.1 CI transforms data and Information into Intelligence

Data and information is the raw material in any added value process and can be considered to be an input for any CI activity. Pirttimäki (2007, p.54) discussed how Business Intelligence enriches environmental data from internal and external sources. Kahaner (1996) emphasized the difference between information and intelligence. He argued that information is factual and intelligence is analytical intelligence. Drucker (1998) also emphasized the importance of transforming an organization's data into information. He noted that internal, client and customer data in an organization can be transformed by dedicated specialists to add value.

Competitive intelligence requires knowing precisely the differences between information and intelligence. Intelligence, not information, is what managers need in order to make decisions. Intelligence is a product in which resources and activities are used to transform data and information into plausible answers and suggestion of key

challengers. Intelligence is a product resulting from the transformation of data and information (Rouach and Santi, 2001).

Similarly, Knowledge Management was studying a value chain in which data is transformed into information and then into knowledge (Nonaka, 1991; Davenport, 1994). The conversion from tacit knowledge to explicit knowledge was studied in the organizational knowledge creation theory (Nonaka, et al. 1994; Nonaka and Von Krogh, 2009).

The review so far indicates that CI and environmental scanning have several elements in common. However, since scanning refers to the ability to gather relevant information about a company's direct or indirect environment, CI differs notably in that it refers to the ability to add value, using sophisticated analysis and to be more proactive.

3.4.2 CI adds Value to the Organization

CI is part of the preparation and implementation of the strategy as well as of the specific actions carried out by the business units, functional areas and departments within the firm and its objective is to contribute tangible competitive advantages in order to achieve the most favorable impact possible on the progress of the organization. Belich and Dubinsky (1999) stated that "the ability to develop adequate organizational mechanisms for information acquisition, dissemination, and effective utilization may be precursors to identifying and effectively adapting to major market shifts".

Understanding how beneficial CI is for the organization was discussed in the CI field and the difficulties of establishing a return of investment have been pointed to out. For instance, the Society of Competitive Intelligence Professionals (SCIP) published several articles on this topic with the aim of demonstrating the value of CI (Herring, 1996). Recently, Calof (2014) established a long list of measures to calculate the value or the effectiveness of a CI function. However, little literature was devoted to this topic.

Pontes (2005) noted that business results are positively correlated to business intelligence activities. On the other hand, the closer the relationship between CI managers and decision makers, the less need there will be for the company to establish the value. Prescott and Williams (2003a) showed that a close working relationship results in a reduced need for formal and/or quantitative CI assessments.

3.4.3 The Competitive Intelligence Function

The CI function and the CI process were described in the CI literature (Fuld, 1995; Tyson, 1998; Marceau and Sawka, 1999; APQC, 1999, 2000 and 2001; Prescott and Miller, 2001; McGonagle and Vella, 2002 and 2003; Hannula and Pirttimäki, 2004). McGonagle and Vella (2002, p.7) and Prescott (2001), for instance, suggested several areas where the type of intelligence function is different. The way a CI program is organized can differ between firms. A review of CI bibliography (Prescott and Bhardwaj, 1995; Lackman, et al. 2000; APQC, 2000; Rouach and Santi, 2001, McGonagle and Vella, 2003; Comai, et al. 2005; Michaeli, 2006, p.6; Cardoso, 2005) shows that there are several characteristics which define the CI function in the organization and which depend on the level and type of investment devoted to it.

However, a developed CI function does not necessarily need more resources. Rothberg and Erickson (2012; p.9) observed that the budget allocated to a CI function is not directly proportional to the maturity of the function. In other words, an older CI function may have developed skills and techniques that are more effective compared to a start-up function which requires a higher CI expenses to develop the specific knowledge.

The positive contribution of a formal CI function was discussed at length (Furach, 1959; Aguilar, 1967; Porter, 1980; Diffenbach 1983). For instance, Diffenbach (1983) identified 44 payoffs for an organized environmental scanning and analysis. However, one major problem is clarifying how one defines whether a CI function is formalized. Diffenbach

(1983) noted that an organized CI function, as opposed to an informal function, focuses mainly on the type of process or method of analysis. An interesting contribution was offered by Furash (1959), who described several activities needed to build a formal CI program. Porter (1980, p.74) suggested that a formal intelligence system involves documentation.

All CI functions have two main activities: primary and support. Both are essential to operating a world-class operation.

- Primary CI activities include those that enable CI projects. The process of producing intelligence may be seen as adding value to raw data and information that is available from the environment. The manner in which data and information is gathered, captured, classified, interpreted, disseminated and stored, adds uniqueness to the information and therefore to the value CI provides.
- Support activities are the administrative and managerial tasks that keep the CI function going. They are typically performed by the CI manager to ensure that operations are organized, the right resources are available, and the CI operation meets the organization's expectations. A competitive intelligence function is embedded in the intelligence cycle, but needs to be orchestrated by an overall framework.

When a CI function is operating properly, several activities and resources are combined to provide actionable intelligence for decision makers. Since competitive intelligence is the intersection of many activities it requires an understanding of the variety of disciplines that are at play within it. Thus, rigorous planning processes for infrastructure as well as operational activities are necessary if the whole function is to be properly coordinated.

To see how these two perspectives work, it is helpful to study the value chain proposed by Porter (1984). This concept was used to describe how firms or organizations create

value by organizing their activities. The value the entire chain of activities provides is superior to the sum of the added values of each activity. Thus a support area is needed to achieve maximum added value The reason for using this parallelism of the firm and CI is that the CI function can provide services and goods to decision makers (their internal customers) working as an independent unit. It helps also to understand the different capabilities of an intelligence unit. Miller (2004) also discussed two different levels of CI roles: core and supporting.

Some of today's CI functions have been developed based on what is popular, while others have been based on intuition, or on the intelligence cycle. Whatever the background, framing CI is a good starting point, and there are a variety of diagnostic tools to help a firm to evaluate their CI function (Comai, et al. 2005). Several frameworks were suggested to date to formalize the CI activity in an organization (Sammon, et al. 1984; Herring, 1988; Simon, 1997; Tyson, 1998; Lackman, et al. 2000; Settecase, 2003; McGonagle and Vella, 2003; Comai, et al. 2005; Michaeli, 2006; Cardoso, 2005; Anderson, 2006; Singh and Beurschgens, 2006).

3.4.4 The intelligence cycle

Competitive intelligence research projects are developed following several steps and require precise project management. The process can be linear (Porter, 1980; IMA, 1996, p.8; Breeding, 2000; Prescott, et al. 2001) or circular (Durö and Sandström, 1987, p.61; Marceau and Sawka, 1999) or network-based (Carroll, 1966 p.84; Cleland and King, 1975; Montgomery and Weinberg, 1979, p.44; Tena and Comai, 2003; Dishman and Calof, 2008). Therefore, any competitive intelligence activity uses a process which incorporates several key steps. Even if this process varies between firms (Dishman and Calof, 2008), the activity adopted by CI practitioners is typically called the intelligence cycle which involves at least four steps. This project-based process can be shown with the business cycle suggested by Cleland and King (1975), described in Figure 6, or more specifically by Montgomery and Weinberg (1979, p.44).

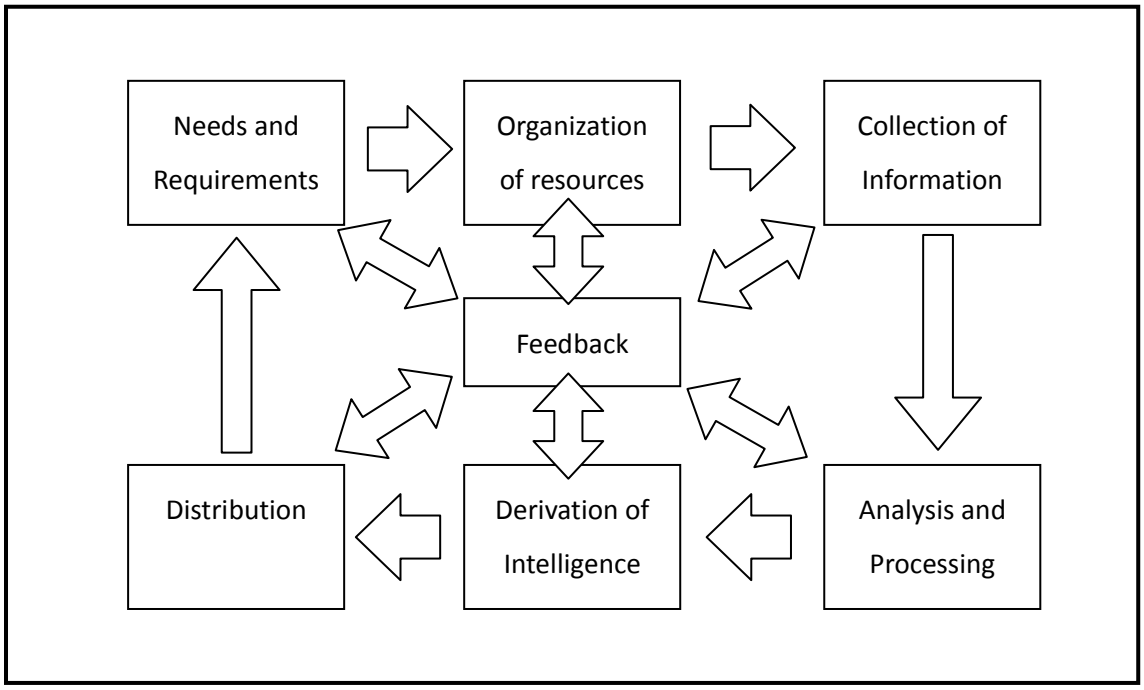

Figure 6 - Intelligence Cycle.
Adapted from Cleland and King (1975).

However, the most traditional steps of the intelligence cycle are:

1. Planning, needs definitions or definition of the requirements. This task involves an understanding of the project purpose and of the objectives that need to be accomplished. Herring (1999) suggested using key intelligence topics (KITs) and key intelligence questions (KIQs) to establish the needs of the CI projects. The topics and the questions will be then answered using intelligence. On the other hand, Prescott, et al. (2001, p.187) suggested a hypothesis-driven approach to test assumptions about the specific issue or topic that needs to be investigated. Hypothesis may also applied when studying the future actions of competitors (Durö and Sandström; 1987, p.61). This initial step in the intelligence cycle also includes several sub-activities and careful preparation and planning to make sure that the project will be accomplished in the specific timeframe. Resources need also to be allocated to the project.

2. Collection of Information: This step is focused on retrieving data and information from a wide variety of primary and secondary sources. These can be based on external commercial or open sources (Fleisher, 2008) as well as internal sources (Fuld, 1995). Porter (1980) made a clear distinction between the data that are collected in the field or data that is gathered from secondary sources. Collecting information also requires skills and competencies. John Nolan (1999) dedicated an entire book describing how elicitation techniques can be used effectively to gather primary data from people.
3. Analysis and interpretation. This is adding value to the data and information collection and intelligence system (Porter 1980). It involves methodologies and techniques. The process may include business analysis (Porter, 1985; Hussey and Jenster, 1999; Oster, 1999; Fahey, 1999), specialized techniques such as the structural analytic techniques suggested by Heuer and Pherson (2010) or technology (Vergara, et al. 2006).
4. Distribution: this refers to the communication of the results to the decision makers. CI results can be delivered in many formats (Bell and Breeding, 2003) and mediums (Comai, et al. 2006). This process involves editing and communication skills. Results can also be distributed using software, corporate intranets or dashboards for storing different type of CI products (Breeding, 2001).

In the survey carried out by Dishman and Calof (2008), the authors reviewed the use of the intelligence cycle (planning, collection, analysis, dissemination and decision) by 1,025 executives of Canadian technology firms. The study revealed that the strongest of the five phases of the intelligence cycle is the collection phase. Prescott and Bhardwaj (1995) also showed that 37% of time is dedicated to collection. Dishman and Calof (2008) noted that the intelligence cycle is influenced by two elements: CI awareness (culture) and CI structure (how CI is formally organized around the cycle).

The intelligence cycle offers a framework for organizing CI research projects that can be developed continually, systematically and ad-hoc (Tena and Comai, 2001). These three types of CI projects adopt, however, the same process as described in the intelligence cycle.

3.5 CI Function Expenses and Resources

The CI function is a set of tangible and intangible assets which are devoted to the gathering, analyzing and distribution of intelligence within the organization. Any CI function is shaped by a specific set of resources able to perform all types of activities. The way in which companies allocate resources to the CI activities, applying international scope (Robertson, 1998) or industry (Comai, et al. 2005), can differ from company to company. In addition, Francis, et al. (1995) stated that "few organizations have a formal procedure for deciding how many resources to allocate to watch the competition".

Any CI function is adequately supported with human and other resources based on a separate CI expenses for capital and operational expenditure as follows (Comai, et al. 2005):

- Human resources: capable CI managers, intelligence analysts or on-going training.
- Non human resources: office accommodation, communication tools, software packages for data storage and analysis and knowledge management, information technology hardware and "a range of external primary and secondary sources of intelligence is used by the CI function; this includes databases, external experts and agents, and external intelligence vendors as appropriate".

Several indicators can be identified and associated with the two groups as follows:

- Staff and managers dedicated to CI. The number of “full-time equivalent” individuals responsible for the CI activity will be identified, as suggested by the APQC study (2003, p.19).
- CI expenses which is allocated as follows: software and hardware licenses, database subscriptions, reports, external consultancies, training and educational programs, travel and other taks not performed by CI personnel.

Table 5 shows the percentage that was allocated according to a comparison study of 164 Chinese firms (Tao and Prescott, 2000).

Table 5 - Resources invested in a CI function.

Adapted from Prescott and Bhardwaj (1995, p.7) and Tao and Prescott (2000, p.70)

Activity	***Percentage of budget allocated (%) by US firms***	***Percentage of budget allocated (%) by Chinese firms***
CI personnel Salary	49	32
Clerical support	5	4
Operating supplies/equipment	6	13
Education: Training, seminars, meetings	5	10
Travel	6	14
External database use	11	8
Outsourcing: consulting, research	13	12
Others	5	7

Based on these observations a CI function may be measured by identifying the efforts that are invested in human and non-human resources by assigning monetary values. Several studies attempted to put an estimated value on the CI expenses incurred.

Prescott and Bhardwaj (1995, p.7) find that an average of 350,000 USD and a median of 150,000 USD was allocated to CI. The authors also stated that "budgets should be interpreted with caution because firms differ in how various activities are founded". Tao and Prescott (2000) identified an average of 92,000 USD budget allocated to CI in Chinese industries and non-profit organizations. In a more recent survey of 228 CI professionals, half the sample declared that their CI expenses was below 100,000 USD (Comai, et al. 2005). However the other half of the sample showed very different figures and 14 companies had budgets of over 2,000,000 USD, resulting in an average of approximately 430,000 USD. A similar result was found in the study sponsored by the SCIP Foundation where almost half of the 520 companies surveyed declared managing a budget (excluding salaries) of less than that 100,000 USD (Fehringer, et al. 2006). Hawkins (2005, p.16) showed that 41% of the New Zeland firms had a budget less than $25,000.

Capatina, et al. (2012) showed several different amounts allocated to the CI budget and how these amounts differed in the Romanian software industry. Fuld and Company (2013) compared the CI budgets in several different industries and discussed how these changed during economic crisis. Resources vary between firms. Varughese and Buchwitz (2003, p.203) observed that CI professionals at both large and small and medium-sized firms face the same challenges in running a CI operation on a limited budget. Table 6 proposes a list of metrics adapted from Prescott and Bhardwaj (1995) although several references were introduced to support the idea of each element. To each indicator a monetary value should be assigned.

CI expenses can also be estimated according to company turnover. For instance, Savioz (2003) identified total technology intelligence expenses allocated to technology-based SMEs of between 0.1-0.8% of sales. However, CI expenses can differ greatly from firm to firm and these differences can be seen not only across industries but also across the different sizes of company (Comai, et al. 2005).

Table 6 - CI expenses: resources needed to perform a CI function.

Indicators/CI Resources	***Main literature***
Number of CI FTE personnel	Stubbart, (1982); Prescott and Bhardwaj (1995); APQC (2003); Savioz (2003); Tena and Comai (2004b); Comai et al. (2005).
Software and hardware licenses.	Prescott and Bhardwaj (1995); Bouthillier and Shearer (2003), Savioz (2003); Comai, et al. (2005); Vergara, et al. (2006); Baaziz and Quoniam (2014).
Hardware and other operating equipment.	Prescott and Bhardwaj (1995), Savioz (2003), Comai, et al. (2005).
Education: Training, seminars or meetings.	Furash (1959); Prescott and Bhardwaj (1995); Comai, et al. (2005); Shelfer (2003); Tena and Comai (2004b).
Travel.	Prescott and Bhardwaj (1995).
External on-line database subscription and electronic alerts or material.	Prescott and Bhardwaj (1995); Savioz (2003); Comai, et al. (2005).
Buying reports and other paper-based material (trade magazines, newspapers, etc.).	Prescott and Bhardwaj (1995); Savioz (2003).
Outsourcing: consulting, research.	Prescott and Bhardwaj (1995); Venkatraman (1997); Fiora (2002); Díaz and Álvarez (2003); McGonagle and Vella (2003); Savioz (2003); Tena and Comai (2004d); Comai, et al. (2005).

Another possible indicator for measuring the level of resources invested in CI may be the number of full time equivalent (FTE) employees. The research done by Prescott and Bhardwaj (1995), on 390 CI practitioners observed that companies invest almost half of their CI budget in human resources. Anecdotal evidences show that the CI group is relatively small and may have 1-3 specialists (Comai, et al. 2005). On the other hand, there are exceptions. Some units can employee between 15 and 20 professionals (Postigo, 2000, p.70) more than 30 (Kalb, 2001; Lackman, et al. 2000) or can be extremely large with up to 80 CI professionals (Bell and Breeding, 2003). Jaworski and

Wee (1993) identified that the average number of staff allocated to CI was 4.5 FTE. However, Lackman, et al. (2000) concluded that larger organizations used larger numbers of CI staff, but they do not make any reference to budgets.

As discussed so far, this function is embedded in a structure which can be seen as a set of specialized capabilities. To date, several authors argued the need for an independent system capable of coordinating the CI function in the organization (Fuld, 1995; APQC, 2000; Prescott and Miller, 2001). For instance, Ansoff (1980) and Porter (1980) argued that a specialized administrative function should be employed to manage the systematic activity of scanning the environment.

3.6 Specializations of Intelligence

Competitive intelligence can also be seen as an umbrella that includes several specializations. A large part of the literature focuses on categorizing the type of intelligence used in the firm. Several empirical studies analyzed scanning activity using a broad perspective (Aguilar, 1967; Ghoshal, 1987) whilst others focused more on some of the dependent variables, such as technological scanning activity in SMEs, for instance, (Raymond, et al. 2001).

Perhaps one of the most difficult tasks when establishing a CI program is to define the intelligence needs based on the key priorities of the firm. A number of interpretations can be found, such as:

- Non-oriented observation or search with the aim of obtaining a general knowledge of the environment.
- Specialized research or oriented search which aims to obtain information relevant to a decision or problem.

- Monitoring the environment as a non-oriented search responding to the idea "listen" or passive observance in which CI plays the role of monitor.
- Exploration or oriented search characterized by active observation, often with the prior specification of an issue or decision for which the monitoring needs to be carried out and, if appropriate, anticipation of the consequences - a new regulation planned by a government or an acquisition or merger, for example.
- Competitor Intelligence: this activity focuses primarily on gathering intelligence from the direct or indirect competition (Porter, 1985; Durö and Sandström, 1987; Fuld, 1988 and 1995; Hussey and Jenster, 1999; Gordon, 2002).
- Competitive Intelligence, which focused originally on the markets and their players, especially clients and competitors, in order to then extend the perspective. Historically, CI replaced the term Business Intelligence (Sammon, et al. 1984; Gilad and Gilad, 1985; Tyson, 1986).
- Business Intelligence was used in the late 80s by Sammon, et al. (1984) but is still in use in Nordic countries such as Finland. The Finnish perspective includes not only external but also internal information. This perspective sustains the idea that in order to create an appropriate intelligence product, both types of information must be used (Pirttilä, 1997; Hannula and Pirttimäki, 2003 and 2004; Comai, et al. 2006; Pirttimäki, 2007).
- Economic intelligence, which includes the intelligence activities of all the economic actors - including government actors. This type of intelligence, which can include sources of any kind, is very common in France (Bessons and Possin, 2005; Bégin, et al. 2008). Economic intelligence is frequently used in support of public policies. For instance, Lorraine[6], a region in France, identified six key industries and/or clusters that were contributing significantly to the economic growth of the region with the help of a centralized intelligence service.

[6] See the "Decilor" project at http://www.lorraine.cci.fr/FRANCAIS/C3/300_2.htm

The term competitive intelligence was adopted due to its widespread use. It is considered that CI includes the aspects relating to strategic business decisions, marketing, sales, etc., as well as those relating to the relationship with the environment and with the public authorities. All efforts by any type of organization whose purpose is to interpret and analyze the environment for decision making will be included in our field of interest.

Empirical studies adopting a qualitative (APQC, 1999, 2000, 2001, 2003; Comai, et al. 2006; Wright, et al. 2009) as well as a quantitative approach, revealed different types of CI activities with specific focuses and priorities. However, several definitions tried to simplify the environment by creating different categories. Montgomery and Weinberg (1979) suggested that "to accomplish the purposes of defensive, passive and offensive intelligence, a strategic intelligence system (SIS) should focus on six environments: competitive, technological, customer, economic, political and regulatory, and social". The various terminologies used show that intelligence has several possible domains. For instance, Bessons and Possin (2006, p.44) introduced twelve types of surveillance activities: law, alliances, lobbies, scientific, competitors, diplomatic, computer technology, criminal, security, finance, social and trade unions or rumors.

Several terminologies can also be found when describing the job (Wright, et al. 2009). These competitive intelligence focuses or types will allow me to introduce the concept that an intelligence function can have at least six dimensions. The most common specializations are:

- Marketing or Market Intelligence
- Competitor Intelligence
- Customer Intelligence
- Technology Intelligence
- Economic Intelligence
- Security Intelligence or Counterintelligence:

Wright, et al. (2002) stated that the terms “competitor” and “competitive” intelligence can be interchangeable since their respective meanings are more or less the same. All types of intelligence share common characteristics but they may have specific focuses in terms of scope, needs, end-user group, sources, competences and analyst, collector and process capabilities. Some of the differences are described in the following sections.

3.6.1 Marketing or Market Intelligence

Marketing intelligence (MI), field since this domination is frequently used among professionals.[7] In addition, the journal “Marketing Intelligence & Planning” was entirely dedicated to this specialty since 1983. Walle (2001, p.9) noted that “marketing intelligence and/or marketing research nested competitive intelligence from which it became an independent activity in the company”. Durö and Sandström (1987, p.61) suggested a tactical marketing intelligence operation for understanding competitors’ actions and responding with offensive or defensive strategies.

The introduction of intelligence into the field of marketing might be attributed to Kelley (1968; p.I) who made an important distinction between marketing research and the marketing intelligence system. For the author, marketing research concentrates on solving a specific problem whilst marketing intelligence focuses more on continuously monitoring the market. Lately, Pinkerton (1969) also devoted significant time to the process for establishing a marketing intelligence system. Although marketing intelligence was discussed in the sixties, a significant amount of work was published more recently (Xu and Kaye 1995; Maltz and Kohli, 1996; APQC, 1999b; Walle 2001; Castanon, 2004; Huster, 2005; Jenster and Solberg Søilen, 2009; Trainor, et al. 2013).

[7] A review of the titles used in current job position in the social network LinkedIn shows that Marketing Intelligence is the most commonly used term in the intelligence field. More information can be found in chapter 8.

There are several commonalities between CI and marketing intelligence (MI). These commonalities can be extracted from the different definitions of marketing intelligence:

- "Marketing intelligence is viewed in its totality as a continuing and interacting structure of people, equipment, and procedures to gather, sort, analyze and distribute pertinent, timely and accurate information for use by marketing decision makers to improve their marketing planning, implementation and control" (Tan and Ahmed, 1999),
- "The ability to fully understand, analyze, and assess the internal and external environment related to a company's customers, competitors, markets, and industry to enhance the tactical and strategic decision-making process. Creating this ability requires the integration of competitive intelligence, marketing research, market analysis, and business and financial analysis information." Huster (2005, p.13),
- "Leveraging internal and external data, analysis and statistical remodeling with the ultimate goal of improving the marketing response" (Castanon, 2004).

The following Table summarizes the key components relating to the various definitions of marketing intelligence discussed so far.

Table 7 - Marketing Intelligence Components and main references.

Components	***Main References***
Process and structure	Tan and Ahmed (1999).
Integration of other disciplines	Huster (2005).
Scope	APQC (1999 and 2000); Castanon (2004); Huster (2005).
Internal Information based	Castanon (2004); Huster (2005).
External Information based	Tan and Ahmed (1999); Castanon (2004); Huster (2005).
Planning	APQC (2000).
Analysis and interpretation	Castanon (2004); Jenster and Solberg Søilen (2009).
Distribution and Dissemination	APQC (2000).
Action and result based	Tan and Ahmed (1999); Castanon (2004).

3.6.2 Technology Intelligence

Competitive technology intelligence (CTI) is a specialized intelligence field in CI (Hefti, 2003) and it looks at intellectual propriety fields including, for instance, patents, grey literature and technical information. CTI can also be defined as technology intelligence (Courtial and Sigogneau, 1994; Norling, et al. 2000; Paap, 2002), technical intelligence (Albagli, et al. 1996; Ashton and Klavans, 1997; Savioz, 2004 and 2005; Muller, 2006b) or technology watch (Dou, et al. 1993; Dou, 1997; Ransley, 1996 and 2001; Palop and Vicente, 1999a and 1999b; Escorsa and Maspons, 2001). Although the first few definitions embed the whole intelligence process, intelligence watch is merely devoted to the collection of technology or technical news. CTI makes use of many sources, such as norms, legislations, offer on demand, technology news (Palop and Vicente, 1998) and the competition (Walde, 1984; Brockhoff, 1991), but the most popular source is patents (Brockhoff, 1992; Brenner, 2005). Several tools and algorithms were developed

to exploit patents and scientific litherature with the aim of analyzing them in very large numbers (Courtial, et al. 1996; Vergara, et al. 2006).

Technology intelligence was adopted by many types of companies and industries. However, the type of organization that utilizes CTI is likely to be technologically oriented. Savioz (2003 and 2005), for instance, demonstrated the successful application of technical intelligence in several cases, in companies using CTI a few of which were small enterprises. Others described CTI processes in several big companies (Ransley, 1996; APQC, 2001). CTI is used in private companies (Brockhoff, 1991) as well as by government, non-profit organizations and technological centers (Kennedy, et al. 2005).

CTI was used for providing executives with technological insights (Maisseu, 1995) for understanding technology trends applying specialized analysis techniques (Courtial and Sigogneau, 1994). Ashton (1997) defines CTI as actionable information on external science and technology (S&T) developments and trends that could impact on a company's competitive position.

Several processes were suggested so far for establishing a formal CTI activity (Paap, 2002; Lichtenthaler, 2004; Brenner, 2005). Every CTI activity has several generic steps in common which can be described with the following six activities: need identification, planning the resources and tasks, acquisition of information, analysis, communication of the results and review of monitoring performance (Ransley, 1996). However, one of the most complete processes described so far may be the one suggested by Ashton and Klavans (1997), shown in Figure 7.

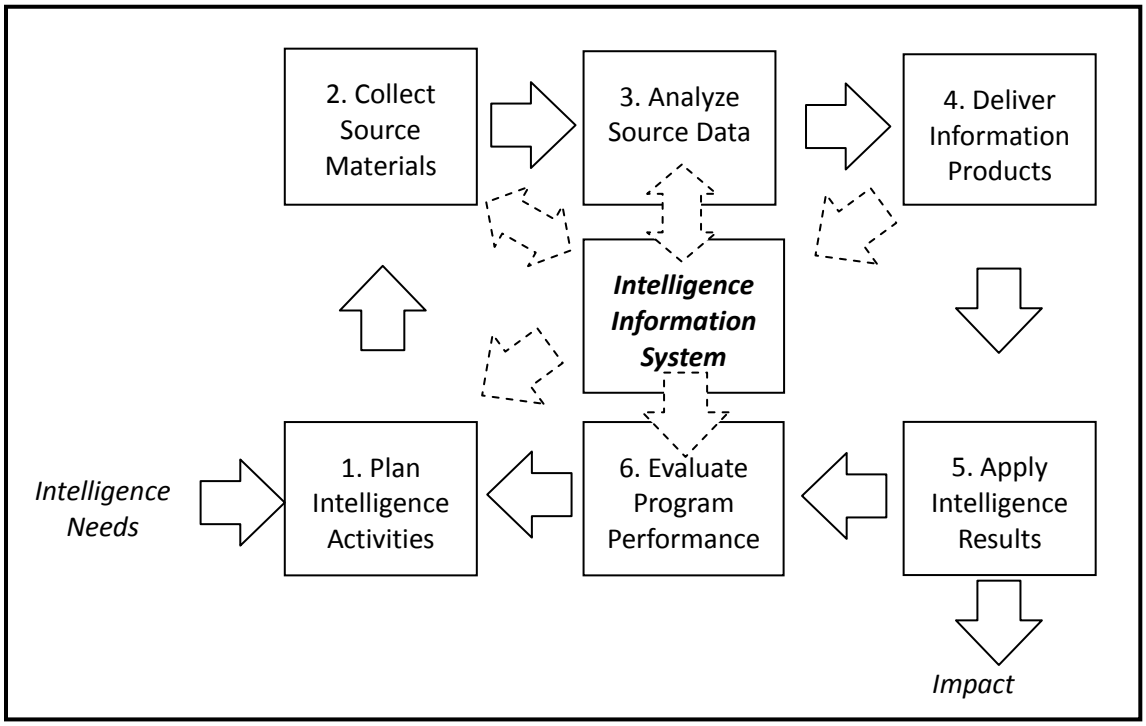

Figure 7 - Technology Intelligence Cycle.

Adapted from Ashton and Klavans (1997).

Patent analysis is applied in order to understand "the state of the art" of a particular technology and can be focused on a specific sector (Hernando and Río, 2005).

In conclusion, it is possible to state that most of these studies described the process and the various components of CTI, whether the process is formally established and fully embedded in the organization or whether it is still in its infancy. Very few studies focused on identifying the reason and the conditions that make CTI successful. Moreover, there is very little study devoted to the external environment. Raymond, et al. (2001) analyzed several contingencies and demonstrated that ten of them showed a positive correlation with technological scanning behavior.

3.6.3 Business Intelligence

Although there is a specific definition for BI, the difference between competitive intelligence and business intelligence is not clear. The term Business Intelligence is hardly ever used in literature to describe CI's application of a broader scope to information sources (Hannula and Pirttimäki, 2003; Fyrstén, 2005; Koskinen, 2005; Comai, et al. 2006; Pirttilä, 2007; Pirttimäki, et al. 2006; Pirttimäki, 2007; Vuori, 2007). Anecdotal observation shows that BI and CI are very different in terms of skills required from the professional individual (Freyn, 2015).

The term business intelligence was adopted in the past as a perfect substitute for competitive intelligence (Greene, 1966; Porter, 1980; Sammon, et al. 1984; Tyson, 1986). Greene (1966, p.5) for instance, defined business intelligence as "processed information of interest to management about the present or futures environment in which the business is operated". Tyson, (1986, p.9) defined business intelligence as "an analytical process that transforms raw data into relevant, accurate and useable strategic knowledge". Freyn and May (2015) also noted that business intelligence (BI) job descriptions are very different from CI job descriptions and this suggests that nowadays BI is a different specialty.

During the last few decades, however, CI was replacing business intelligence because BI also took on a different meaning. Wright and Calof (2006) noted that "competitive intelligence, or, as it is sometimes referred to, business intelligence (BI), actually causes considerable debate between practitioners and academics". North European countries such as Finland use CI as an extension of BI (Hannula and Pirttimäki, 2003; Pirttimäki, 2007; Pirttilä, 2007). Pirttimäki (2007, p.93) showed that "the most significant difference between BI and other intelligence concepts seems to be that most others focus mainly on the external environment". Although Tyson's previous definition can be applied to internal or external sources of information, the orientation was primarily the external environment and therefore internal data about the company was not taken into consideration.

A study of four Finnish BI functions shows that the companies were combining both internal data with external information to get a more precise understanding of opportunities and threats (Comai, et al. 2006). Nowadays business intelligence may be related to technology which uses proprietary data stored in the company database (Vitt, et al. 2002; Jenster and Solberg Søilen, 2009; p.12) and therefore only a few pieces of literature connect it to analysis or scanning practices in the business or industry environment.

3.7 Summary of the literature review

As shown, specialized literature reviews Competitive Intelligence and environmental scanning, devoting significant attention to the study of environmental characteristics and relating them to scanning frequency and mode. The review of relevant literature and the subject studied shows the relationship to this study as well as the differences. For instance, for environmental literature, the following points relating to the purpose of this study can be highlighted:

- The studies focused mainly on the CEO (Daft, et al. 1988; Sawyerr, 1993; Jain, 1984; Elenkov, 1997b; Garg, et al. 2003), decision makers (Duncan, 1972; Lawrence and Lorsh, 1967; Correia and Wilson, 1997 and 2001) or owner-managers (Fann and Smeltzer, 1989; Raymond, et al. 2001; McGee and Sawyerr, 2003)
- Some studies described the type of scanning activities (Daft, et al. 1988; Elenkov, 1997a).
- Studies were focusing on measuring the scanning behavior, mode and/or frequency of the firms (Aguilar, 1967; Sawyerr, 1993) and the correlations with sources (Auster and Choo, 1993).

- Scanning frequencies vary between firms and are influenced by the age and size of a company.
- Immediate task environment is more strategically important than the general environment for UK executives (Xu, et al. 2003).
- It is not clear whether there is a significant difference between industries or not. For instance, Xu, et al. (2003) stated that "the perception of far environment information differs widely from industry to industry" and in contrast, Aguilar (1967, p.vii) argued that "few differences were noted in the problem of scanning process".
- Other pieces of literature focused on country-related conditions which may influence both the environmental and the organizational factors (Kokkinis, 2005, p.209; Kerr, 2005, p.223).
- Pontes, (2005) suggested that business intelligence and other intelligence activities are positive correlated to results and success.
- Little attention was paid to organizational characteristics (Raymond, et al. 2001).

With regard to Competitive intelligence literature, there are some points which should be noticed and taken into consideration for this study. The key points are:

- CI studies focused on CI practitioners (Prescott and Bhardwaj, 1995; Tao and Prescott, 2000), executives (Xu, et al., 2003; Dishman and Calof, 2008; Lesca, et al., 2012), CEO (Calof, 1997), owners (Savioz 2003) or small enterprises (Barendregt, 2010).
- Several terminologies can be found in CI (Wright, et al. 2009) and in small enterprises the owner may be responsible for CI (Saayman, et al., 2008, p.409), therefore the identification of CI practitioners needs careful attention.
- Little attention was given to organizational and environmental trials.
- CI expenses were studied by several authors (Prescott and Bhardwaj, 1995; Tao and Prescott, 2000), although these studies were not connected to organization and environmental trials.

With regard to the organization and environmental characteristics, the previous review shows that the majority of writings were concentrated on measuring the frequency of the environmental scanning or information gathering process based on the perception of the environment itself. The following Table shows this evidence by looking at both the sample and the purpose or main result of the studies.

The following chapter will discuss which components may influence the decision to create a CI function and how these components influence the CI expenses.

Table 8 - Summary of Research of environmental Scanning and Competitive Intelligence.

Authors	***Source and sample***	***Purpose and/or Main result***	***Focus***
Aguilar (1967)	CEOs and managers from Chemical manufacturing firms.	Scanning frequency, scope and time.	E
Hambrick (1982)	165 Executives in College, Hospital or Insurance industry.	Studied the effect of the firm's strategy (prospector and defender) on the scanning frequency, process and hours invested of three sectors in the general environment.	E
Ghoshal (1985)	111 managers at 16 Korean firms.	Studied the relationship between the perceived importance of environmental characteristics and the difficulty in collecting environmental information. He also evaluated the rate of importance, time spent in scanning and usage of sources.	E
Daft, et al. (1988)	50 US company CEOs.	Positive correlation between the degree of environmental uncertainty and the frequency of usage of personal over impersonal sources and external over internal sources.	E
Fann and Smeltzer (1989)	48 SME owner-managers.	The Information gathering process is mostly informal and irregular.	-
Auster and Choo (1993)	207 CEOs of Canadian	Positive correlation between strategic uncertainty and the frequency of usage of	E

	publishing and telecommunication firms.	personal and impersonal sources.	
Sawyerr (1993)	44 CEOs of Nigerian SMEs.	Positive correlation between environmental uncertainty and the remote environment.	E
Yasai-Ardekani and Nystrom (1996)	179 US CEO and decision makers at manufacturing firms.	Task environment change, Organization size and low cost orientation are positively and significantly related to the scanning frequency. General environmental change, Inflexibility of technology is negatively related to the frequency.	E, O
Boyd and Fulk (1996)	72 senior executives	Scanning frequency is positive correlated with strategic variability but negative correlated with environmental complexity.	E
Correia and Wilson (1997)	47 decision makers.	Several organizational factors capable of affecting the scanning behavior were discussed.	O
Elenkov (1997b)	226 Russian CEOs.	More advanced scanning systems show positive correlations with extent of product-service and profitability.	O
Calof (1997)	209 Executives at Canadian export companies.	Firms which are active exporters made great use of information on international markets.	O
Ahituv, et al. (1998)	48 CEOs	Significant correlation between environmental uncertainty and scanning frequency in those firms which are more successful with new products.	E
Calof (1999)	1,025 Canadian firms (President, Vice-President and CEO).	The survey showed the level of CI activity in seven phases: Planning and focus, Collection, Analysis, Communication, Counter-intelligence, Process/structure, Awareness/Culture.	-
May, et al. (2000)	106 executives at Russian firms.	Strategic uncertainty, moderated by the perception of source accessibility, is a significant predictor of the executives' use of internal sources.	E
Ebrahimi (2000a)	55 top and mid-level Hong Kong	The level of task and remote environment scanning behavior depends on the degree of	E

	Chinese executives.	perceived strategic uncertainty level.	
Raymond, et al. (2001)	324 owner-managers of technological SMEs.	Of 20 contingencies only 10 showed a positive correlation with technological scanning behavior.	E, O
Correia and Wilson (2001)	19 Portuguese pharmaceutical companies.	"Information climate" and "openness of the organizations to the external environment" (two organizational characteristics) were influencing environmental scanning.	O
Hannula and Pirttimäki (2003)	Top 50 Finnish companies.	Several case studies	-
Garg, et al. (2003)	116 Manufacturing Firms	Relationship between the environment dynamism perceived by the CEO and president of the firms and performance.	E, O
Savioz (2003)	16 Firms	16 in-house CTI case companies were studied.	E, O
McGee and Sawyerr (2003)	153 owner–managers of small high-technology manufacturing firms.	High levels of perceived strategic uncertainty are associated with an increase in scanning activities.	E
Xu, et al. (2003)	155 UK executives.	"This study was initiated to test how UK executives perceive the importance of the environment sectors for strategic information scanning in different industries"	E
Garg, et al. (2003)	108 CEOs of US companies.	Two variables - environmental dynamic and scanning focus - impact scanning frequency.	E, O
Qiu (2008)	309 decision makers at manufacturing firms.	Entrepreneurial attitude orientation and market orientation significantly impact managerial scanning for competitive intelligence.	E
Liao, et al. (2008).	242 US SMEs (not defined who was the target of the study as the work states only manager)	Environmental turbulence is positive related to information search frequency. The study also identified that the age of the organization (younger and mature companies) impacted the scanning frequency and mode.	E, O

Lesca, et al. (2012)	8 French managers	The qualitative study suggested that the interpretation of the environment by managers results in a different type of scanning behavior.	E
Xue Zhanga, et al. (2012)	42 travel agent companies in Singapore.	Positive relationship between the scanning frequency and the perceived strategic uncertainty of task environment.	E

O = Organization E = Environment

Chapter 4: CI FRAMEWORKS AND PROCESS

4.1 Introduction

This chapter introduces seven elements which may influence the CI function from a holistic perspective. The intention is not to provide an in-depth description of the elements which interact with the intelligence process, but rather to have an overall understanding of how these elements could hinder or support the establishment and execution of the CI function and the processes that go with it. An understanding of how these elements are connected and interact within an organization is crucial to the understanding of why and how the intelligence process is established in the firm and which elements influence CI expenses.

In addition, the framework allows us, firstly, to justify why organizational and environmental characteristics are used in this study and, secondly, to build the model that will be used in this study to measure how organizational and environmental variables have a positive impact on CI expenses.

This chapter starts with an initial discussion on seven elements. Firstly, the business information characteristics, which are the external environment sources, are explained. Secondly, the role of the decision makers, who perceive and interpret the information in order to create an understanding of the environment and perceive the need for CI, is introduced. Consequently, how a CI function would benefit the company is discussed. The third part is devoted to the two key activities indicating how the need for intelligence and its value is perceived and/or understood by decision makers. This part helps us to get closer to the previous relationship: the competitive intelligence program as a basis for the provision of a competitive insight into the decision-making process and the effectiveness of a CI function. These relationships demonstrate the value of CI to managers and enhance the entire intelligence process. Figure 8 shows the seven elements.

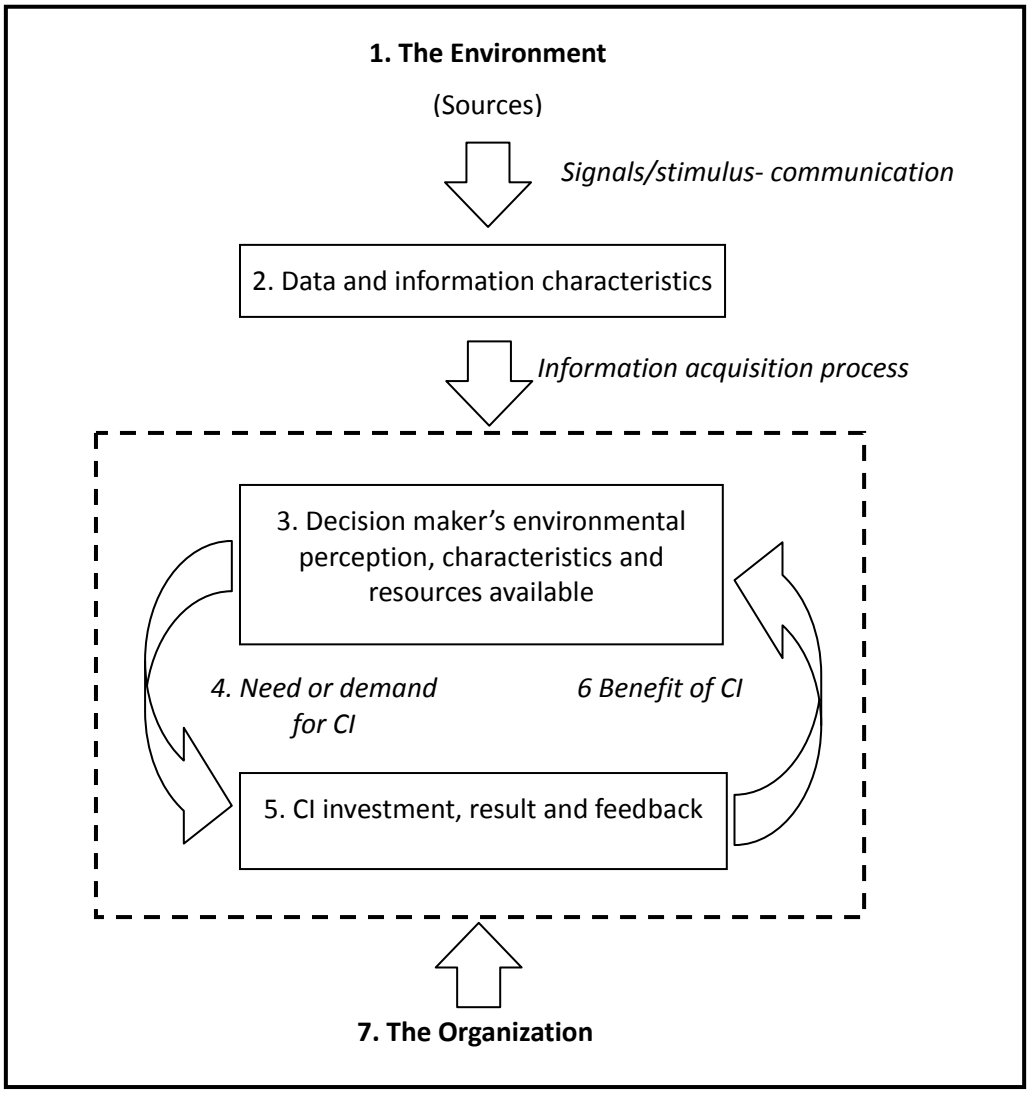

Figure 8 - Key elements interacting in the CI process and the CI function.

The framework proposed in Figure 8 aims to show how the seven elements are related together and make possible the detection of the CI needs. In addition, the framework highlights the fact that decision makers are the key to the championing or promoting of a CI function (Stanat, 1990, p.54; APQC, 2000; Madden, 2001, p.52; Comai, et al. 2006) and, therefore, to the establishment of the entire process. CI practioners also have a key role in the whole process by their identification of the added value of CI (Brooks, 2013) and correct communication of it to decision makers in a way which will allow them to perceive the value of CI. From this particular perspective, the framework

suggests a loop between CI practitioners and decision makers which feeds both the demand and the supply side of CI in an interactive way. In the study done by Williams and Prescott (APQC, 2003, p.11) it was demonstrated that the closer the interaction between decision makers and CI team, the higher the resultant level of trust, social capital and legitimacy for the CI function will be.

Finally, the last part will discuss how to identify decision maker needs and the potential limitations of the organization with regard to understanding CI needs. This study suggests that the identification and evaluation of the environmental conditions as well as the organization's characteristics may better reveal investment in CI. Thus, a clear understanding of how these variables interact with the CI function may help overcome potential blind spots in CI.

4.2 Existing models/frameworks

The previous model shows the possible interaction between the components involved in the understanding of a CI function's needs. As discussed previously CI can take many forms inside an organization (Prescott and Miller, 2001; Tena and Comai, 2006) or at a location (APQC, 2000; Prescott and Williams, 2003b). This part will introduce several models and frameworks that adopted an analogue perspective regarding everything that was proposed so far.

One framework which touches on the topic discussed in this chapter is the model proposed by Choo (2001, p.86), which observed that an organization's strategy, situational dimension and managerial traits have a certain impact on the information acquisition process (Figure 9). The author introduces a framework in which the information scanning activity is influenced by four elements: (1) the external factor, which is considered to be the situational dimension, (2) the organization factor, defined as the organization and scanning strategy, (3) the information factor, which can be

established as the information need and behavior, and finally, (4) the individual factor also defined as the managerial traits.

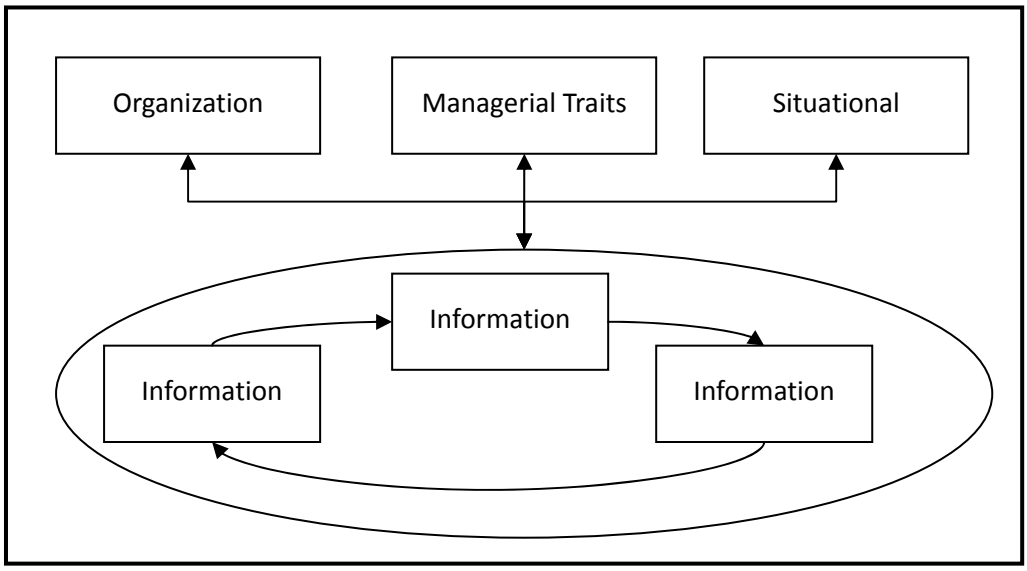

Figure 9 - Choo's framework.
Adapted from: Choo (2001b).

Pirttilä (1997, p.10) also incorporated several elements in her theoretical framework. In particular, she studied the competitive environment and the decision maker's cognitive biases around it. However, the literature revision made in chapter 3 demonstrates that the number of models incorporating different kinds of elements that interact with the CI function is limited. Thus, the following paragraphs will discuss the elements in Figure 6 and explain the reasons why an overall understanding of the interaction of key elements is important.

An interesting study was proposed by Ghoshal (1985, p.40), who discussed three key variable attributes that influence on the organizational scanning process. The three groups are: Individual, Organizational and Environmental Attributes (see Figure 11). That study discussed those variables which may indeed significantly characterize the

scanning process of an organization. On the other hand, the model described the type of scanning system, which was divided into the individual and the organization level.

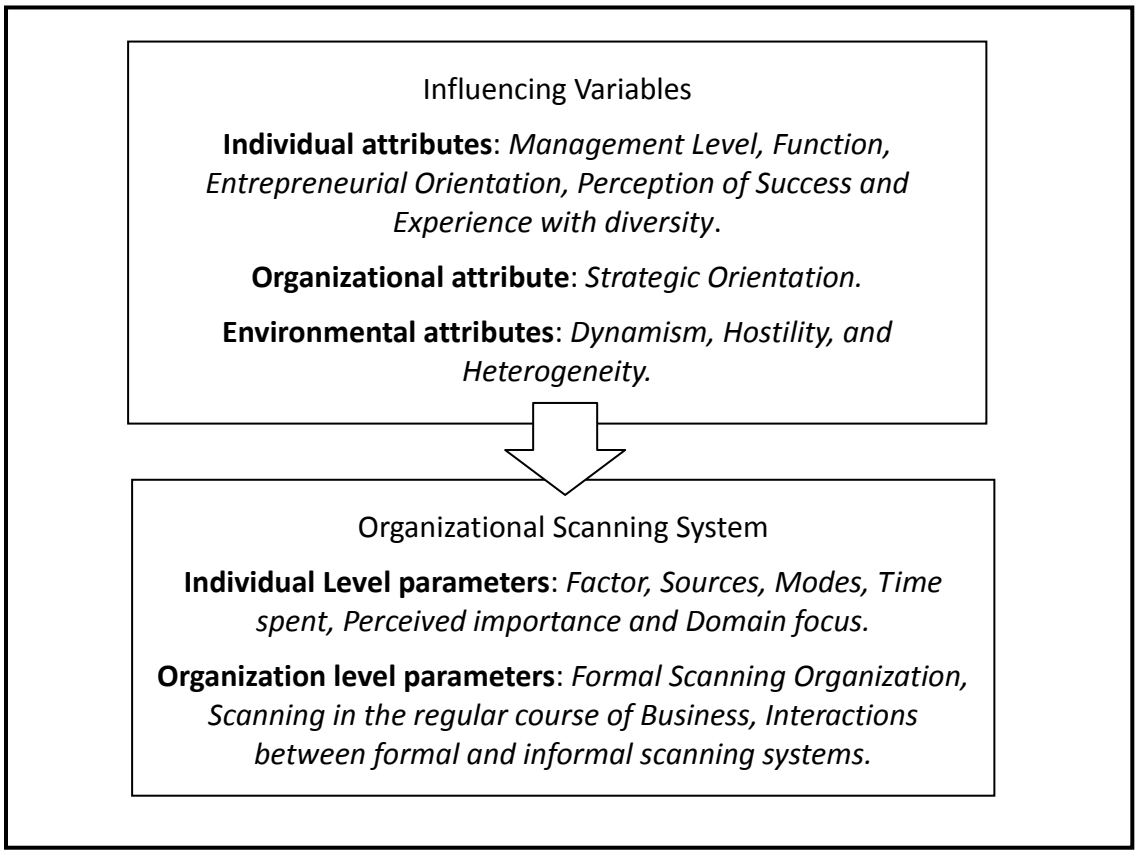

Figure 10 - Ghoshal's research framework.

Adapted from Ghoshal (1985, p.40)

There are two main elements that distinguish this framework from the one I am proposing. First of all the framework introduces individual attributes. However, as discussed previously, the framework I am proposing does not consider decision maker intervention. The fact that decision makers present subjective constraints which may encourage the development of the CI function or, in contrast, downgrade CI characteristics was already discussed. Due to this subjectivity, the intention was not to consider this element as a key attribute for the determination of the CI function.

Ghoshal's framework aims to study the components of the CI process rather than look at which attribute is contingent upon the level or resources invested in a CI function.

Ghoshal's framework studies, manly, decision maker activity in scanning behavior. Particularly, Ghoshal's perspective concentrates on those variables which are directly related to the process and which have a certain "attitude" to the scanning process. For instance, Hambrick (1982, p.169) concluded in his study on environmental scanning that "upper-level executives did not indicate a consistent, concentrated tendency to scan according to their organization's strategies. This may be due to a general tendency among executives to scan according to their own personal or functional interests".

An additional limitation of Goshal's study, as well as of the majority of the study on environmental scanning reported in literature, is that these works are based on the perception that CEOs or decision makers have of the scanning behavior or CI function. Anecdotal observations show that a CI function can be placed at corporate or business level or at both (Comai, et al. 2005). In addition, larger corporations can have several CI functions. Thus, the CI or scanning activity that executives would be able to evaluate are those which are closer to top management positions and therefore other CI functions are not considered. The studies showed that neither CI practitioners nor marketing specialists were involved in the study to evaluate the scanning mode, function etc. Despite the fact that several companies case demonstrated the importance of management attitude (Comai, et al. 2006), no CEOs or decision makers at all were involved in the process. Thus, a CEO perspective on the level of sophistication of the CI function may be limited if biases regarding the operations of the function are included.

Bowman and Asch (1987, p.8) also highlighted the existence of objective and subjective conditions**.** The approach taken in this study can be considered somewhat similar to the "Resource Based View" and the "Resource Independency Theory". The framework proposed by Ghoshal for instance, was more inclined towards the RBV even though

both approaches were adopted. In contrast, this study embraces the idea that both approaches show that CI is related (see Figure 12).

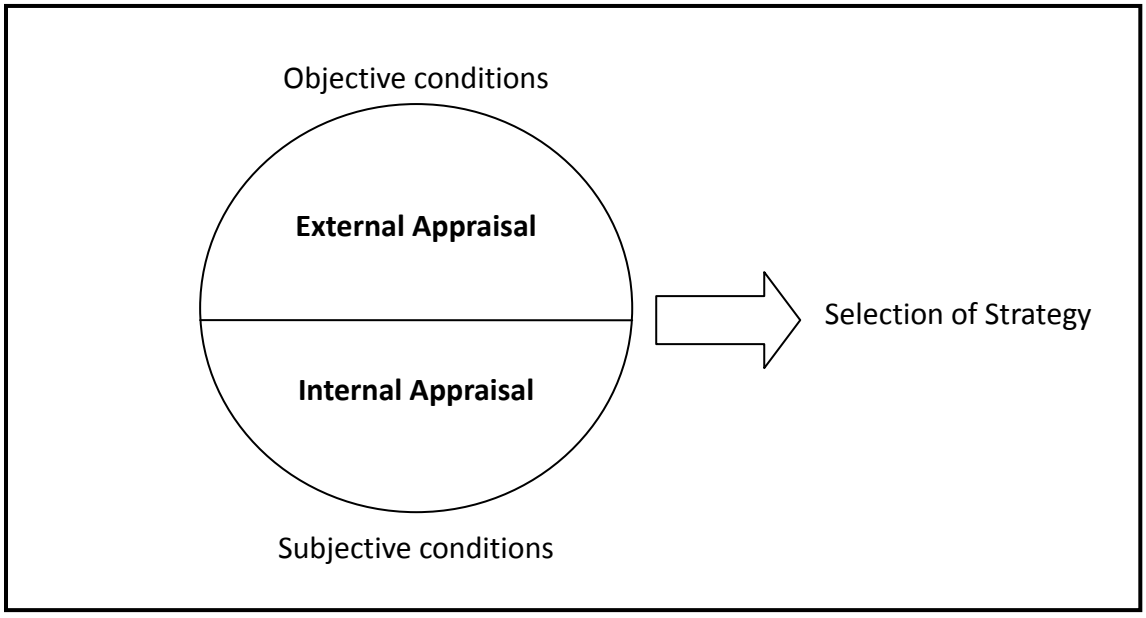

Figure 11 - Bowman and Asch framework.
Adapted from Bowman and Asch (1987, p.9)

Another significant contribution was provided by Raymond et al. (2001) who identified the relative importance of certain external and internal contingencies which determine "the nature and the level" of the technological scanning activity of 324 small technological Canadian firms. This study proved that external and internal factors positively affect the technological scanning process. The framework proposed by Raymond, et al. (2001) includes the three main areas of elements from the common model proposed. The study made by Raymond, et al. (2001) is, perhaps, one of the most comprehensive studies carried out on the contingencies and design of an intelligence collection process. However, the elements analyzed are devoted exclusively to the technological orientation of the firm. On the other hand, Prescott and Williams (2003b) identified four characteristics that contribute to the relationships between CI activities and the decision-making process. These factors are based on the characteristics of: CI users, CI function, CI professional people and the organization

itself. The study was not taken into consideration any influences from the external environment such as other additional factors which might be used to study all possible relationships between user and producer of intelligence.

Therefore, previous studies do not analyze an exhaustive list of organizational and environmental characteristics affecting the scanning or CI activities. Moreover, the question as to whether an increase in these characteristics or contingencies is related to an increase in CI expenses or needs was not answered until now.

4.3 Information characteristics

Any market, business or industry has a distinctive structure and therefore an explicit set of information sources for obtaining data. The environment which surrounds the company includes many types of data and information resources which are primary and secondary sources for CI. Elenkov (1997a, p.289) stated that "the environment is, essentially, seen as a pool of information/resources". Generally, the environment is studied according to the data and information which characterizes the specific sector or business. The business environment is interpreted through the information, data and signals a firm acquires and processes from it.

Information was divided into several categories (Ahituv and Neumann, 1990, Cornella, 2000; Wright and Ashill, 1998). For instance, Lesca, et al. (2012) evaluated 18 items related to the information for both ad-hock projects and the continuous mode of scanning. On the other hand, Comai (2013b) identified and ranked 10 critical issues while searching for information using internet. However a review of specialized literature (Fuld, 1995, p.31-32) suggests that information can have at least five characteristics, which are the following:

4.3.1 Availability of sources and information

It refers to the overall amount of information available in the environment. Industry structural characteristics affect the available information. For instance, if the number of players in a specific industry increases, it is expected that the information available will also increase. The intensification of commercial transactions seems also to be favorably correlated with information availability. Fuld (1995, p.27) asserts that "wherever money is exchanged, so is information". A positive relationship is expected between the quantity of information available and the use of it in the organization, providing the information does not overload the daily scanning activity.

4.3.2 Accessibility

Accessibility refers to the types of barrier information collectors find when acquiring data. This characteristic may depend on the type of sources or business players protecting the information. For instance, trade associations are quite reluctant to share information with those who are not members of their specific sector and, in contrast, other sources, such as government bodies or export organizations are quite open. A good example of an open source is internet. This source played a significant role, by offering not only more information but also free access to commercial information. Web pages on competitors, suppliers, clients or government increased information accessibility considerably. According to Endrulat (2003, p.19) internet is "the single greatest CI development in recent history" in that it enhances the CI collection activity. Furthermore, a firm's own strategic position can also make an interesting contribution to information accessibility. Fuld (1995, p.27) asserted that the degree of backward or forward integration is positively related to the accessibility of data.

4.3.3 Aggregation

The way information is organized may affect collective behavior. Information can be found centralized or broadly dispersed in the environment. Aguilar (1967, p.12) argued that an absence of aggregated information would make scanning the business environment harder. Again, internet played a major role in the fact that information can now be easily acquired and downloaded from centralized on-line data bases presented to people in a standard language. It is one of the most dominant tools for gathering secondary published information.

4.3.4 Variability

Variability refers to the rate of change (Eisenhardt, 1989; Lozada and Calantone, 1996), volatility (Bourgeois, 1985; Wright and Ashill, 1998) or instability of the information. This characteristic may be associated with how dynamic the business environment is. Variability makes getting the right information at the right time more difficult. A constant flow of information is not guaranteed and therefore the CI function may be altered.

4.3.5 Value

Value refers to the economic value associated to the information. If a business is not economically attractive there is less value associated to the data. For instance, in a declining market with little or no future growth prospects, the information available may not be considered to have a significant interest for the organization that follows this market or industry. Sawka, et al. (1995) observed that if the value of CI is not perceived by executives then CI will obtain less or no support. The perceived value of the information may become a barrier to the development of a CI function.

It seems that these information characteristics may have different capacities to influence an intelligence function. For instance, an increase in information available may result in a greater understanding of the environment. Andrew (1971, p.84) stated that "the objective assessment of opportunity is difficult because of the unreliability of statistical information in developing countries and hazards of predicting the political, social and technical developments in a given area". Another example is information accessibility which can be positively linked to CI behavior. Research in the Russian marketplace by May, et al. (2000) suggested that scanning may be highest within important sectors where information is accessible. Gathering pieces of information from several sources can be more complex if information is highly disaggregated. Moreover, Miree and Prescott (2000) noted that "the level of information available in the industry facilitates coordination especially through the human intelligence network". On the other hand, information characteristics may have a negative impact on the scanning process. For instance, the positive correlation of data quantity with information overload (Mayer, 1998) may limit the human information process capacity (Jacoby, 1975).

4.4 Decision maker characteristics

As discussed so far, the scanning process can be affected by the environment and the information characteristics. Scanning is developed in order to cope with the decision maker's needs and demands. This paragraph wishes to draw attention to fact that the practitioners are involved in the intelligence acquisition process. Child (1972) suggested that "the boundaries between an organization and its environment are similarly defined to a large extent by the kind of the relationship its decision makers choose" (quoted in Vibert, 2003, p.141). Andrew (1971) also pointed out how sources play a key role in the relationship between external environment and top management. Godiwalla, et al. (1980) found that "environmental factors have influence upon the

ways by which chief executives perceive the environment". Thus the environment conditions may have an important impact on firms.

Figure 8 showed the key role played by decision makers in the information acquisition process in terms of perception. The intention is not to discuss whether or not decision makers should be involved in the acquisition process, even though there is evidence that some managers work very closely with CI teams (Prescott and Williams, 2003a and 2003b), but rather to illustrate the major role they may play in perceiving the value of the information and consequently, the significant effect they have on the definition of the CI function. Kahner (1997, p.32) analyzed several reasons why firms do not use CI and he concluded that "the most important reason is attitude, the way managers see intelligence". The strategic management's perception of the external environmental conditions was studied by Elenkov (1997a) who defined the attitude of decision makers in a particular environmental condition.

Managers may not pay significant attention to the external environment because they prefer to devote their time and resources to the task activity (Worthington and Britton, 1994, p.368) or, alternatively, they have a limited capacity for processing the information (Haberstroh, 1965; Simon, 1957). Aguilar (1967) introduced top management interpretation as a limiting factor in the theoretically perfect and complete scanning process. A review of literature (Duncan, 1972; Milliken, 1987; Lenz and Engledow, 1988; Fahey, 2002) suggests that there are at least two main constraints limiting the information gathering process and the analysis of business environment data: perception and skills.

4.4.1 Perception

Perception refers to the ability to perceive the usefulness and or the applicability of business information. Pfeffer and Salancik (1978) noted that management perception affects the relationship an organization builds with its environment. Manager

perception plays a central role in that the way in which a situational dimension will be assessed in different ways by managers in different ways. Fahey (1999, p.35) identified manager attitude towards the environment as one of the main components of the manager reasoning process.

The major role played by decision makers in the promotion and championing of the intelligence function in an organization so far was already discussed (Stanat, 1990, p.54; APQC, 2000; Martins, 2001; Kindler, 2003; Comai, et al. 2006). Madden (2001, p.52) suggested, for instance, that "where champions are not available to drive CI, best practice organizations have developed policies, missions, statements or other means of substituting these individuals and integrating CI into the organization".

Scanning practice may be linked to the uncertainty perceived by decision makers in the external environment. So the question is: if a "subjective" element exists, how can we really measure an effect if that one effect can be perceived in many different ways? (See discussion by Choo, 2002, p.99). Uncertainty refers to the state of understanding and comprehension of the current or future environment (Milliken, 1987). Knight (1921) noted that when uncertainty is measured, then uncertainty is transformed into risk.

Uncertainty was also widely discussed in organization science (Duncan, 1972; Miles and Snow, 1978; Milliken, 1987; Elenkov, 1997a) and was also considered the main reason for adopting information in the strategic decision-making process (Frishammar, 2002). For instance, Milliken (1987) defined three types of perceived uncertainty in the external environment which an organization might experience: the state, which refers to the actual understanding of the current or future environment, the effect, which refers to the impact the environment may have on the company, and the response, which represents the options available for responding to possible changes. As discussed in the previous chapter, uncertainty is not the only environmental condition to have been studied up until now even though it was one of the most discussed.

4.4.2 Skills, resources or competences

The scanning process may also depend on the skills, resources or competences of its managers and employees. Raymond, et al. (2001) studied some of the owner-manager contingencies. He showed, for instance, that whilst the level of education was significant to technology scanning, the level of experience in the sector or professional management experience was not. In an intensely uncertain environment, where competitive pressures are significantly high and events change frequently, perhaps managers do not have the appropriate skills or resources for gathering the right information. Liao, et al. (2008) demonstrated that mature SMEs do not increase scanning activity when the turbulence of the technological environment grows. In contrast, younger SMEs will engage in more frequent CI activities. On the other hand, in a high level of environmental turbulence, managers may tend to withdraw information search action and do less environmental scanning. Moreover, the environment-scanning process can be inadequately managed (Lenz and Engledow, 1988). Aguilar (1967, p.12) also makes a reference to scanning instruments and agents, which can be a barrier to the scanning process and therefore to the gathering of information.

As discussed earlier, greater information gathering skills are required for information which is difficult to access, so that alternative sources can be planned and identified. Fuld (1995, p.288-292) discussed how important it is to use creative sources to obtain understanding from those information sources which are not directly accessible or available. The way in which information collectors use their skills with closed type can open up an information window. For instance Raymond, et al. (2001) established that involvement in a professional association or research center has a positive impact on the scanning activity.

Decision maker and or information specialist characteristics may have a significant impact on the way information is used and processed. There are two fundamental contributors to decision-making characteristics. On the one hand, decision makers may perceive different kinds of environments and may therefore require different types of

intelligence. For instance, Lozada and Calantone (1996) demonstrated that the decision maker's perception of environmental uncertainty is positively related to the information scanning process. On the other hand, Ghoshal (1985) discussed the influence on the effort by managers to collect environmental information based on the perceived nature of the external environment characteristics.

Manager characteristics also can affect the type of information requested. Hedin and Svensson (1995) indicated that the amount of intelligence requested and the number of alternatives sought in pursuit of the best decision will depend on a manager's style. The model identified several decision-making strategies based on five management styles: decisive, flexible, hierarchic, integrative and systemic. Moreover, Driver and Streufert (1969) observed that environmental load or pressure affect the complexity of information processing in individuals in an inverted-U-shaped function. On the other hand, managers also perceive different values for the CI activity, which is linked to CI culture and awareness. For instance the broad diffusion of CI functions in Swedish companies is due to the Swedish mentality regarding management style (Hedin, 2004). Ghoshal (1985) also discussed several individual attitudes such as management level, function, entrepreneurial orientation, perception of success and experience, as being contingencies upon the scanning process. Figure 10 illustrates how CI management requirements are influenced by the perception of three main conditions: the environmental characteristics, the value of information and the knowledge regarding intelligence. These first two factors are described in more detail in the following paragraphs.

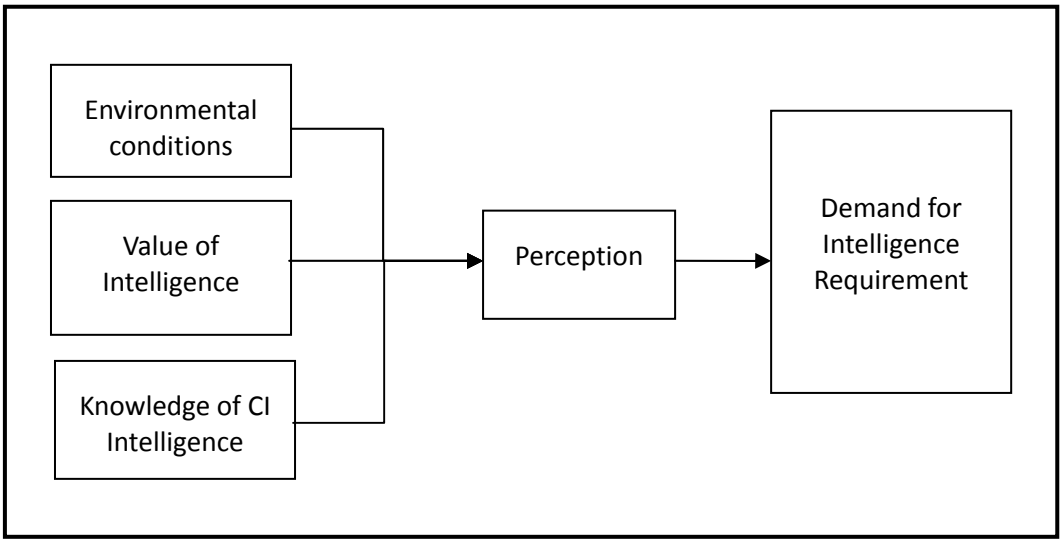

Figure 12 - Perception and demand for intelligence: three characteristics.

4.5 Perceived Value of Intelligence

It is generally accepted that scanning the business environment and obtaining data from the field is an essential part of the strategy development process. General wisdom says that information is power and therefore, according to Chan Kim and Mauborgne (2005, p.64) a company can gain a significant advantage in respect to another one based on its "disparities in information". Research in the marketing field shows the importance of environmental scanning or the factors that may contribute as well as limit the development of a continuous scanning activity (Stubbart, 1982). Specialized literature on competitive intelligence (Prescott and Bhardwaj, 1995; Herring, 1999; Powell and Bradford 2000; Fleisher, 2004; Sawka, Pirttimäki, et al. 2006; Durán Machicado, 2015) also dealt with the value, benefits and effectiveness of a CI program in different ways:

- The *competitor comparative approach* argues the relative competitive advantage of other companies and competitors (Aaker, 1989; Robertson, 1992). Porter (1980,

1985) introduced the concept of competitive advantage to those firms which have a better understanding of the environment and the competitive arena. In CI, Miller (2001, p. xiii) argued that "too many businesses still have not incorporated CI into their organization… which puts them at a disadvantage when other companies have implemented company- wide campaigns for the collection, analysis and dissemination of competitive intelligence". The competitor approach will become more effective with the application of a benchmark method for understanding whether CI gives the other competitor a greater advantage. Anecdotal evidence also suggests that some companies are reluctant to disclose their name and/or own achievements in public since they do not wish to alarm competitors with regard to the superior intelligence capability of one company with respect to another.

- *Economic value approach*: is a more specific, tangible and accounting method for measuring the effectiveness or the performance of competitive intelligence. This approach compares the costs of and income from CI activities and attempts to calculate the net profit of the program or of a specific research project. This approach can be applied to either the ad-hoc or the ongoing CI process. The sources of an economic value approach can be detected either by using business enhancement, such as winning a contract, or by cost avoidance, such as halting a technological development which will have little chance of reaching future markets. This approach focuses on measuring the tangible results of the CI function and may include several of the elements proposed by Fleisher (2004) such as: output or result information, input information, process information or productivity, for instance.

The two approaches are applied in order to understand the value of a CI program. They are not mutually exclusive and can be used before, during and after the establishment of a CI program. For instance, the latter approach is more suitable when the program was established but it can also be used to obtain a prior valuation in the planning phase. In contrast, a specialized review of competitive intelligence literature (Kahner,

1997, p.22-28; Pollard, 1999; Miller, 2000; Prescott, 2001; Gilad and Gilad, 1986, p.60) shows that significant attention was devoted to CI and the formalization of the activity which would benefit every firm and extensive lists of the benefits involved were consistently associated to CI. McGonagle and Vella (2003, p.239) support the idea that almost every firm should be involved with CI. For instance, a very large number of companies seem quite unprepared to anticipate the future (Fuld, 2003) because they do not have any system in place which is able to predict competitive threats. This perspective is an introductory, and may also be a speculative way of defining the value of a CI program in the firm. Indeed, this method lacks the tangible elements which would make it more realistic or scientific. Nonetheless, these approaches do not ensure an understanding of CI needs even though the effectiveness of CI demonstrates the value of it to the organization.

Competitive intelligence secures actionable information integrated in the analysis process (Prescott and Gibbons, 1993), which allows decision makers to take better decisions. Porter (1980, p74) argues that the intelligence process must be used in formulating strategy. Even if the establishment of an organized environmental scanning process can be less efficient than expected, the study made by Analoui and Karami (2002), which analyzed the perception of environmental scanning and strategy of 132 chief executive officers (CEO) from English SMEs, demonstrates the significant relationship between environmental scanning and the success of the firm's performance. Other studies also argued the relationship between information collection or capacity for environmental scanning and the effectiveness of strategic planning (Godiwalla, et al. 1980).

The paper includes a firm proposal for this scheme, where managers need to improve their knowledge due to increasing changes occurring in the environment. The authors assert that “under these circumstances many senior-level executives feel increasing pressure to make greater investments in the personnel and systems involved in conducting comprehensive environmental analysis” (Lenz and Engledow, 1986, p.329). Lenz and Engledow’s implicit assumption supports the idea that managers, under their

own cognitive structure (1986, p.329), mental constructs (North, 1990, p.8) and perception (Hambrick, 1982), may not be able to define their own needs and a better understanding of the possible positive contributions of the different theories is therefore needed. Moreover Pfeffer and Salancik (2003, p.75) stated that the "decision maker does not know what he needs but only what is available".

4.6 Decision maker Blind Spots and Cognitive Biases

Organizations often suffer from information cognitive limitation (myopia or competitive blindness) (Levitt, 1960; and Bazerman, 1991; Zahra and Chaples, 1993; Gilad, et al. 1993; Pirttilä, 1997; Fleisher and Bensoussan 2003; Holtzman, 2004; Sawka, 2006). APQC (2003, p.11) argued that "the identification of competitive intelligence needs in best-practice organizations is driven by a somewhat informal process initiated by events in the marketplace, unsolicited requests, changes in strategy or tactics, and internally-generated analysis." Thus, an organization may not be aware of CI or of the contribution the CI function can make.

Corporate illness can occur for several reasons. Andrew (1971, p.60) noted that "the corporate strategist is usually at least intuitively aware of the features of the current environment around him". Manager blind spots (Gilad, et al. 1993) or corporate myopia can take different forms. Gilad (1994, p.19) identified three main causes of business blind spot: "unchallenged assumptions", "corporate myths" and "corporate taboos", which refer to the notion that decision makers have mistaken ideas regarding the external environment and even regarding the company itself. Porter (1980, p.58-59) described two main assumptions competitors can have: about the firm itself and about the industry and the other firms in it. For instance, in a Swedish electrical company "there was very little that inspired the members of the organization to monitor the environment under a wider perspective. The coming deregulation of the energy market was not a "reality" for most of them, even though they all could read about it in the

newspapers" (Hamrefors, 1998b). Blindspots can significantly affect CI. Sawka (2006) noted that the reasons why a great number of American firms do not utilize a systematic CI process is because their management is "too comfortable with the status quo, refuse to recognize competitive changes, stuck in the same old way of doing things, suspicious of change predictions and lazy and complacent".

The "blindspot theory", defined by Gilad (1994), can be applied to the initial framework (Figure 9). Managers could undoubtedly ask themselves a few questions, such as:

- Is that information available and accessible?
- What kind of information should be used to achieve a higher level of competitor understanding?
- How can we exploit the information through an intelligence function?
- Should the firm expand its intelligence capabilities?

Another observation refers to the way in which managers devalue the benefits provided by the intelligence information. The blind spot theory reveals that managers are not always able to perceive the real value of information or understand how strategic intelligence can significantly improve their decisions. Prescott (2001, p.1) noted that "well-organized CI processes lead to sustainable and profitable growth". However, whilst CI benefits may be hard to define at operational level, they will be even harder to define at corporate level. For instance, McGonagle and Vella (2002, p.3) believed that "CI usually has only an indirect impact on the bottom line of any business".

Fleisher and Bensoussan, (2003, p.114) noted that one of the reasons why the decision process is not carried out properly is because "individuals do analysis on the basis of the data they are happy to have, and not the data they should have". It is often said that 80-90% of the decisions taken in one's personal life are based on emotion, which subsequently attempts to rationalize these decisions. Moreover, for Urbany, et al.

(2001) blindness will only take place when a firm has to respond to a competitor's action but it will not occur where no response is required. This cognitive dissonance can significantly affect the perception of the needs of a CI system which helps take better decisions. Theoretically, intelligence needs can be under- or overestimated by the demands of the decision maker. Even if managers agree on the value of good information, which allows them to take better decisions and so accomplish strategic or tactical objectives, they may not have the sufficient resources to study their needs or they may simply suffer blind spots. Moreover, and on the other hand, organizational behavior discussed this point as far as identifying possible reasons for management failure. For instance, Watkins and Bazerman (2003) discussed the human "psychological vulnerabilities" as a cause of poor management decisions.

4.7 Conclusion of CI framework and process

As discussed previously decision makers are the key elements in understanding the need for and the value of a CI function. Correia and Wilson, (2001) stated that "information consciousness means the attitude towards information-related activities or the value attributed to information". The attitude towards and the perception by key managers of CI and how it affects the system and the way that intelligence evolves in the organization was also discussed. Executives can convert these attitudes into real barriers for the CI function (Sawka, 2006). Figure 8 shows this relationship and the circular problem that if there is no CI function there will be no way of stating its value. On the other hand, if CI is not measured, then it is not manageable (Fleisher, 2004).

An additional issue is that decision makers may suffer blind spots or myopia. Aguilar (1967, p.23) stated that "the firm is never able to define all its strategic concerns or their associated needs for information". This statement may give rise to a key question

based on that paradox, which is: why should an organization invest in the CI function? One purpose of this study is to try and find the answer to this key question by circumventing this intricacy. In other words, this study is interested in examining an alternative approach capable of understanding the needs of CI without involving decision makers. The following Table 9 summarizes the topics discussed in this chapter.

Table 9 - Summary of studies on Competitive Intelligence and information management.

Focus	***Main literature***
External environment	Duncan (1972); Ghoshal (1985); Lenz and Engledow (1986); Jauch and Kraft (1986); Miller (1992 and 1993); Weerawardena, et al. (2006).
Information characteristics	Aguilar (1967); Andrew (1971); Bourgeois (1985), Daff (1988); Lozada and Calantone (1996); Ahituv and Neumann (1990); Wright and Ashill (1998); Cornella (2000); Endrulat (2003).
Information acquisition	Fuld (1988 and 1995); Elenkov (1997a and1997 b).
Decision maker attitudes towards CI and/or perceptions of the environment and cognitive biases	Levitt (1960); Hambrick (1979 and 1981); Ghoshal (1985 and 1988); Zajac and Bazerman (1991); Zahra and Chaples (1993); Gilad (1993); Elenkov (1997a); Pirttilä (1997); Kahner (1997); Fleisher and Bensoussan (2003); Sawka (2006).
CI needs or demand	Aguilar (1967); Herring (1999); Correia and Wilson (2001); Prescott and Williams (2003a and 2003b).
CI Investment and processes	Aguilar (1967); Sammon, et al. (1980); Gilad and Gilad (1986); Fuld (1988 and 1995); Prescott and Miller (2001); Philips (2003).
CI effectiveness, results and benefits	Prescott and Bhardwaj (1995); Herring (1999).

The following chapter describes which organizational and environmental characteristics influence the CI function and have a positive impact on CI expenses.

Chapter 5: ORGANIZATIONAL AND ENVIRONMENTAL CHARACTERISTICS

5.1 Introduction

This chapter, reviews several organizational and environmental characteristics and discusses the potential relationship with CI. It also discusses the reasons behind the adoption of the characteristics as independent variables in the study.

Traditionally, the organization and the environment are those that were used when analyzing the strategic position of a firm in terms of its own resources and capabilities in comparison with the sector (Aguilar, 1967; Ansoff, 1965; Mintzberg, 1979; Porter, 1980; Aaker, 1995, p.19). An examination of the firm and the environmental

characteristics may help in understanding how CI is shaped within the organization (Kokkinis, 2005, p.208).

Several studies adopted this perspective in order to discuss the relationship between the scanning process or CI and the environment. For instance, Bensoussan (1996) noted that the carrying out of CI in Asia is hampered by the type of markets, regulations, governments. Gibbons (1992) suggested that "environmental changes, including shifting market structure, technical opportunities and increasing rapid political shifting, are compelling executives and organizations to collect, analyze, decide and act on environmental information". MacDonald and Blenkhorn (2005, p.46) proposed an extensive list of factors that may influence global intelligence operation. Tao and Prescott (2000) identified several strategic environmental dimensions in China, such as economic, customer technology, which have an impact on the organization and create uncertainty among practitioners. Dishman and Calof (2008) identified several factors influencing the competitive intelligence cycle in Canadian technological firms.

Chapter 3 showed that environmental characteristics are seen as targets for constant monitoring when they change with more frequently or when there is a higher level of perceived uncertainty.

However, the various studies mentioned focus on only a few of the issues relating to CI resources and thus the environmental characteristics were not dealt with exhaustively. Additionally, a very limited number of studies paid attention to which organizational characteristics are related to scanning behavior or to CI (Raymond, et al. 2001).

5.2 Organizational Characteristics

The following are the descriptions of several organizational characteristics which may interfere with the CI function. As discussed in chapter three and four, a review of literature shows that very few studies discussed the relationship between

organizational characteristics and CI expenses. Thus a review of the nine organizational characteristics must be carried out in order to understand the current level of research and identify potential gaps.

5.2.1 Marketing innovation

When a company launches several products in the market it is assumed that information is needed. Probably, no one will launch a product without knowing the environment or having done a market or marketing research. Market oriented companies showed to prioritize scanning for competitive intelligence (Cervera, et al. 2001; McDonald and Madhavaram, 2007) and to engage significantly in proactive market intelligence activities (Qiu, 2008). These observations allow me to introduce the idea that companies which are more likely to launch new products or add new features to the existing ones, are more active in CI. According to Kotler (1997), marketing intelligence is a system that provides daily and updated information on the marketing environment of a firm. Understanding the market trends, changes and shifts in terms of customer needs and preferences were studied. Understanding customers as well as competitors is a task of market intelligence (Walle, 2001 p.93). McGonagle and Vella (1996) suggested that the concept of market intelligence is very close to the sales and marketing department.

Several authors found that marketing intelligence has a positive effect on innovation speed and new product performance (Carbonell and Rodríguez, 2010; Langerak, et al. 2004). In addition, Lynn, et al. (2003) showed that a faster environmental learning process also accelerates new product launches. Several studies demonstrated the link between marketing intelligence (MI) and new product development. Qiu (2008) investigated 309 decision makers of manufacturing firms and proved that entrepreneurial attitude orientation and market orientation significantly impact managerial scanning for competitive intelligence. Although the relationship between intelligence, new product development speed and success seems consistent, the

question of whether a marketing-innovatory company is likely to adopt CI or MI has not yet been answered.

5.2.2 Technology innovation

Technology intensity in the product or manufacturing process may be associated with a need for intelligence. APQC (2001) showed that firms with products incorporating a high level of technology adopted competitive technical intelligence programs. In the study developed by Hannula and Pirttimäki (2003), all information and communication technology (ICT) firms among the 50 largest Finnish companies were found to report having a systematic CI program. A survey of Canadian R&D companies made by Calof (1999) also found that the use of Competitive Technical Intelligence was developed systematically in 59% of the companies surveyed. Similar studies defined some technological contingency to the scanning process. For instance, Raymond, et al. (2001) identified that the R&D characteristic is the one which had "the most impact on technological scanning". The authors showed that some technological attributes of Canadian SMEs (number of generic production technologies, number of domains in R&D, number of people assigned to R&D) significantly effect technology scanning. Thus, these studies support the idea that companies with technological products and services pay more attention to intelligence and tend to have more sophisticated intelligence systems. However, no one in the above studies was measuring the link between organization variable and CI expenses.

5.2.3 Vertical Integration

Integrated companies tend to build a more manageable business environment and therefore have a better control not only with regard to the process but also with regard to information. Pfeffer and Salancik (2003, p.126) discussed how an organization can enhance the management and control of its environments as a result of the vertical

process. According to Fuld (1995, p.32) highly integrated firms will control contacts and sources of information on supply and distribution. Thus, vertically integrated firms can manage and guarantee their own resources. The results of these studies may suggest that more exploration and measuring of the link with CI expenses, is needed.

5.2.4 Product Portfolio

As specified by Kotler (1997) or Boyd, et al. (1995) a strategic business unit (SBU) has a defined set of competitors, can be planned independently from the company and has specific factors affecting profit. The more SBUs a company has, the more it will need a coordinated information system capable of coordinating its businesses portfolio. The type of business a firm may operate is also related to the type of CI function. For instance, the degree to which a CI program is centralized will depend on the resources which can be shared across the business (Prescott, 2001, p.6). Diversified companies may need to invest more resources on analyzing the external environment as, according to Diffenbach (1983) diversified firm operating in multiple environments makes business analysis more difficult. Although the link within product portfolio and CI is discussed, there is no reference to the level of CI or, in particular, to expenses. Therefore a further understanding of this variable in conjunction with CI expenses is needed.

5.2.5 International presence

Firms which are active in new markets need to understand those markets and a CI program may offer insights. Several studies were developed to assess the levels of competence regarding the information or competitive intelligence management process in exporting companies (Viviers and Calof, 2002; Tena and Comai, 2004a). Exporting companies conduct competitive intelligence in a more systematic manner (Viviers and Muller, 2004). Calof (1997) showed that Canadian firms which are active

exporters made great use of information on international markets. Finnish export companies, with their small domestic market, invested extensively in CI programs in order to gain an understanding of new profitable markets (Hirvensalo, 2004). Pelsmacker, et al. (2005) showed that in South African and Belgian export companies CI is developed in the firm although it is not placed in a separate department. Thus, based on these studies it is possible to argue that those firms that have a higher level of export presence in the foreign country may invest more resources in relation to those in which the level of exports is lower. However, the exact relationship between the level of international presence and CI has not been explored with empirical evidence.

5.2.6 Growth and Decline

Fast growing companies must also have a better understanding of environmental opportunities and threats. For instance, the company Perlos experienced an analogous situation when it established a formal CI process with a clear mission in just a few years and dedicated major resources to it (Comai, et al. 2006). Similarly, the case of the Finnish company Metso Automation shows that when a company wishes to grow using M&A, decision makers need to have the right information from the intelligence function (Comai, et al. 2006). Tena and Comai (2001) also argued several types of product life cycle stages but it is still not clear which one has a positive impact on CI expenses. Although these anecdotic observations show a potential link to CI, they do not specify the level of CI investment and they have not been tested either.

5.2.7 Size

The relationship between the firm size and CI is widely described. However some different views should be considered before stating whether CI resources are related to the size of a firm.

It was observed that large organizations tend to be more proactive in their environmental analysis and they adopt a more sophisticated system (Diffenbach, 1983), influence the scanning activity (Correia and Wilson, 1997), engage actively in CI (Teo and Choo, 2001) - or have specific people doing environmental surveillance and analysis - (Ansoff and McDonnell, 1990, p.104) and are more likely to use it in the decision-making process (Cetisme, 2003). Saayman, et al. (2008) found that a firm's size influences the success of the CI process. According to Scott (2001, p.165) large firms are richer in resources and are more susceptible to institutional environmental changes. It was argued that large firms are more visible to the government bodies (Edelman, 1992) needing a responsive activity as regards the institutional environment. Additionally, specilized CI literature indicates that large companies usually have systematic CI in place (The Future Group, 1997; Pirttilä, 1997; APQC, 1999a; Prescott and Miller, 2001; Hannula and Pirttimäki, 2003; Tena and Comai, 2004a and 2004b). For instance, Hannula and Pirttimäki (2003, p.594) find that 80% of the 50 top Finnish companies adopted systematic business intelligence process. Other studies considered organization size as a key determinant of effective and ineffective scanning frequency (Yasai-Ardekani and Nystrom, 1996). This empirical study, which produced results from 107 North American firms, supports the relationship between size and scanning frequency. If it is accepted that bigger firms are more likely to invest in CI, then smaller firms are less likely to invest in CI. Barendregt (2010; p.285) discussed the relationship between resources and CI in seven Dutch SMEs. His findings showed that the limited resources available in all the SMEs analyzed put constraints on the activity of gathering competitor information. Several marketing intelligence, environmental scanning and CI studies show that the process adopted by SMEs is informal (Smeltzer, et al. 1988; Fann and Smeltzer, 1989; Fuller, 1994; Wright, et al. 2002; Hall and Bensoussan, 1997). Thus, the resources applied to this process may be more sporadic than those that are applied to a systematic and organized CI function.

In contrast, several authors argue that the size of an organization may not restrict the adoption of a formal CI process and a systematic CI function does not depend on the

size of the firm (Savioz, 2004, p.246). Aguilar (1967) claimed that organization size was not closely connected to the extent executives scan their environment. In addition, several studies observed that small and medium-sized enterprises (SMEs) are now incorporating CI in their daily business process (Pollard and Hayne, 1998) and the formalization of the CI process is becoming progressively institutionalized in firms which have a clear specific advantage, such as, a specific technology, for example (Raymond, et al. 2001). Smeltzer, et al. (1988) concluded that "most owner/managers of small retail and service firms conduct environmental scanning fairly regularly".

Dissimilarities between small and large companies were studied by Although, these studies show that large firms are using CI in a systematic manner it is definitely not clear whether company size has a positive effect on CI expenses. For instance, Comai, et al. (2005) showed that more than 50% of 228 companies and organizations surveyed employed a CI team of fewer than 3 people. In addition, studies that found some positive relationship were using frequency of scanning (Franco, et al. 2011) which does not reflect the level of monetary resources devoted to CI. Thus this variable needs further review to see whether the size of a company and specifically, the SBU, has a positive effect on CI expenses.

5.3 Environmental Characteristics

It is commonly accepted that firms have little capacity for controlling the more remote environments such as economy and society. In contrast, the task environment is the one where firms have some degree of control over the players, in the form of the management of competitors and customer relations. Fahey and King (1977) stated "characterized environmental scanning is the process of seeking and collecting information about events and relationships in a company's environment". In addition, Aguilar (1967, p.37) stated that "for managers in any given industry, condition and

trends in that industry determine in large measure what of external information will be relative most important".

In the discussion so far, it was observed that specialized and strategic management literature gave a substantial amount of attention to the environment and the scanning process (Ansoff, 1965; Aguilar, 1967; Fahey and King, 1977; Porter, 1980; Sammon, et al. 1984; Ghoshal, 1985; Daft, et al.1988; Hambrick and Abrahamson, 1995; Lang, et al. 1997; Elenkov, 1997a; Miree, 1999; Savioz, 2005). Understanding the environment and its different forces is close to strategic management and the industrial economics. For instance, Refik (2002, p.106) described several industry dynamics while describing the global business alliances in the automotive and pharmaceutical industries. First Hambrick and Finkelstein (1987) and then Hambrick and Abrahamson (1995) discussed seven industries that are related to a varying degree of managerial discretion. The degree of managerial discretion may be associated with the need for information and therefore for the CI activity.

As discussed in chapter 2, organization theory also devoted attention to the influence of the external environment (Lawrence and Lorsch, 1967; Daft, 1989; Miller 1992 and 1993). For instance, Daft (1989, p.55) states that "environmental uncertainty represents a major hazard to organization structure and internal behavior". Environmental uncertainty may not be an absolute condition but may relate more to the management's perception of the environment and the difficulty in interpreting it. For instance, for Lawrence and Lorsch (1967) uncertainty consists of: (1) lack of clarity of information (2) uncertainty of casual relationships and (3) the long time span required for definitive feedback. Moreover, Duncan (1997) suggested that the inability to assign probabilities on, for instance, the condition of a future environment, is also a component of uncertainty which should be included in Lawrence and Lorsch's definition. On the other hand, the resource dependency theory also paid significant attention to external traits. Pfeffer and Salancik, (2003, p.66-69) argued that environmental uncertainty is produced by conflicts and interdependency between players and may be reduced by the concentration of organizations.

McGonagle and Vella (2002, p.61-88), suggested 19 contingency factors divided into 5 different competitive environment categories. As discussed previously Raymond, et al. (2001) provided several external and internal contingencies for the collection process. Other studies addressed the issue of why intelligence is needed. The study, based on 212 New Zealand companies and developed by Hawkins (2005, p.16), showed four main external environmental changes which address the reasons information is needed, with the aim of maintaining or improving competitiveness: new technology, new products and services, what competitors are likely to do and what potential competitors might do. On the other hand, Hambrick and Finkelstein (1987) studied managerial discretion as being determined by the characteristics of an organization's environment, the company and top management. The authors identified several characteristics that have a certain repercussion on executives in the way they can make decisions and take action according to these characteristics. The factors that have a dominant capacity to influence managerial discretion (Hambrick and Abrahamson, 1995) are in some ways very close to the ones discussed in the following pages. One of the most interesting pieces of work that dedicated to this issue so far was put forward by the consulting firm “The Futures Group” in 1997 (Futures Group, 1997). The study identified several key intelligence concerns relating to “the need for better intelligence on competitive activities”. The results of the study are summarized in Table 10.

Table 10 - Areas where better intelligence is required.

Source: The Futures Group (1997)

Area	***1997*** ***With/Without BI System***	***1995*** ***With/Without BI System***
Competitive Activities	53% / 63%	70% / 83%
Changing Market or Industry Structure	35% / 60%	63% / 71%
Customer or Supplier Activities	38% / 50%	50% / 62 %
Emerging Technology Initiatives	33% / 45%	60% / 67%
Global Economic Conditions	18% / 25%	30% / 36%
Regulatory Climate	17% / 28%	38% / 33%
Political Climate	13% / 23%	28% / 32%

A review of CI specialized literature (Miree, 1999; Miree and Prescott, 2000; APQC, 2000, p.60-61; McGonagle and Vella, 2002, p.61-88; Hawkins, 2005) also revealed that there are some industry characteristics which affect the establishment and the coordination of the CI activities. For instance, the study of Indian firms identified customers and competitors as the two main drivers of the eight macro and micro environmental factors in emerging industries (Adidam, et al. 2012). Some industry characteristics can represent a fundamental barrier or facilitator for CI (Miree and Prescott, 2000, p.11) and therefore they can have a positive or negative effect on the CI. However, the authors observed that the degree of influence of these factors may not be identical in each industry and therefore we may find companies that are more active in coordinating CI activity in comparison with others in different industries. For instance, Savioz (2005) discussed how CI fits into science or market-driven industries. The author observed that sources can be “strongly influenced by industry characteristics”.

Although there are significant studies on environmental characteristics, little attention was devoted to ascertaining which variables have a positive effect on CI expenses. Thus a better understanding of how these variables are affecting CI is needed.

5.3.1 Marketing Innovation

Marketing innovation is most frequently defined in broad terms. However, in this study, marketing innovation refers to the level of product launched in the market each year. Understanding the task environment, such as customer or competitors, for instance, can be very helpful in accelerating the development of new products (Lynn, et al. 2003). Product innovation may also include adding new product or service features or performances (Carbonell and Rodríguez, 2010) or understanding new market opportunities (Slater and Narver, 1995), in order to speed-up sales or simply to compete successfully. Therefore, the level of marketing innovation in CI is not covered exhaustively and thus needs further study.

5.3.2 Industry Technology Innovation

Technology intelligence as a response to technology innovation intensity was analyzed by several authors (Miller, 1993; Ashton and Klavans, 1997; Coburn, 1999; Raymond, et al. 2001, Hawkins, 2005, p.16; Viitanen and Pirttimäki, 2006). Technically intense environments seem to be positively related to the need for a CI function (Kahaner, 1996, p.31) or scanning activity in order to detect and anticipate signals from the environment (Bright, 1970). When the technology innovation of an industry is characterized by a high rate of evolution, a technology-related intelligence is needed (Viitanen and Pirttimäk, 2006). According to Savioz (2003, p.19) a “contingency company will be able to survive in a fast changing technology environment. In order to survive is crucial to learn how to monitor technological developments”

Firms must be able to develop technology in order to leapfrog competitive products and so respond to customer needs (Pascheles, 2007). Certain “disruptive” technologies are considerably effective when it comes to outwitting the firm’s products (Christensen, et al. 2004). However, some technologies can be suitable for other markets or industries. Cantrell (1998) stressed this point whereby the technology of a firm can also represent a possible threat to or opportunity for those companies which have the same technology or where the technology can satisfy the same customer need in a specific market. Blenkhorn and Fleisher (2005, p.8) also discussed the importance of assessing technological trends for global CI practice. Although, Raymond, et al. (2001) studied the relationship between technology innovation and scanning frequency empirically, it is not clear whether the relationship with this variable is in the monetary term expressed by CI expenses.

5.3.3 Regulatory Constraints

Regulations may have a certain effect on a company’s behavior and strategy and therefore on its results. A deregulation process allows new competitors to enter the market and it may affect prices and technology intensity between new and existing competitors (Chan Kim and Mauborgne, 2005, p.52-53). Oster (1999, p.44-47) argues the key importance of governments in affecting industry profitability and mainly refers to a domestic or international competition (García-Lombardía, et al. 2006). Allaire and Firsirotu (1989) state that activities such as lobbying for and against legislation and corporate social responsibilities and/or negotiation, are actions used by firms against governments with stakeholders, in order to cope with external global uncertainties. The liberalization processes taking place in free economies also have a significant impact on globalization. The degree of regulation in one industry may have certain positive and negative effects on CI activities (Miree, 1999). Cho (2006) in her study into the airline industry found that the scope of executives carrying out environmental scanning became broader in the post-deregulation environment than in pre-

deregulation. The more regulated the industry or the markets, the less formalized the CI may needed. For example, energy, airline industry or telecommunications underwent a transition from protected to free market. Non-regulated markets greatly reduce the barrier to accessing information and, simultaneously, the value of the information also increases. Anecdotal evidence supports this idea. The case of Telecordia Technology (APQC, 1999a, p.24) or Telefonica España (Tena and Comai, 2001), for instance, and the telecoms industry in particular (Marceau and Sawka, 1999), show the effects of regulation and CI activity. When state-owned companies are privatized they need to face new environmental challenges (Baaziz and Quoniam, 2014) and thus they have to acquire new competences in order to better understand market and industry shifts. McGonagle and Vella (2002, p.63) stated that those companies which face low levels of regulation will have a CI impact. Hawkins (2005, p.16) demonstrated that there is an interest in watching the external market in search of regulation changes. Gibbons (1992, p.V) observed that after the European Community's single market initiative, banks were to invest more resources in CI. The author observed that "in all the banks sampled, the formal CI system did address the 1992 event in some fashion".

Product market regulation was studied by the OECD. The organization reports that “Product market regulation (PMR) indicators measure the degree to which policies promote or inhibit competition in areas of the product market where competition is viable.” OECD also considers that although markets are regulated for many reasons, it is “essential to encourage healthy competition, which can lower prices, widen consumer choice and encourage innovative start-ups”[8]. Although these exploratory studies and anecdotal observations attempt to support the relationship between Regulatory constraints and CI expenses, an empirical study is needed to add evidence.

[8] See: http://www.oecd.org/eco/growth/indicatorsofproductmarketregulationhomepage.htm

5.3.4 Industry alliance

The alliance intensity of an industry may correspond to the nature and intensity of the relationships between firms in the external environments. Winett (1995) discussed how important it is to follow rivals' alliances and agreements to outsmart the competition. Fahey (1999, p.207) discussed two types of networks: the alliance, which is an economic-based relationship, and informal networks. Others discussed more types of relationships between actors. For instance De Wit and Meyer (2004, p.360-368), who proposed 4 types of relations: relational actors, relational objectives, relational factors and relational arrangements. The alliance intensity wants to focus on the boundaries between players and their particular roles. Andrew (1971, p.70) indicated that "the complexity of a company's environment begins to appear more manageable as its relationship to other organizations and individuals is sorted out".

Environmental characteristics indicate that the existence between players of a type of network will significantly affect intelligence expenses. Hamel, et al. (1989) stated that strategic alliances and collaboration agreements have to be carefully monitored to reach an understanding of which information should be disclosed or not. Raymond, et al. (2001) also defined that information networks have a positive relationship with the technology scanning of Canadian SMEs even though this determinant is not one of the main external factors.

The number of business networks, whatever type they may be, seems to have a positive relationship with information availability. Pfeffer and Salancik, (2003, p.62-63) discussed how the creation of strong relationships (interdependencies) between different organizations results in superior control of external resources which may include information and knowledge about the environment. Alliance and business networks provide the firm with a rich information environment (Koka and Prescott, 2002). Based on these anecdotal observations, empirical evidence is needed to support the connection of the level of industry alliance with the level of monetary resources devoted to CI.

5.3.5 Globalization

Globalization may arise as a result of government action on trade barriers and other factors. As a result, globalization will create new market availability and simultaneously, new opportunities and threats in the industry. Indeed, globalization seems to be one of the reasons for establishing a CI function (Kahaner, 1996, p.29-30; Coburn, 1999, p.3-4) or a global scanning activity (Blenkhorn and Fleisher, 2005, p.13). This determinant has a propensity to increase the amount of information required in order to adopt a systematic intelligence process. Globalization may also give rise to the need for better information on foreign governments and international, customers, products and competitors in order to understand market opportunities and threats which may involve a certain degree of uncertainty. Blenkhorn and Fleisher (2005, p.13) stated that "uncertainty gives greater importance to CI, ensuring that increased environmental scanning leads to the production of accurate intelligence, resulting in the making of better global decisions". This particular characteristic is also under-studied and further evidence is needed to show how it is connected to CI.

5.3.6 Industry Rivalry

Industry rivalry or competition intensity was long considered a main topic for strategic management (Porter, 1980; Oster, 1999; Fahey, 1999) and competitive intelligence (Sammon, et al. 1984, p.172-175; Fuld, 1988; Tao and Prescott, 2000; Jenster and Hussey, 2001; Gordon, 2002). Competitive rivalry among existing firms may manifest itself in different forms. Porter identified several conditions which may increase the degree of industry rivalry. Du Toit, (1998) indicated that competitor intensity refers to the number and type of companies competing. Sammon, et al. (1984, p.172) described the rivalry when two companies fight for a brand position in the market place or over a cost cutting plan which will result in price competition (Sammon, et al. 1984, p.174). This category may include the number of direct substitutes or the degree of

concentration of competitors in the market as suggested by McGonagle and Vella (2002, p.66).

However, Hawkins (2005, p.16) observed in his study that a key topic for the New Zealand companies is to understand and follow "what existing competitors are likely to do". Firms which are in concentrated markets, where players are well identifiable and have a substantial market share, such as pharmaceutical, automotive, semiconductor, airline, telecommunications, investment banking, bulk chemical or petroleum (Saloner, et al. 2001, p.185), for example, may need a sophisticated CI system. Several studies (APQC; 1999a; 1999b, 2001) show a higher presence of coordinated CI Units in these industries. Nevanlinna (1997, p.70-74) also found the important connection between level of competition in the telecommunications industry and competitor monitor system type. Industry rivalry intensity can also be observed in the international arena. For instance, the intensity of international competition was analyzed by Raymond, et al. (2001).

The level of rivalry between competitors in a particular industry may depend, among other things, on the types of barriers present. The competences or capabilities of a firm, such as tangible and intangible capital, economy of scale, skills, and so on are needed by markets. If markets do not require particular resources, it means that the entry barriers are weak. Entry barriers and potential and substitute firms were suggested by the five forces model (Porter, 1980). Indeed, if no special requirements were made by markets, firms acting in that particular market would be vulnerable. For instance, Coburn (1999) argued that technology can be a determining barrier and that a reduction of it intensifies the competitive arena. Moreover, to discover what new or potential competitors might do, may be one of the intelligence needs (Hawkins, 2005, p.16). Firms which are not able to improve their competence and capabilities if required may be threatened by other contenders outside the particular industry if the entry barrier levels are low. Those companies which are in markets with moderate entry or exit barriers will have the greatest bottom-line CI impact (McGonagle and Vella, 2002; p.64-66). In addition, if the exit barrier levels are high, this may create

more competitive frictions which may cause a rivalry between existing firms in industry downturns. Christensen, et al. (2004, p.152) stated that “one of the major drivers of this rivalry is high exit barriers” which will result in “high degrees of competitive rivalry among firms”.

5.3.7 Industry Growth and Decline

Industry life cycle may have a positive relationship with the efforts dedicated to CI (Tena and Comai, 2001). Markets which are in the growth stage of their life cycle tend to become more competitive. New contenders can be attracted, new customer segments will be developed and achieved and products will change rapidly. At the same time, a growing market will attract new players. In a recent survey of PricewaterhouseCoopers it was ascertained that “fast-growth CEOs report that business information on major competitors is more important today than it was a year ago” (PWC, 2002). The assessment of markets as attractive and profitable suggests that companies must reinforce their strategy and observe possible new competitors. The Israeli defense industry, for instance, showed an increase in intelligence activity due to several factors including the growth of the industry (Barnea, 2014). However, other industrial stages may be related to different kinds of CI needs (Tena and Comai, 2001).

5.4 Summary of Organization and Environmental Characteristics

As discussed previously there are several organizational and environmental characteristics that may have a significant influence on CI or environmental scanning activities. ´

The frameworks proposed by Bowman and Asch (1987, p.8) and Ghoshal (1985, p.40) show that environmental variables and organization variables are influencing scanning

behavior. Specifically, the work of Raymond, et al. (2001) is the most complete since the authors found several variables correlated to technology scanning activities. However, expenses were not taken into consideration in those studies. Tables 11 and 12 summarize the most significant contributions made by authors from the field which was discussed in this chapter.

Since a large amount of exploratory research has been carried out and some discussions are based on anecdotal observation, these findings can be empirically tested. The following chapter provides the research proposition and the hypotheses based on the organizational and environmental characteristics discussed in this chapter.

Table 11 - Theoretical contribution to the organizational characteristics.

ORGANIZATIONAL Characteristics	***Significant contribution by authors***	***Indication by authors***
1 Marketing Innovation	-	Lynn, et al. (2003); Langerak, et al. (2004); Qiu (2008); Carbonell and Rodríguez (2010).
2. Technology Innovation	Yasai-Ardekani and Nystrom (1996); Calof (1999); Raymond, et al (2001); Hannula and Pirttimäki (2003).	Aguilar (1967, p.37-38); Kahner (1997, p.31); Porter (1985, p.164); Gates (1999); Rouach and Santi, (2001); Bouthillier and Shearer (2003, p.26).
3. Vertical Integration	-	Fuld (1995); Pfeffer and Salancik (2003 p.126).
4. Product portfolio	-	Elenkov (1997a); Prescott (2001, p.6).
5. International in-house sales force	Raymond, et al. (2001).	Calof (1997); Viviers and Calof (2002); Comai and Tena (2004a); Viviers and Muller (2004); Hirvensalo, (2004).
6. Direct International presence	Hannula and Pirttimäki (2003); Anton (2005).	Yasai-Ardekani and Nystrom (1996); Pirttilä (1997); The Future Group (1997); Correia and Wilson (1997 and 2001); APQC (1999); Prescott and Miller (2001); Tena and Comai (2004a and 2004b); Comai, et al. (2005); Savioz (2004, p.246); Adidam, et al. (2009).
7. Growth and Decline	Raymond, et al. (2001).	Kahner (1997, p.28); Comai, et al. (2006).
8. Size	Yasai-Ardekani and Nystrom (1996); Teo and Choo (2001); Saayman, et al. (2008).	Fann and Smeltzer (1989); Ansoff and McDonnell (1990, p.104); Pirttilä (1997); Berger (1997); Correia and Wilson (1997); APQC (1999); Prescott and Miller (2001); Hannula and Pirttimäki (2003); Tena and Comai (2004a and 2004b); Savioz (2004, p.246); Barendregt (2010); Franco, et al. (2011).

Table 12 - Theoretical contribution to the environmental characteristics.

ENVIRONMENTAL Characteristics	***Significant contribution by authors***	***Indication by authors***
1. Market Innovation	-	Slater and Narver (1995).
2. Industry Technology innovation	-	Porter (1985, p.164); Miller (1993); Ashton and Klavans (1997); Coburn (1999); Tao and Prescott (2000, p.68); APQC (2001); Raymond, et al. (2001); Hawkins (2005, p.16); Blenkhorn and Fleisher (2005, p.8); Viitanen and Pirttimäki (2006); Barnea (2014).
3. Regulation Constraints	Gibbons (1992); Cho (2006).	Hambrick and Finkelstein (1987); Oster (1999, p.44-47); APQC (2000, p.24), Tao and Prescott (2000, p.68); Mysore and Lobo (2000); Crouhy, et al. (2000, p.1); Tena and Comai (2001), McGonagle and Vella (2002, p.63); Blenkhorn and Fleisher (2005, p.9); Hawkins (2005, p.16); Chan Kim and Mauborgne (2005, p.52-53); Baaziz and Quoniam (2014).
4. Industry Alliance	Raymond, et al. (2001).	Aguilar (1967, p.37-38), Porter (1985, p.353); Drucker (1993, p.18) Fahey (1999); Bouthillier and Shearer (2003, p.25); De Wit and Meyer (2004, p.360-368); Blenkhorn and Fleisher (2005, p.9).
5. Globalization	Babbara (1993).	Kahner (1997, p.29-30); Coburn (1999, p.3-4); Blenkhorn and Fleisher (2005, p.13); Tao and Prescott (2000, p.68); Bouthillier and Shearer (2003, p.26); Chan Kim and Mauborgne (2005, p.8); MacDonald and Blenkhorn (2005); Comai, et al. (2006).
6. Industry Rivalry	Nevanlinna (1997, p.70-74); Raymond, et al. (2001).	Mintzberg, (1979); Porter (1980, p.71); Sammon, et al. (1984, p.172); Kahner (1997, p.29-30); Oster (1999); Fahey (1999); Mysore and Lobo (2000); Tao

		and Prescott (2000, p.68); McGonagle and Vella (2002, p.66); Bouthillier and Shearer (2003, p.26); McGonagle and Vella (2002, p.64-66); Koskinen (2005, p.7); Hawkins (2005, p16); Chan Kim and Mauborgne (2005, p.52-53); Baaziz and Quoniam (2014).
7. Industry growth and decline	-	Aguilar (1967, p.37-38); Tena and Comai (2001); Barnea (2014).

Chapter 6: RESEARCH PROPOSITION

6.1 Introduction

This part of the study defines a set of organizational characteristics and environmental contingencies relating to the CI function[9]. In particular, I will examine the resources devoted to the CI function that establish the level of expenses in monetary terms.

[9] CIS is defined as Competitive Intelligence System. A review of literature shows that several terminologies can be used when identifying a formalized or systematic CI activity. As an example, the following terms can be considered as a substitute for the CIS: CI function, CI program, CI process, CI unit, CI department, etc.

As discussed in chapter 3, literature on environmental scanning shows that the information collection activity was measured using frequency and there is very little study done describing the organization.

A limited number of studies evaluated what degree/level of the organizational and environmental variables are related to CI and, therefore, the expenses devoted to it. The empirical study developed by Peyrot, et al. (2002), suggested that (1) environmental complexity (competitors, clients, products, suppliers) and (2) organization marketing size are central elements influencing decision maker attitudes towards the use of CI. Weerawardena, et al. (2006) identified that the competitive intensity of the industry, based on 25 items, positively impacted the market-focused learning process. Correia and Wilson (2001) also discussed two major internal factors that influence the environmental scanning process of an organization: the individual and the organizational climates. Miree (1999) who concentrated her study in the sales function, found that "the presence of various industry characteristics impact the firm's ability to coordinate strategic and tactical intelligence".

Thus, in order to better understand the level of the scanning activity using expenses as an indicator and why these expenses are allocated to CI, a study of the organizational characteristics is needed. In addition, the type of environmental characteristic must also be pinpointed in order to see how these trials strengthen the relationship between organization and CI expenses.

6.2 Objective of the study

This study aims to offer an insight into the relationship between organizational and environmental characteristics and CI expenses and how this relationship is affected by the environment. By doing so, the study seeks to fill the gap in research in this particular field. The objectives of the study are:

- To understand which organizational characteristics are closely related to CI expenses.
- To understand which environmental characteristics are closely related to CI expenses.
- To understand which environmental contingencies affect the relationship between organizational variables and CI expenses.

6.3 Research Proposition

The research proposition includes two sets of independent variables defined as Organization and Environmental characteristics and an independent variable defined as CI expenses. The relationship between the independent and the dependent variable is shown in Figure 13 by arrow number 1 and arrow number 2, respectively. In addition, Environmental Characteristics will have a moderation effect on the relationship between the organization and the CI expense. This effect is shown with by arrow number 3 in Figure 13.

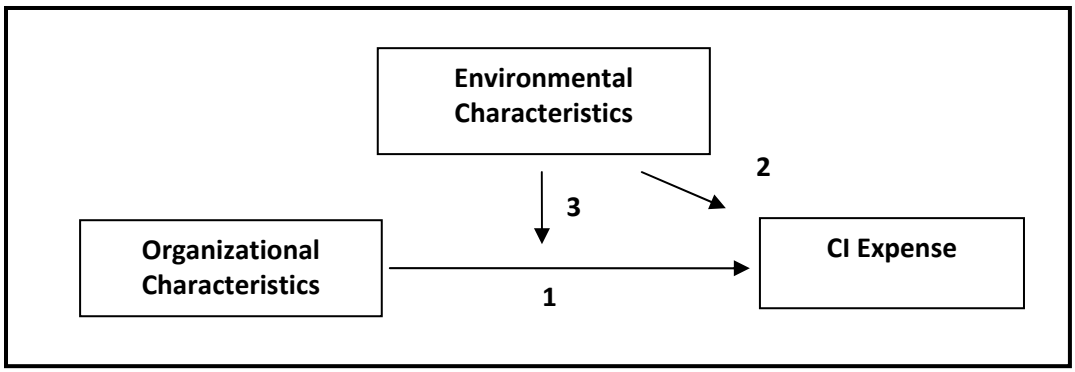

Figure 13 - The research proposition.

The two groups of characteristics will therefore have some influence not only on the type of scanning behavior but also on the intelligence function. Porter (1980, p.72) argued that the intelligence process will be organized in a "variety of alternative ways". Therefore, we can see that the relationship between organizational and environmental characteristics and environmental contingencies can be seen through a set of CI characteristics that define the CI function. Thus, a dependent variable will be introduced, which is the CI program characteristic which defines the type of scanning process required for the particular organization in the specific context.

The study adopts two different sets of variables in which the organizational characteristics and the environmental variables are related to the CI expenses. In addition, the environmental variables act as contingencies upon the organization by moderating the relationship between organization and CI expenses. These variables were described in chapter 5 and are listed in the following Figure.

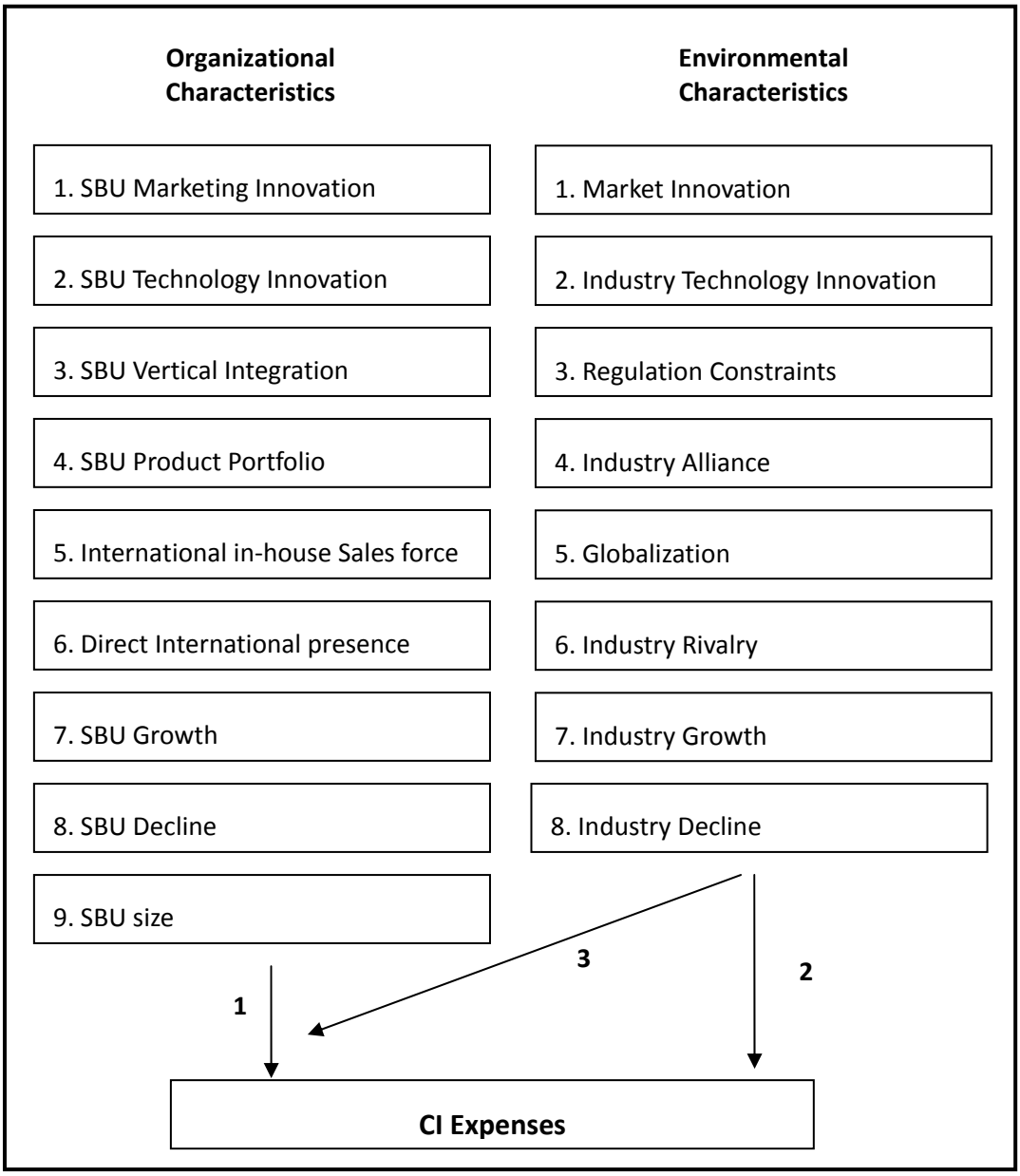

Figure 14 – Variables of the research proposition.

The decision to use the organizational variable as directly related to CI instead of the environment is influenced by the fact that anecdotal observations show that there are important differences between companies in the same industry (Del Pozo, 2004). Garg, et al. (2003) used environment dynamism as a contingent variable on the focus of scanning behavior and scanning frequency. Elenkov (1997b, p.119) found that scanning function was identified as a moderating factor in the alignment between the

environment and the organization. He also argued that “It is possible that there are other moderating factors which control this alignment”. In addition, according to the RBV theory, the organization will directly decide which kind and level of resources should be devoted to the CI function. Thus, the environment will act as a contingency.

6.4 Hypotheses

As discussed previously organizational and environmental characteristics may have a certain effect on CI and therefore on the economic resources that are allocated to the function. Thus, three broad hypotheses can be stated as following:

H1 - Organizational characteristics (O) have a positive impact on CI expenses (CI).

H2 - Environmental characteristics (E) have a positive impact on CI expenses (CI).

H3 - The environment (E) strengthens the relationship between organizational characteristics (O) and CI expenses (CI)

Figure 15 shows the theoretical framework with the three broad hypotheses.

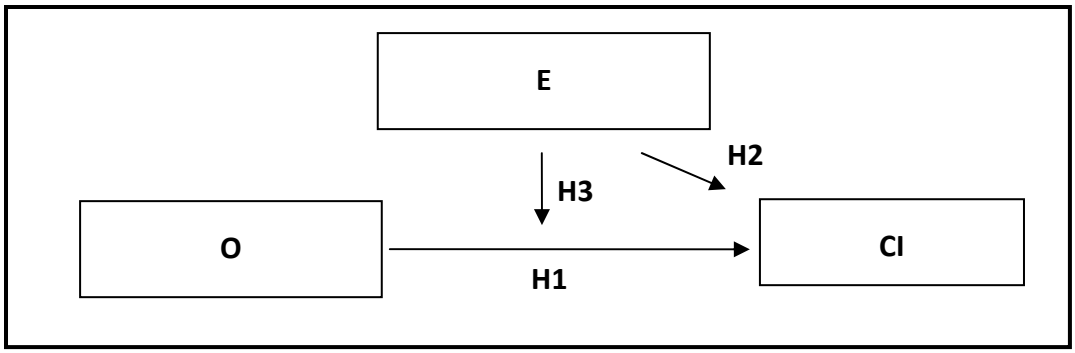

Figure 15 - The study model and broad Hypotheses.

Each broad hypothesis was divided into several testable sub-hypotheses based on the seventeen variables described in Figure 13. The following is a list of the sub-hypotheses:

6.4.1 Specific Hypotheses about the Organization (H1)

The nine specific hypotheses regarding organizational characteristics are:

- *H1.1 A higher level of **SBU Marketing innovation** (launches of a lot of new products each year) will result in a higher level of CI expenses.*

- *H1.2 A higher level of **SBU Technology innovation** (investing a lot in R&D each year) will result in a higher level of CI expenses.*

- *H1.3 A* higher *level of the **USB Vertical Integration** (both forward and backward) will result in a higher level of CI expenses.*

- *H1.4 A broader level of **USB Product Portfolio** (products and services) will result in a higher level of CI expenses.*

- *H1.5 A higher level of **USB International in-house sales force** (entirely owned by the parent companies) will result in a higher level of CI expenses.*

- *H1.6 A higher level of **USB Direct International presence** (The SBU utilizes only the parent company to sell in international markets) will result in a higher level of CI expenses.*

- *H1.7 A higher level of **USB Growth** (strong revenue growth) will result in a higher level of CI expenses.*

- *H1.8 A higher level of **USB Decline** (steep revenue decline) will result in a higher level of CI expenses.*

- *H1.9 A higher level of **USB Size** (Nº of full-time equivalent employees) will result in a higher level of CI expenses.*

6.4.2 Specific Hypotheses about the Environment (H2)

The seven specific hypotheses regarding the environmental contingencies are:

- *H2.1 A higher level of **Market Innovation** (new products are launched each year in the market/s in which the SBU operates) will result in a higher level of CI expenses.*

- *H2.2 A higher level of **Industry Technology Innovation** (number of patent applications requested each year in the industry in which the SBU operates) will result in a higher level of CI expenses.*

- *H2.3 A lower level of **Regulatory Constraints** (regulations or government rules) will result in a higher level of CI expenses.*

- *H2.4 A higher level of **Industry Alliance** (strategic alliances between firms) will result in a higher level of CI expenses.*

- *H2.5 A higher level of **Globalization** (international competitors) will result in a higher level of CI expenses.*

- *H2.6 A higher level of **Industry Rivalry** will result in a higher level of CI expenses.*

- *H2.7 A higher level of **Industry Growth** (Rapid growth in the industry in which the SBU operates) will result in a higher level of CI expenses.*

- *H2.8 A higher level of **Industry Decline** (Rapid decline in the industry in which the SBU operates) will result in a higher level of CI expenses.*

6.4.3 Environmental Contingencies (H3)

The eight specific hypotheses based on the effect of the environmental variables on the relationship between the organizational variable and CI expenses is stated as follows:

- *H3.1 The relationship between organizational characteristics (O) and CI expenses is moderated by **Market innovation***

- *H3.2 The relationship between organizational characteristics (O) and CI expenses is moderated by **Industry Technology Innovation**.*

- *H3.3 The relationship between organizational characteristics (O) and CI expenses is moderated by **Regulatory Constraints.***

- *H3.4 The relationship between organizational characteristics (O) and CI expenses is moderated by **Industry Alliance**.*

- *H3.5 The relationship between organizational characteristics (O) and CI expenses is moderated by **Globalization**.*

- *H3.6 The relationship between organizational characteristics (O) and CI expenses is moderated by **Industry Rivalry.***

- *H3.7 The relationship between organizational characteristics (O) and CI expenses is moderated by **Industry Growth**.*

- *H3.8 The relationship between organizational characteristics (O) and CI expenses is moderated by* ***Industry Decline.***

6.5 Conclusion of the Research Proposition

The research proposition described in this chapter converted the research questions into three broad hypotheses, each divided into more specific hypotheses:

- Nine hypotheses relating to organization variables
- Eight hypotheses relating to environmental variables
- Eight contingencies based on nine environmental variable

All the hypotheses described in the model are tested and are discussed in Chapter 9. Next chapter describes the methodology utilized in this study for testing the hypotheses.

Chapter 7: METHODOLOGY

7.1 Introduction

This chapter discusses the research process and the method used to test the hypothesis. The research process included two phases: a pilot phase in which an initial list of organizational and environmental characteristics were shown to be sufficiently relevant for the study and a full research phase in which the final list of organizational and environmental variables were evaluated based on a sample. This chapter also discusses the sampling process and the instrument used for both phases. The statistic methodology is described in the last section.

7.2 Research Process

The research process was made up of two main phases (see Figure 16). The first phase consisted of a pilot study where environmental and organizational contingencies were evaluated through a panel of experts. The second phase consisted of the full research, where companies and industries were studied. Finally, the 2 phases and the result of the first one will be discussed.

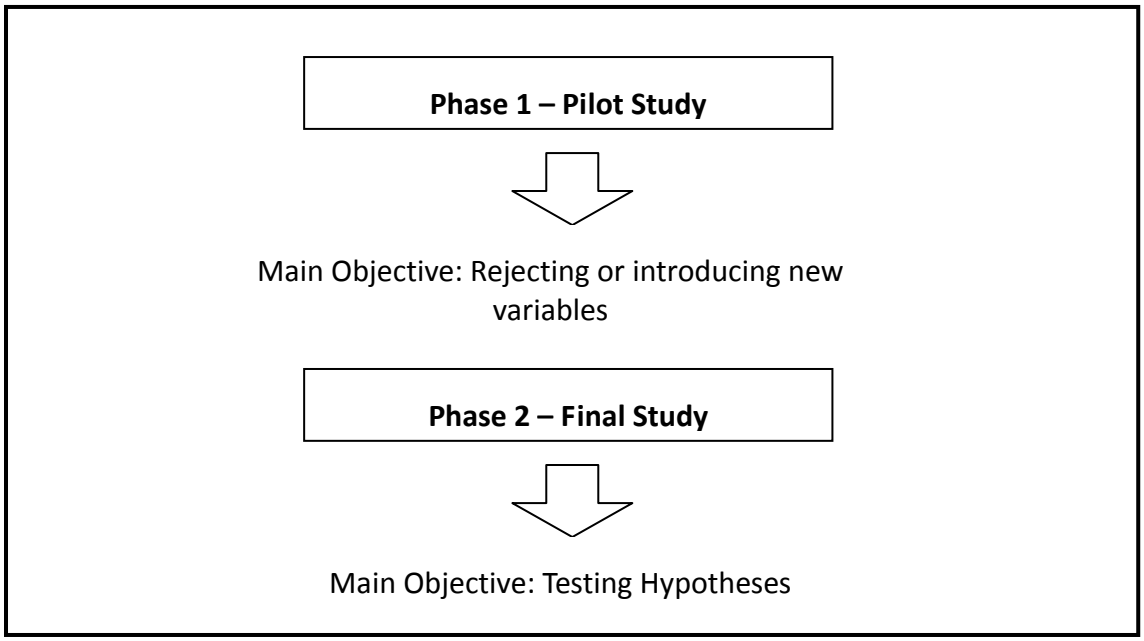

Figure 16 - Research Process.

7.3 Phase 1: The Pilot study

In the previous chapters, several exploratory studies and/or anecdotal observations were indicating the relationship between organizational and environmental characteristics and CI. The number of studies in each characteristic varies significantly and therefore an additional exploration study has been chosen to see which variable is

a candidate to be included in the final study. This process allows a better focus on which variable is more closely related to CI.

The purpose of the pilot study (see Appendix 1) was to test if the environmental and organizational contingencies identified in chapter 4 contribute to the establishment of a competitive intelligence function. This step was taken because there is insufficient understanding of which contingency may have a certain impact on the CI function. There are several additional reasons for adopting this research step:

1. Limited bibliography. A review of existing literature showed that there is limited discussion regarding the elements that can be considered contingency factors. Usually the CI function is associated only with various contingencies in passing references.
2. Changes in context. Even if valuable literature made contributions to this topic (for example, the seminal work of Aguilar, 1967), management practices and the environment evolved and therefore relevant factors and relationships may have changed.
3. New elements: Another reason for implementing the pilot study with the panel of experts was to identify potential factors that were not covered in current literature. Hambrick and Abrahamson (1995), suggested the use a panel for whom the existence of a multi-dimensional topic.

Therefore, a better understanding of what factors most contribute to the adoption of a CI function was needed.

7.3.1 Sample and Methodology

41 experts in the academic and professional field were identified as being able to contribute significantly in this first research step. These experts were selected by using

secondary CI specialized literature (journals and magazines). The scholars and consultants selected to be part of the panel showed the following expertise:

1. Higher level of knowledge in competitive or business intelligence.
2. Institutions and companies with a high level of knowledge.

Therefore, it was assumed that the opinions and suggestions that this panel of experts would earn maximum respect and were considerably more accurate even if "a potential limitation of the academic panel is that, although its members were knowledgeable about the concept of discretion, they might not have had in-depth knowledge of the specific industries we asked about" (Hambrick and Abrahamson, 1995). The methodology used was a 5 likert scale questionnaire to measure the agreement of the panel regarding the various factors.

7.4 Phase 2: Final study

7.4.1 Research Methods

The method used for answering the research questions and testing the specific hypotheses will be quantitative. Several studies in this area were carried out using this approach (Miller, 1993; Raymond, et al. 2001; Weerawardena, et al. 2006), which seems to fit best in a large sample. In addition, a quantitative methodology was needed to test empirically the impact of the organizational and the environmental characteristics on CI expenses suggested by exploratory research and anecdotic observation.

The instrument that was applied for testing the hypothesis was a closed type of questionnaire. The questionnaire developed to collect the data was focused on the organizational characteristics, environmental characteristics and CI expenses. The research involved three main parts:

1. The organizational variables
2. The environmental variables
3. The CI expenses.

In addition, some demographic information and the scope of CI function was obtained.

7.5 Target Population and Sampling

7.5.1 Selection

The identification of the knowledgeable person able to answer the questionnaire and therefore able to evaluate the organizational and environmental variables as well as the resources devoted to CI was also a key aspect. There is no unique directory of companies offering a clear indication of whether there is a CI department or not (Bouthillier and Jin, 2005, p.49). In chapter 3 the review of relevant studies looking at environmental scanning and competitive intelligence showed that most of the samples used were non-CI practitioners (see Table 13).

Some studies focused primarily on CEOs and considered that the individual in this position was the best person to evaluate environmental contingencies and the information gathering process (Weerawardena, et al. 2006). However, the CEO and some other executives are not always directly involved in the CI activities. The extent to

which decision makers are involved in CI was studied by Prescott and Williams (2003b). They found that there are several possible phases in which a decision maker can work together with CI practitioners. However, the study which was based on case companies showed that firms differ widely.

CEO evaluation may work fine when the company is small and the CEO is the owner (Raymond, et al. 2001), when the CI function is located at corporate level (Comai, 2005b) or the company is a single business unit. For instance, Saayman, et al. (2008, p.409) concluded in the study of 48 owner-managers of small businesses that 'in smaller companies, it is often the business owner who also fills the role of the CI professional'. Also Barendregt (2010, p.289) found that owner-managers of SMEs are actively engaging in the competitor intelligence activity.

Table 13 - Type of sources used in empirical studies.

Source	***Authors***
CEO	Lawrence and Lorsch (1967); Jain (1984); Daft, et al. (1988); Sawyerr (1993); Auster and Choo (1993); Yasai-Ardekani and Nystrom (1996); Elenkov (1997b); Correia and Wilson (1997 and 2001); Garg, et al. (2003), Weerawardena, et al. (2006).
Decision makers, marketing managers and Executives	Duncan (1972); Lawrence and Lorsch (1967); Yasai-Ardekani and Nystrom, (1996); Jennings and Jones, (1999); May, et al. (2000); Xu, et al. (2003); Qiu (2008); Dishman and Calof (2008); Lesca, et al. (2012).
Owner-managers (SME)	Raymond, et al. (2001); Savioz (2003); Saayman, et al. (2008).

However, when a CI function is located at the SBU level, the CEO may not be the best source of information for gaining an understanding of how the CI function works at business level, as the CI unit will be reporting mainly to the SBU manager (APQC, 1999a; Brooks, 2013; Comai, 2005b). There are also studies that focused on CI

practitioners with technological or technical skills (Calof, 1999; APQC, 2001; Savioz, 2003) or expertise in the marketing area (APQC, 1999).

On the other hand, several studies used CI practitioners (Prescott and Bhardwaj, 1995; APQC, 1999a and 1999b; Tao and Prescott, 2000; Comai, et al. 2005; Badr, 2003; Badr, et al. 2004; Badr, et al. 2006; Fehringer, et al. 2006; Smith, et al. 2010; Comai, 2005 and 2013a; Sewdass and Du Toit, 2014). Some studies, such as that of Prescott and Bhardwaj, (1995) who surveyed 390 SCIP members about their CI program and Tao and Prescott (2000) who studied 164 Chinese CI practitioners obtained from the Society of Competitive Intelligence of China (SCIC), were using quantitative methodologies. Other studies used case companies and qualitative methodologies to understand mostly how an in-house CI function is developed within a firm or organization (APQC, 1999a and 1999b; Cetisme, 2002; Savioz, 2003; Tena and Comai, 2004b; Comai, et al. 2006). The following Table shows the number of CI respondents and the sample source for these studies.

Table 14 - Sampling and data source in CI manager-focused studies.

Authors	***Respondents***	***Sample***	***Database / Source of sample***
Prescott and Smith (1989)	CI managers	95 firms	Not specified
Hedin (1992)	Not specified	10 Firms	CI in Swedish Companies
Jaworski and Wee (1993)	Not specified	203 responses	Not specified
Cartwright, et al. (1995)	CI practitioners	59 responses	Not specified
Prescott and Bhardwaj (1995)	CI practitioners	390 responses from 1200 members	Members of the Society of Competitive Intelligence Professionals (SCIP).
Sawka, et al. (1995)	Not specified	104 firms	Not specified
APQC (1999)	MI managers	5 Companies	APQC's Best practice consortium

APQC (2000)	CI managers	12 companies	APQC's Best practice consortium
Tao and Prescott (2000)	CI practitioners	164 responses of 434	Society of Competitive Intelligence of China.
APQC (2001)	STI managers	11 Companies	APQC's Best practice consortium
Badr, et al. (2004).	CI practitioners	94 responses of 302 contacts	The list of CI practitioners was built based on several SCIP European conference directories. The number was not specified.
Comai, et al. (2005)	CI managers	227 responses	Convenience sampling through direct invitations.
Hawkins (2005)	Senior management	212 responses of 1111	Atlantis Marketing
Comai, et al. (2006)	CI managers	4 responses	4 interviews made with Finnish case studies
Badr, et al. (2006)	CI managers based on 244 European firms.	79 responses	Society of Competitive Intelligence Professionals (SCIP). Even though a vast majority of the respondents said that "it helps towards a better understanding of the business environment" there is no evidence as regards what kind of conditions there are affecting their activities.
Vergara, et al. (2006, p.36)	CTI practitioners	102 responses	PUIG and EPO listing.
Fehringer, et al. (2006)	CI practitioners	520 responses	SCIP -
Qiu (2008)	CI and marketing managers	308 responses of around 3,000	SCIP and American Marketing Association (AMA)
Smith, et al. (2010)	CI managers	15 responses	Chambers of Commerce and Industry in France were interviewed with the aim of identifying best practices

Comai (2013b)	CI managers	149 responses	Convenience sampling and snowball sampling.
Sewdass and Du Toit (2014)	CI South African managers	24 responses of 40	Convenience sampling and snowball sampling.

Although other studies focused on CI, the sample used was not made up of CI practitioners (Zinkhan and Gelb, 1985; Gelb, et al. 1991; Ghoshal and Westney, 1991; Maltz and Kohli, 1996; Hannula and Pirttimaki, 2003; De Pelsmacker, et al. 2005; Dishman and Calof, 2008). The following Table summarizes these studies and the database source.

Table 15 - Sampling and data sources in other CI studies.

Authors	***Respondents***	***Sample***	***Database or Source***
Montgomery and Weinberg (1979)	Managers	100	-
Malof (1999)	Executive and CTI managers	1,025 of 3,080 mailed questionnaires	US-based Industrial Research Institute (IRI) and Society of Competitive Intelligence Professionals (SCIP). (It is not clear that the invitation mail was targeted directly to CTI or a mix of technology companies and CTI managers).
Calof (1999)	Executive and CTI managers	1,025 of 3,080 mailed questionnaires	US-based Industrial Research Institute (IRI) and Society of Competitive Intelligence Professionals (SCIP). (It is not clear that the invitation mail was targeted directly to CTI or a mix of technology companies and CTI managers).
Pyrot, et al. (2000)	Owner or top manager of an	172 responses (14%) rate	Mailing list from The Journal of Industrial Distribution

	industrial wholesale company.		
Tena and Comai (2004a)	Marketing directors and managers	35 answers from 159 companies	Sample based on a list provided by a study carried out by the Catalan Government in 2001 (Fontrodona and Hernández, 2001)
Hannula and Pirttimaki (2003)	Executives and managers	50 Top Finnish companies	Finnish company list.
Viviers, et al. (2005)	South African export companies	321 responses of 3,960 companies	3 data bases were used: Reed Inc., Kompass Southern African and membership lists of the respective Export Councils.
Kirschkamp (2008)	CEO in German medium-sized companies	597 responses of 4,500 companies	-
Smith, et al. (2014)	Executives and managers	176 responses	French SMEs form the online panel NETETUDES.

There are some plausible reasons why CI practioners were not used in studies:

- There is no easy open access to CI practitioner's database in each country and if there is, access is limited to members. The only countries that have a formalized CI professional association is the United States (SCIP), China (SCIC), South Africa (SCIPSA) and France.
- CI can have many specializations and can be found embedded in several departments. As showed in the review of the literature, intelligence is applied to a variety of areas and topics.
- Collecting information using other techniques like convenience and snowball sampling to achieve the target populations may require significant time.

These three aspects will probability reduce access to the target population and thus add to the difficulties in getting a representative sample. Although this study was successful in getting the participation of CI practitioners, none of the studies in Table 15 focused on internal and external variables and relating them to CI efforts or expenses.

7.5.2 Estimation of the target population

This study is focused on CI practioners who run and manage an in-house CI function. Thus, consultants, vendors, students and scholars were not included in the sampling pool. Identifying who is the CI practitioner was crucial as discussed in chapter 2 since there are different terminologies used among professionals working in CI and in closely related positions. Perhaps the most difficult part of the research was accessing CI professionals. Badr, et al. (2006) and Wright, et al. (2009) also experienced difficulties while searching for CI specialists in the UK banking sector. Several studies used CI specialists to gather insights on the process and reasoning behind the use of CI (Smith, et al. 2010).

In order to understand the number of people involved in CI and the type of specialization in the field, without access to a professional database, it was used the most popular online professional social network, LinkedIn[10] which is probably the largest professional worldwide database available at the current time. Linkedin, as well as other social networks, provides a "rich source of study participants" (Brooks and Churchill, 2010). Facebook and Twitter are also large databases of populations and were used to some extent for professional social-network research (Bhutta, 2012; Beninger, et al. 2014), however, both were excluded from the research because they did not meet the basic criteria that the job title of the account owner must be accessible. In addition, these two networks are not targeted exclusively to career

[10] LinkedIn claims to have more than 380 million members. [Available at: https://press.linkedin.com/about-linkedin Accessed: 18 September 2015]

advancement, which makes posting resumes less attractive. Furthermore, access to profile data in LinkedIn accounts is not restricted, as it is in the other two social networks. Having access to this data may be very useful for making user profiles. All this information is key for determining potential target populations.

LinkedIn, as well as other social networks, were used in social studies. However, very little[11] study was done using LinkedIn as the target population for scholarly research. Very few studies suggested that LinkedIn can provide reliable information. For instance, the study done by Oleinik (2014), found that the comparison of data from two sources, LinkedIn and the university official website, on the mean length of employment at the same university, suggests some consistency. On the other hand, De Mello, et al. (2015) used Linkedin for identifying the target population of a large group of IT worker profiles and ran an automated survey. Others focused on understanding personality (Garcia and Al Nima, 2015). Although these studies showed only a few examples of how the Linkedin social network can be used in social studies, it is given its number of members it is fair to assume that LinkedIn may be appropriate for selecting target populations in those cases where no databases are available.

In order to get the target population, it was analyzed LinkedIn job titles using the advanced option available in the software at the current time. This option allowed studying how many professionals are using competitive intelligence and alternative terminologies in their current job title. Based on the review of the literature, it was applied the following six keywords:

- "Competitive Intelligence"
- "Competitor intelligence"
- "Marketing Intelligence"
- "Market Intelligence"

[11] I used the following syntax (LinkedIn AND (sample OR "target population")) for searching in several databases and the result was poor.

- “Customer Intelligence”
- Veille (“Watching” in French)

Other terms may be used. For instance, Smith, et al. (2014) studied the frequency of eight different terminologies used by French small businesses in conjunction with CI activities.

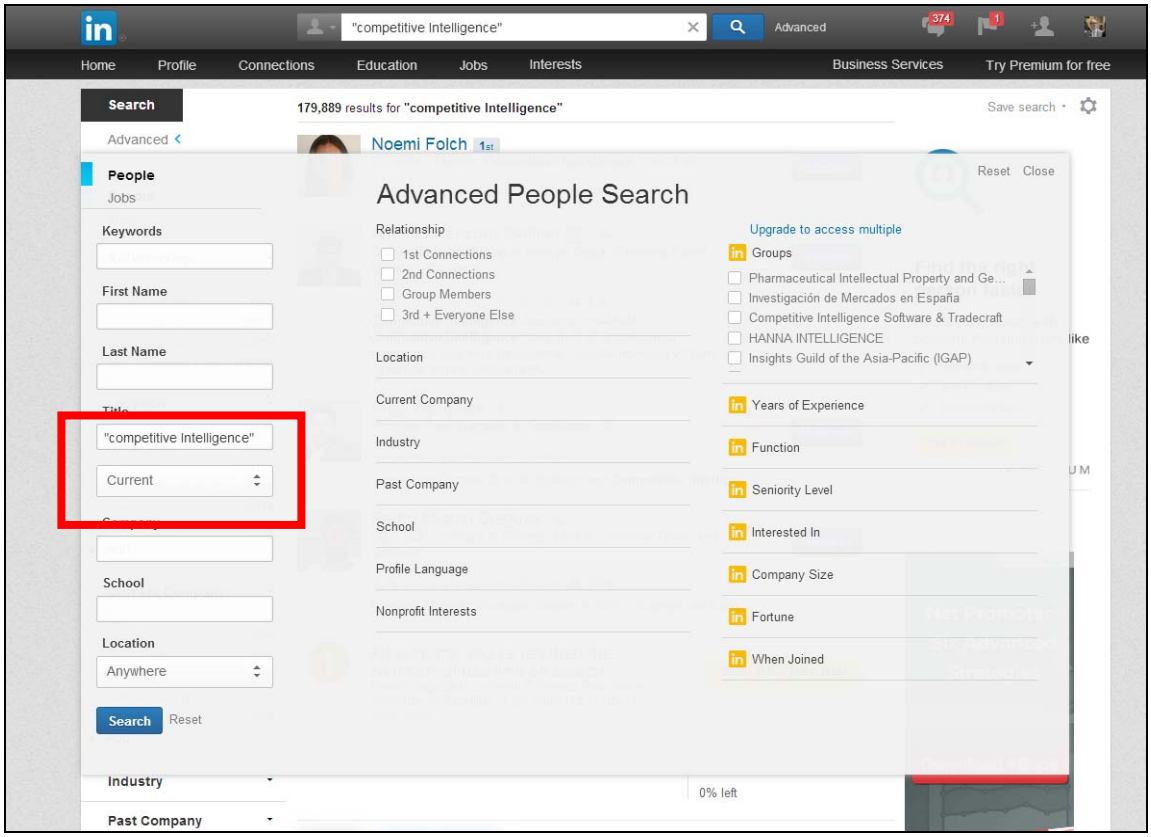

Figure 17 - LinkedIn “Advanced People Search” interface.

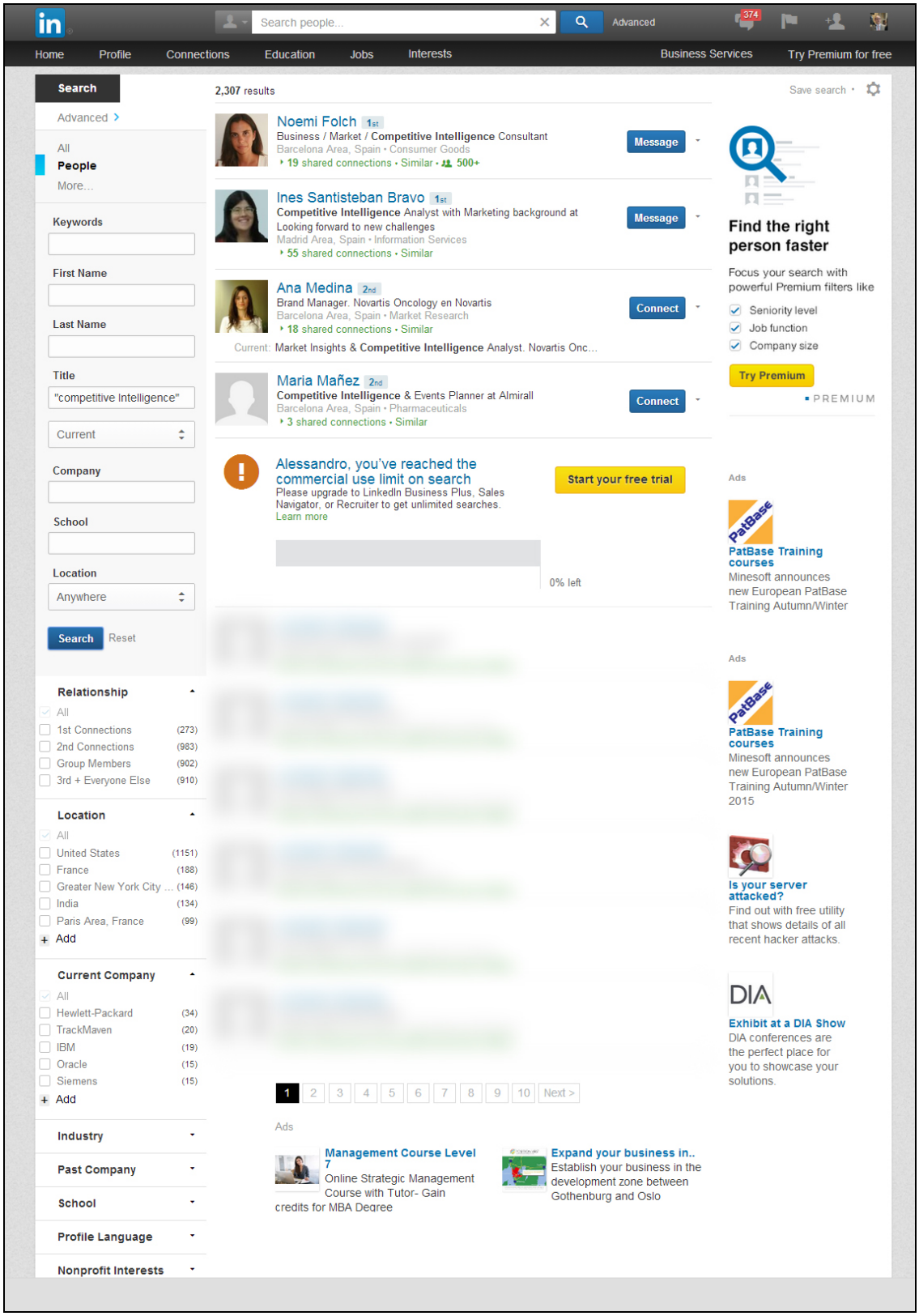

Figure 18 - LinkedIn example of result page.

The following Table shows the number of records that were obtained from LinkedIn for each title with the requirement that Intelligence needed to be at least a part of the title. Each term used was searched for in the current job title posting the professional person was labeling in his or her profile.

Table 14 shows that there are about 16,000 CI professionals worldwide working in the intelligence-related field. The majority of the professionals are working in jobs which include “Market Intelligence” in their title (approx. 7,500 people) and secondly “Competitive Intelligence” (approx. 2,500 people). Freyn and May (2015) showed in their analysis that market intelligence (MI) and Competitive Intelligence (CI) are very similar in terms of job description and requirements. “Commercial Intelligence” (234 results), “Strategic Intelligence” (438 results), and "Intelligence economique" (351 results), were excluded from the pool. “Business intelligence” (BI) was also excluded since anecdotal observations showed that BI is very different from CI and MI (Freyn and May, 2015). However, the following points must be carefully considered:

- In the LinkedIn database there is a very limited number of Asians although other studies showed that there is a CI community (Tao and Prescott, 1999) and CI is an established discipline in China (Xinzhou and Xuehui, 2011; Fleisher, 2002; Bensoussan, 2005). There are probably two main reasons for data scarcity in LinkedIn: the Chinese do not make use of the English titles, (b) they do not post their CVs in this type of database and (c) Chinese CI practitioners use human networks extensively (Changhuo, et al. 2006).

Table 16 - LinkedIn total CI populations and stratification.

Country	*Competitive Intelligence*	*Competitor intelligence*	*Marketing Intelligence*	*Market Intelligence*	*Customer Intelligence*	*Veille*	*%*	*Total*
United States	1129	18	289	1565	279	0	*24.80%*	3280
Brazil*	288	1	212	2278	25	0	*21.20%*	2804
France	189	3	84	244	26	1834	*17.99%*	2380
United Kingdom	66	40	184	439	103	0	*6.29%*	832
Netherlands	21	4	344	235	119	0	*5.47%*	723
India	133	3	44	312	19	0	*3.86%*	511
Canada	80	5	68	204	36	84	*3.61%*	477
Germany	71	18	57	262	39	0	*3.38%*	447
Italy	42	5	144	100	37	0	*2.48%*	328
Spain*	133	1	86	97	52	0	*2.79%*	369
Belgium	18	0	48	102	54	24	*1.86%*	246

Switzerland	70	2	20	78	19	16	*1.55%*	205
Morocco	10	0	4	13	1	141	*1.28%*	169
Australia	22	5	12	60	38	0	*1.04%*	137
Sweden	19	3	15	54	16	0	*0.81%*	107
Denmark	14	1	5	65	14	0	*0.75%*	99
Colombia	48	0	3	11	4	0	*0.50%*	66
Finland	7	1	3	31	4	0	*0.35%*	46
Total**	2360	110	1622	6150	885	2099	*100%*	**13226**
(Percentage)	*17.84%*	*0.83%*	*12.26%*	*46.50%*	*6.69%*	*15.87%*	*100%*	
Global***	2531	125	2052	7558	1184	2339		**15789**

(*) number of current job titles using the English and the respective translated term. (**) number of total current job titles for each term in the listed countries. (***) Global representation of the number of total current jobs available in LinkedIn for each term.

- The total number includes CI vendors, such as, market research or software development consultants, for instance. In addition, there are some professional people who work for government agencies. Although this group of people involved in CI can be considered a minority, it has given special attention during the selection process.
- CI can be part of other activities. According to Smith, et al. (2014), there are CI activities embedded in market research and viceversa.
- Although the job title is labeled "intelligence" it does not mean that he or she is working fulltime in intelligence. For instance, one respondent said in his comments that "we do not have an official CI function in much of the business, a few people have CI in their job title but it is not their main focus".
- In addition, careful attention is paid to those professional people who do CI but do not include the word CI or similar in their job title, such as "marketing insight" or "competitor analysis", for instance.
- There could be a CI function embedded in other job titles, showing, for instance, that CI activities are carried out at least part-time.

Additional thoughts:

- Other words such as "Scientific Intelligence" did not show any result.
- Surprisingly "Technology Intelligence" shows a very low number of job titles (102) considering its importance in the field. Very probably, people working in CTI are networking in other groups such as The Patent Information Users Group (PIUG), for instance.
- As discussed previously, the only people answering all the variables are CI practitioners, although one source of information may include a self-report bias problem in the study (Podsakoff and Organ, 1986; Donaldson and Grant-Vallone, 2002).

7.5.3 Sampling Process

Based on the LinkedIn potential population, the research used a simple random sampling.

7.6 Questionnaire Design

7.6.1 Questionnaire Type and structure

A self-administered questionnaire is designed and used to conduct the research. The questionnaire is web-based and is devised using the free software "Google Forms" provided in the Google drive suite. The questionnaire includes five parts:

- Introduction and background information. This part introduces the respondent to the purpose and objective of the study. The introduction is also interested to make sure that the respondent take on the correct perspective by analyzing one SBU. Some details of this are discussed in the following paragraph. In addition, it is encouraged the use of the year 2014 as a reference when answering the questionnaire.
- Type of company. This part focused on understanding where the CI function is located within the company. For multibusiness companies, respondents are invited to take the strategic business unit (SBU) perspective. However, respondents can also take the corporate perspective in cases where the firm was a single business unit or the CI activities are centrally organized.
- Organizational variables. This part of the survey focuses on gathering the SUB characteristics. Each respondent evaluates the SUB using nine questions as

shown in chapter 6. The following table shows how each hypothesis is converted into a statement in the questionnaire.

Table 17 – Hypotheses and Questionnaire Statements about Organization variables

Hypotheses about the Organization characteristics	***Statements used in the Questionnaire*** *(Please, select the option that most closely matches the characteristic of the SBU.)*
H1.1 A higher level of **SBU Marketing innovation** (launches of a lot of new products each year) will result in a higher level of CI expenses.	1. SBU Marketing innovation. The SBU launches a lot of new products each year.
H1.2 A higher level of **SBU Technology innovation** (investing a lot in R&D each year) will result in a higher level of CI expenses.	2. SBU Technology innovation. The SBU invests a lot in R&D each year.
H1.3 A higher level of the **USB Vertical Integration** (both forward and backward) will result in a higher level of CI expenses.	3. SBU Vertical integration. The SBU is totally vertically integrated both forward and backward in the supply/value chain. If you select "Strongly agree, then the SBU is totally vertically integrated both forward and backward in the supply/value chain.
H1.4 A broader level of **USB Product Portfolio** (products and services) will result in a higher level of CI expenses.	4. SBU Product portfolio. The SBU has a broad portfolio of products and services.
H1.5 A higher level of **USB International in-house sales force** (entirely owned by the parent companies) will result in a higher level of CI expenses.	5. International own sales force. The sales force in international markets are entirely owned by the parent companies.
H1.6 A higher level of **USB Direct International presence** (The SBU utilizes only the parent company to sell in international markets) will result in a higher level of CI expenses.	6. Direct International presence. The SBU utilizes only the parent company to sell in international markets. If you select "Strongly disagree" then, the SBU utilizes only third parties to sell in international markets (alliance, representative, distributors or agents).
H1.7 A higher level of **USB Growth** (strong revenue growth) will result in a higher level of CI expenses.	7. SBU Growth. The SBU experiences strong revenue growth.

H1.8 A higher level of **USB Decline** (steep revenue decline) will result in a higher level of CI expenses.	8. SBU Decline. The SBU experiences steep revenue decline.
H1.9 A higher level of **USB Size** (Nº of full-time equivalent employees) will result in a higher level of CI expenses.	9. SBU size. Please indicate in the following box the Nº of full-time equivalent employees in 2014.

- Environmental variables. This part is designed to collect perceived characteristics about the environment in which the SUB operates. Eight contingencies are included in the questionnaire as described in chapter 6. The following table shows how each hypothesis is converted into a statement in the questionnaire.

Table 18 – Hypotheses and Questionnaire Statements about Environmental variables

Hypotheses about the Environmental characteristics	***Statements used in the Questionnaire*** *Please select the condition that most closely matches your perception about the environmental variable. As you respond to the questions, please reflect on your own experiences, and make as accurate an assessment as possible.* *PS: In the following statements, I always talk about industry or market when referring to the SBU environment. Please, adapt this term to the one that you mostly use or are used to.*
H2.1 A higher level of **Market innovation** (new products are launched each year in the market/s in which the SBU operates) will result in a higher level of CI expenses.	1. Market innovation. A lot of new products are lunched in the market/s, in which the SBU operates, each year.
H2.2 A higher level of **Industry Technology Innovation** (number of patent applications requested each year in the industry in which the SBU operates) will result in a higher level of CI expenses	2. Industry Technology innovation. A lot of patent applications are requested in the industry, in which the SBU operates, each year.

H2.3 A lower level of **Regulatory Constraints** (regulations or government rules) will result in a higher level of CI expenses.	3. Regulatory Constrains. The market/s, in which the SBU operates, have/has a lot of regulations or government rules. If you select "Strongly disagree" then the market is a free economy or there are insignificant regulations or government rules.
H2.4 A higher level of **Industry Alliance** (strategic alliances between firms) will result in a higher level of CI expenses.	4. Industry Alliance. In the industry, in which the SBU operates, there are a lot of strategic alliances between firms.
H2.5 A higher level of **Globalization** (international competitors) will result in a higher level of CI expenses.	5. Globalization. The market/s, in which the SBU operates, has/have a lot of international competitors.
H2.6 A higher level of **Industry Rivalry** will result in a higher level of CI expenses.	6. Industry Rivalry. The Industry, in which the SBU operates, has a lot of industry barriers to entry.
H2.7 A higher level of **Industry Growth** (Rapid growth in the industry in which the SBU operates) will result in a higher level of CI expenses.	7. Industry Growth. The Industry, in which the SBU operates, grows fast.
H2.8 A higher level of **Industry Decline** (Rapid decline in the industry in which the SBU operates) will result in a higher level of CI expenses	8. Industry Decline. The Industry, in which the SBU operates, declines fast.

- Competitive intelligence expenses. The value of CI expenses is converted into seven categorical groups. The two extremes are: “less than 50,000 USD” and “more than 1 million USD”. CI expenses represent the dependent variable in the model. To make sure that respondents provide a precise estimate for the level of CI expenses, the questionnaire included a short explanation of how to estimate the total CI expenses invested in the SBU using the following items: CI personnel salary (full-time or part-time), operating supplies/equipment (IT, maintenance or subscriptions), education (training, seminars or meetings), travel, commercial databases (market research, financial, patents, companies, or risk), outsourcing (consulting or research).

For measuring the organizational and environmental variables, ordinal style questions and a 5-point Likert scale were used. Respondents were asked to indicate the extent to which they fully disagreed or agreed with each Likert item. The responses ranges from 1 (totally disagree) to 5 (totally agree). The order of the answers of all questions is maintained equal (questions were asked in exactly the same order each time) to make sure that respondents are not getting confused and could dedicate time to the questionnaire, although this may induces some potential bias or limitations (Yan and Keusch, 2015).

Regarding the CI expenses, a categorical scale is used to determine the expenses in monetary values. Each of the six intervals is equally-sized with an interval of 250,000 USD, except the first one, which is less than 50,000 USD and the last one that is more than 1M. Instead of using an open question, the questionnaire is made with a closed-type answer to reduce the risk of respondents refusing to disclose the exact CI expenses and therefore not cooperating (Bailey, 1994, p.112).

7.6.2 Firm and SBU

One of the concerns of this study during the research is to make sure that the general focus is on how a firm might operate through a number of business units, each of which would be organized into a number of CI functions.

A CI function can be implemented across the entire organization, although it may take different forms in the firm. It can be centrally located (APQC, 1999a; Fuld, 1997), distributed throughout the organization (Tuller, 2005) or decentralized but centrally coordinated. CI can also be at corporate level (APQC, 1999a; Comai, et al. 2005; Comai, 2005b) or in several independent business units (Tena and Comai, 2003). Moreover, anecdotal evidence shows that companies can have a specialized CI function in several business units, operating as a full-time or part-time activity. Therefore before exploring

the CI function in a company, a comprehensive overall picture is needed to obtain the correct information.

Finally, in order to narrow the research into a specific organizational and environmental area, a Strategic Business Unit (SBU) perspective is adopted. A SBU may be defined by the following characteristics (Ansoff, 1990; Kotler, 1997; Boyd, et al. 1995):

- It is a single business or collection of related businesses that can be planned as a set of resources relating to specific markets.
- It incorporates a unique set of products or services aimed at a homogeneous market.
- It has its own set of competitors.
- It has a manager who is responsible for strategic planning and profit performance and who controls most of the factors affecting profit (such as marketing, for instance).

Although the focus of this research will be at the Strategic Business Unit (SBU) level, it may be possible to find CI functions at the corporate level. For instance, the study carried out by Comai, et al. (2005) showed that whilst an SBU level was initially considered as the main focus, research showed that more companies adopted a corporate level perspective. However, to achieve more precise answers, it asked respondents to focus on a specific SBU in their organization.

7.6.3 Piloting

During the initial phase, the questionnaire is piloted with four CI practitioners in order to ensure the highest comprehension and content validity. The pilot survey is carried out between August 7 and 12, 2015 prior to its full launch. In addition, constructive criticism and suggestions were collected from some of the CI practitioners and this is

subsequently discussed via e-mail. The questionnaire is launched for a period of one week and several minor changes are adopted.

7.6.4 Time frame

A period of four weeks is estimated for collecting data since the invitation process is to be done manually and it is a time consuming process. Sending a LinkedIn invitation to the selected member is not easy since LinkedIn applied several barriers against sending single and mass messages to contacts.

7.7 Statistical technique

7.7.1 Applied methodology

In order to identify which organizational and environmental variables have some relation to CI investment, a means comparison analysis is used. The means are calculated based on the amount invested in CI in each of the five categories of the Likert scale. The same calculation is repeated for eight organizational variables and each of the eight environmental variables. For the variable "organization size" only a descriptive analysis is applied.

This technique allowed the mean of investment to be described according to the number of responses in each of the five possible levels of agreement of each variable. In other words, if the mean "CI expenses" rises in accordance with the level of agreement of a variable, it is possible to assume that CI expenses increases according to the increase or decrease of the independent variable that is measured. The differences in means are calculated at the far ends of the Likert scale for each variable.

When assessing these differences in the means in the two groups, the t-Student test cannot be used to study the means differences of the variable expenses between the "strongly agree" and "strongly disagree" of each variable, because the variable CI expenses does not follow a normal distribution in each of the groups that need to be compared. Therefore the Mann-Whitney test must be used. This test is carried out separately on all the independent variables.

In addition, the effects of the environmental variables on the organizational variables are separately analyzed in order to determine whether the environment can have moderate effects. These effects are studied by applying an analysis of differences of the differences in means seen previously in order to ascertain whether the environmental variable changes the effect measured using the differences in the means. The result of this analysis allows the creation of a Table in which the eight variables are analyzed according to the eight environmental variables in the two subgroups. The resulting matrix provides a total of 112 means.

7.7.2 Reasons for not applying Multiple Regression Analysis and other techniques.

Although multiple linear regression analysis was chosen at the beginning of the study for measuring correlation and the moderation effect in the environmental scanning literature (Sawyerr, 1993; Yasai-Ardekani and Nystrom, 1996; Ahituv, et al. 1998; Daft et al. 1988; Raymond, et al. 2001), it is not possible to use it with the data collected in this study. The reason is that two of the fourt assumptions that apply to multiple linear regression analysis are not met (Osborne and Waters, 2002). More specifically, the assumption of **linearity** and **normality** fails and the technique can not be implemented, as discussed below:

- **Linearity**: The following scatter plot graph (Plot residuals vs. predictor) shows a non-random pattern which suggests that a simple linear model is not

appropriate. The linearity assumption is only met, if the scatter plot shows a random pattern around zero residual value. This is not the case.

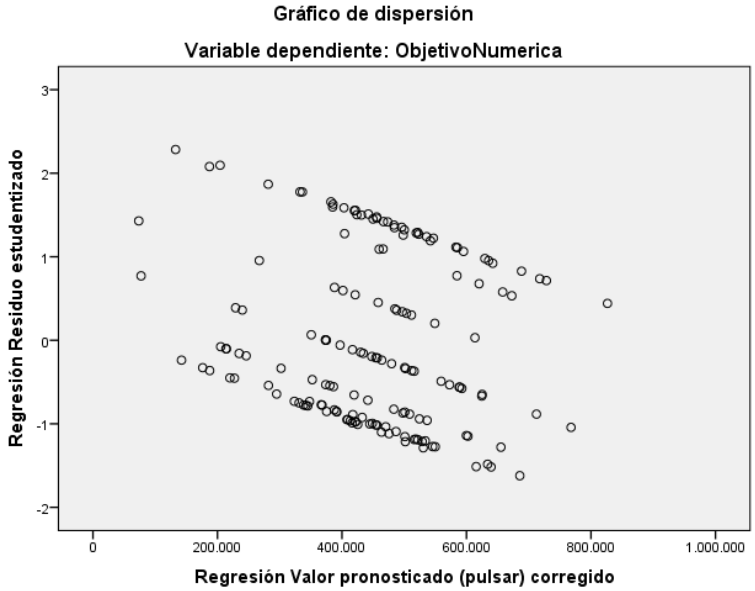

Figure 19 – Test of Linearity (Multiple Regression analysis)

- **Normality:** The following graph does not show a normal distribution and therefore the assumption of Normality is not met.

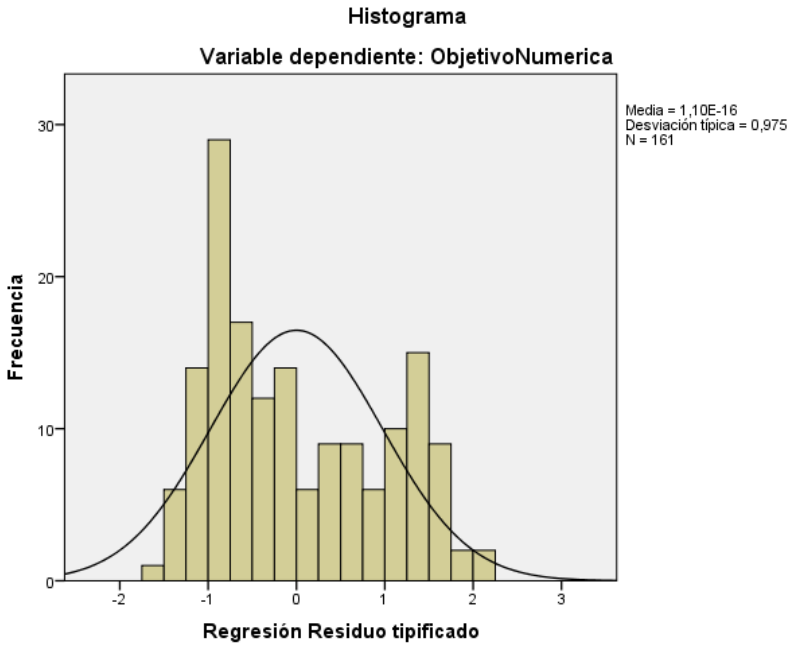

Figure 20 – Test of Normality (Multiple Regression analysis)

Several attempts are made to transform the variables into logarithmic, quadratic or exponential variables. However, the variables do not pass the assumption of normality either. Based on this result, other means difference techniques such as T-student and Anova are explored but these techniques also fail because the data is not normal. Osborne and Waters (2002) considered that "although non-parametric techniques often are somewhat lower in power than parametric techniques, they provide valuable alternatives". The Mann-Whitney U test is therefore applied as an alternative statistical test for measuring significance and to interpret whether there is a difference in the distribution in the medians in this particular case. Hambrick (1982) reported using the Mann-Whitney test in his study on environmental scanning.

In addition, descriptive analysis is also used to interpret the results. Descriptive analysis was particularly useful for showing the relationship for those variables were the p-value was slightly greater than α=0.05

7.7.3 Analysis of meaning

In order to analyze the meaning of the results, the Mann-Whitney test is applied. Due to the fact that the investment variable does not comply with normality, it is not possible to use the Student's T test. The Mann-Whitney test unlike the Student's T test, which can only be applied to normal distributions, can be applied to unknown distributions and is nearly as efficient as the T-test on normal distributions". It should be emphasized that, essentially, the Mann-Whitney test compares central tendencies based on the medians.

7.7.4 Data analysis tools

The data are analyzed using the software package Statistical Package for the Social Sciences (SPSS) version 16.0 which allowed several tests to be run. In addition, it is

used an MS Excel spreadsheet to create the graphs and analyze the means in each variable.

7.8 Conclusion of Methodology

This chapter describes two methodologies: the pilot study that reinforces the reason for selecting the independent variables and the final study which tests the hypotheses stated in chapter 6. These two steps are critical for the study.

As shown previously, there are a fair number of studies focusing on CI practioners whose main objective was to study the process of CI. Thus little attention was dedicated to organizational and environmental characteristics. Careful attention is paid when collecting the sample since access to CI professionals is very limited. This study uses Linkedin in order to involve as many respondents as possible in the survey. The target population is built by combining several search strategies using Linkedin functionalities although the database has some important limitations in term of contacting the potential respondents.

The central part of this chapter talks about the statistical techniques used for analyzing the data. The Mann-Whitney U test is applied to analyze the data and test the hypotheses, although multiple regression analysis cannot be used because two necessary assumptions are not met. In addition, descriptive analysis is used to show relationships between the independent and the dependent variable.

The following chapter describes the results of the pilot study and the variables that are considered in the final study.

Chapter 8: RESULTS FROM THE PILOT STUDY

8.1 Introduction

During May and July, 2005, an invitation to participate in a pilot study was sent to 28 experts selected following a review of literature to identify those scholars and consultants who contributed most to the CI field. The aim of this study was to get a preliminary idea of what kind of organizational and environmental characteristics were related to the CI function. The success of this pilot study was in large part thanks to all the experts for the effort and contributions they put into it.

8.2 Final sample and Timing

8.2.1 Respondents

The initial sample consisted of 28 experts (15 scholars and 13 consultants) identified from a review of the literature. The sample was made by selecting those experts who made a major contribution to CI in specialized journals, books and magazines. This group reflects the latest thinking in this field, by proposing updated work, articles and studies relating to CI. The final sample consisted of 7 scholars and 7 consultants. One consultant failed to reply. Thus, this pilot study achieved a 50% success rate.

8.2.2 Timing

Two invitations were sent by e-mail during May and June, 2005. The first invitation was sent in May and the second (as a backup), in June, 2005. A telephone call was also made to those experts who did not reply to the first e-mail. The completed questionnaires, with the exception of one which was sent by fax, were re-sent by e-mail between May and the end of September, 2005.

8.3 Results

The most important results of the pilot study are as follows:

8.3.1 Overall Experience in CI

Experts confirmed that they had an average CI experience of 19 years.

8.3.2 Organizational Characteristics: Agreement and Importance

With regard to organizational characteristics, the variables "Growth intensity" and "Technology intensity in product". All the other organizational characteristics showed at least neutral agreement. With regard to importance of organizational characteristics, "Technology intensity in product" showed the highest average rating. This category it was considered almost twice as important as "Level of hierarchy", which became the reference for organizational characteristics variables with 1.00 mean importance. The following Table shows the scores for each variable ranked by degree of agreement.

Table 19 – Organizational characteristics agreement and Importance by experts

Organizational Characteristics	***Agreement (Mean)***	***Importance (Mean)***
Growth intensity	**4.00**	1.47
Technology intensity in products	**3.54**	**1.85**
Organization size	3.31	1.53
Level of formal culture	3.15	1.33
Technology intensity in the manufacturing process	3.08	1.33
Export intensity	3.08	1.26
Level of hierarchy	3.00	**1.00**
Level of vertical integration	2.92	1.11
Level of diversification	2.92	1.13

8.3.3 Environmental Characteristic Agreement and Importance

"Industry Rivalry Intensity" was rated highest mean (4.46). Scholars and consultants strongly agreed with the idea that intensity of competition significantly influences a

company to adopt a formal CI function. However, they agreed that other environmental characteristics are key influencers. The most important are: "Regulation Intensity" (4.00), "Level of technical innovation" (3.92), "Industry growth intensity".

Regarding the importance scale rating, "Industry Rivalry Intensity" was the most important factor with respect to the others. It was almost the double important (1.90) as opposed to "Changes in customer/client needs" which was rated lowest mean in this study (1.00)[12]. "Regulation Intensity" and "Level of technical innovation" were also rated as relatively important. The following Table shows the scores for each variable ranked by level of agreement.

Table 20 – Environmental characteristics agreement and Importance by experts

Organizational Characteristics	***Agreement (Mean)***	***Importance (Mean)***
Industry Rivalry Intensity	**4.46**	**1.90**
Regulation Intensity	4.00	1.45
Level of technical innovation	3.92	1.44
Industry growth intensity	3.92	1.19
Globalization Intensity	3.85	1.21
Industry Entry barrier level	3.85	1.21
Level of Environmental Changes	3.85	1.32
Changes in customer/client needs	3.62	**1.00**
Industry Network Intensity	3.38	1.05
Product life cycle length	3.23	1.07
Degree of industry overlapping with others	3.38	1.02

[12] The rating 1.00 means that this factor is the reference for the others. This factor obtained the lowest overall rating. All the factors, including this one, have been adjusted by reducing the overall value of the lowest one. Thus the lowest factor will be "1.00"

8.4 Suggestions forwarded by experts

In addition to the closed question, the questionnaire introduced an open question where experts could suggest additional internal or external contingencies. The experts suggested several factors which can be divided into the following categories:

- New organization characteristics: Performance of the firm, Cash-flow revenue profit Strategy, and Organizational innovation.
- New environmental characteristics: Cost-cutting pressure and Price competition.
- Top Management attributes: Senior executives' prior organizational experiences with CI function, Management experience.
- Potential Constraints: Existence of champions for CI within the organization, Prior competitive successes or failures.

8.5 Relationship between Agreement and Importance

Figure 19 shows the position of the most important factors in relation to the two overall results: agreement and importance. It can be observed that “Industry Rivalry Intensity” had an important position in relation to other environmental characteristics, such as “Regulation intensity”, “Level Technical Innovation” and “Industry growth intensity”, for instance (see blue dots).

On the other hand “Technology intensity in products” achieved the highest relative position as an internal contingency. It was followed by “Organization size”, “Growth intensity”, “Technology intensity in the manufacturing process” or “Level of formal culture” as the most important factors contributing to the establishment of a formal CI function in the organization (see orange dots).

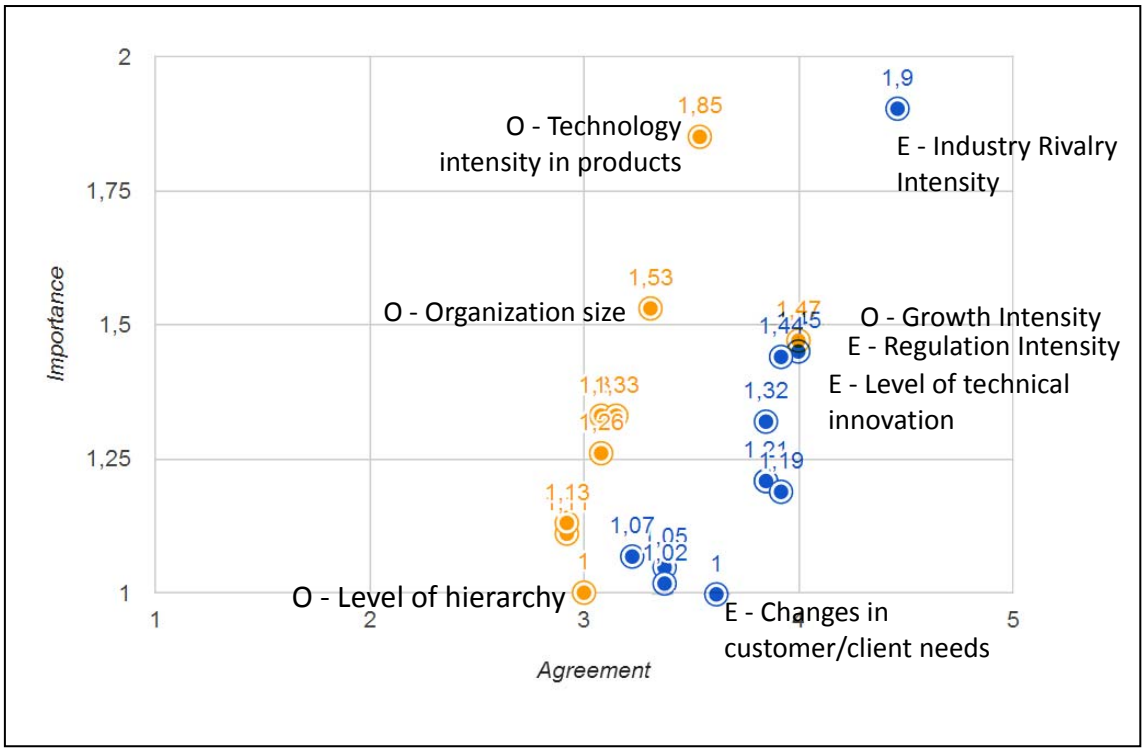

Figure 21 - Relationship between Agreement and Importance

8.6 Conclusion of Pilot study

The main conclusion that can be drawn from the pilot study is that there is no factor which can be pre-excluded as a potential contributor to CI expenses. No factor is given a disagreement rating. Therefore, all previous variables (organizational and environmental) are not rejected as possible influencers upon the CI function. The condition given is that those variables that were not rejected by the pilot study would be associated to the hypotheses and tested in the final study. Thus, all hypotheses are included in the final research. In addition, the pilot study raised some interesting points:

- There is a positive relationship between the level of agreement and the importance of the characteristics. For instance, the position achieved by Industry Rivalry Intensity showed the highest value in terms of agreement and importance. Not surprisingly, this characteristic obtains the most important position. A review of literature shows that this element is one of the dominant determinants for the competitive or “competitor” intelligence function.
- There is a difference between the overall agreement of the organizational and environmental characteristics. Figure 20 shows these differences, which can be generalized as an overall half point.
- Environmental characteristics dominates organizational characteristics in terms of agreement. For instance, “industry rivalry” shows a mean that is between “agree” and “strongly agree” and all the other environmental characteristics show means that are close to “agree”, whilst the figures for organizational characteristics are closer to neutral.
- Expert suggestion shows that there is a need for the incorporation of a new group of elements, such as top management attributes, for instance, which may be a constraint for CI.

Additional conclusions are discussed in chapter 10, which compares the findings of the pilot study with the results of the final study. The following chapter describes the results of the final study.

Chapter 9: FINAL STUDY RESULTS

9.1 Introduction

This chapter provides a description of the results of the final study. The first part describes the number of responses obtained as well as the respondent profiles. The second part is devoted to each organizational and environmental variable. Statistical and descriptive analysis is used to support or reject each variable. In addition, in the last part of the chapter it is included a contingency table to show which variables strengthen the relationship between an organizational characteristic and CI expenses.

9.2 Respondents

A random selection of the population is made in order to collect a list of 1440 professional people from LinkedIn. The sample did not include CI students, scholars, consultants or information suppliers. Careful attention is given to the company for which the CI professional works and the position held. However, there are two exceptions in which the professional person had left the company recently and hence responded taking 2014 into consideration.

Personalized invitations were sent between August 15 and September 25 by means of personal messages to the target person. A link to the on-line questionnaire was included. 225 usable questionnaires were collected of which 2 were eliminated (incomplete). Thus the valid responses amounted to 223 which results in a 15.49% response rate. This sample therefore resulted in a 6% margin of error within a 95% confidence interval.

Although CI professional studies show a relatively good response rate of between 31% and 37% respectively for Badr, et al. (2004) and Tao and Prescott (2000), other CI focused studies which used SCIP and other professional associations suffered a low rate of response resulting in only 10% of valid responses (Qiu, 2008). Thus, using a professional association does not guarantee a high response rate. The survey used in this research produced a good response rate by comparison with the large-scale survey developed by De Mello, et al. (2015) in LinkedIn inviting 7745 members and resulting in a very low rate of response (3.75%).

9.2.1 Company and Respondent Profile

The respondents are from companies located in 35 countries and more than 32 sectors. More than half of the sample are from the USA (23.73%), Brazil (9.86%), the

Netherlands (8.96%), the United Kingdom (8.07%), Spain (7.62%) and Switzerland (6.73%). Figure 20 shows the distribution of respondents for each geographic area.

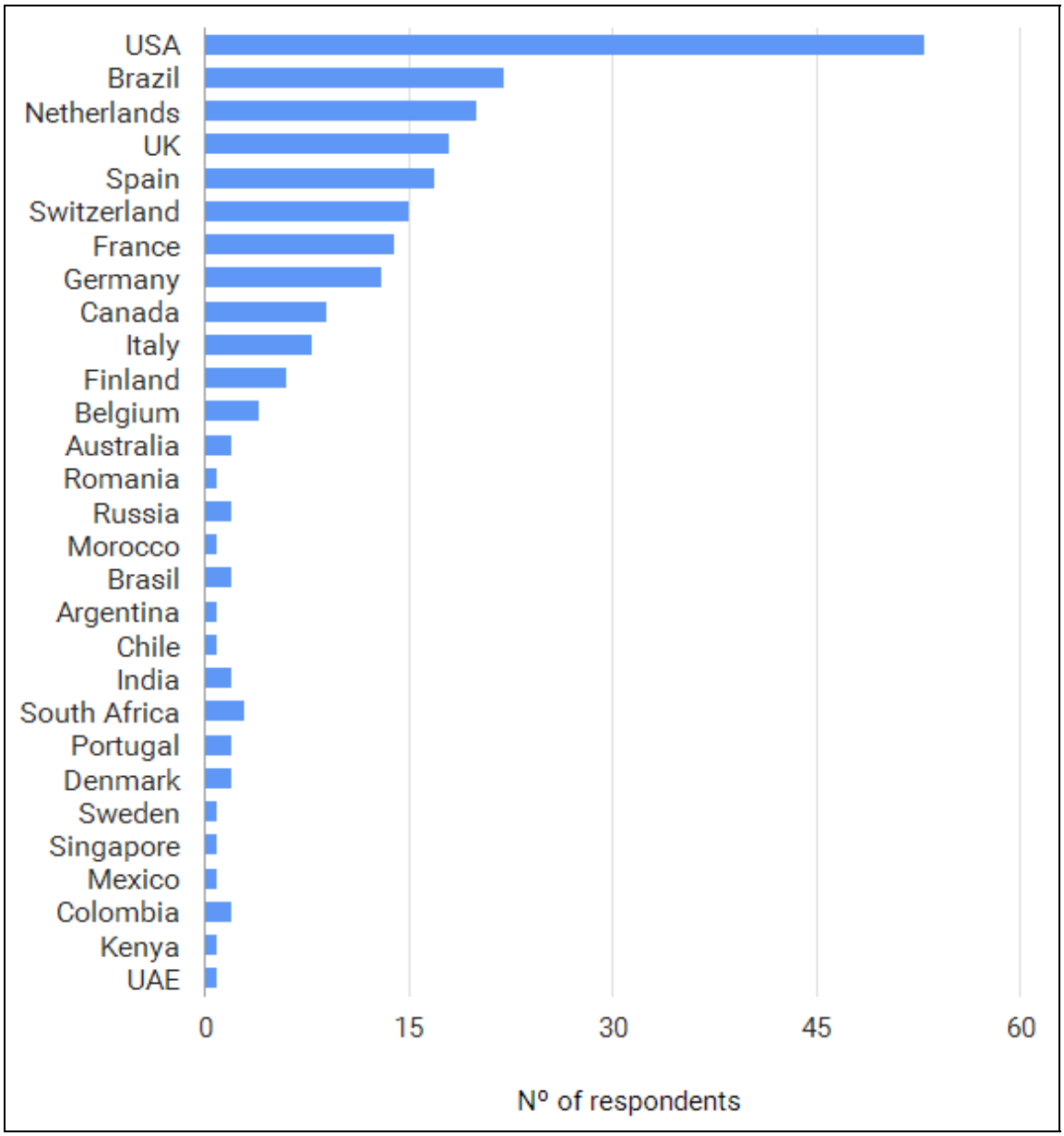

Figure 22 – Respondents by Country

The following table shows a comparison of the number of respondents in the sample for each country against the number of CI professionals in the target population.

Although there are some differences between the two groups, the sample include a satisfactory level of representatives for each country with the exception of Brazil, France and India.

Table 21 - Nº of respondents per country in the sample and in the population

Country	***Population***	***Sample***
United States	24.80%	23.77%
Brazil	21.20%	9.87%
France	17.99%	6.28%
United Kingdom	6.29%	8.07%
Netherlands	5.47%	8.97%
India	3.86%	0.90%
Canada	3.61%	4.04%
Germany	3.38%	5.83%
Italy	2.48%	3.59%
Spain	2.79%	7.62%
Belgium	1.86%	1.79%
Switzerland	1.55%	6.73%
Morocco	1.28%	0.45%
Australia	1.04%	0.90%
Sweden	0.81%	0.45%
Denmark	0.75%	0.90%
Colombia	0.50%	0.90%
Finland	0.35%	2.69%
Others	-	6.28%
Total**	100%	100.00%

The most important industries are Chemical and Manufacturing and Industrial Products each with 8% of respondents followed by Healthcare, Telecom, Computer and others each with 7.1%. Pharmaceutical and Utilities and Energy followed with 6.7% and 4.5% respectively. These industries represent in total more than half of the respondents. The following Figure shows the number of respondents for each industry.

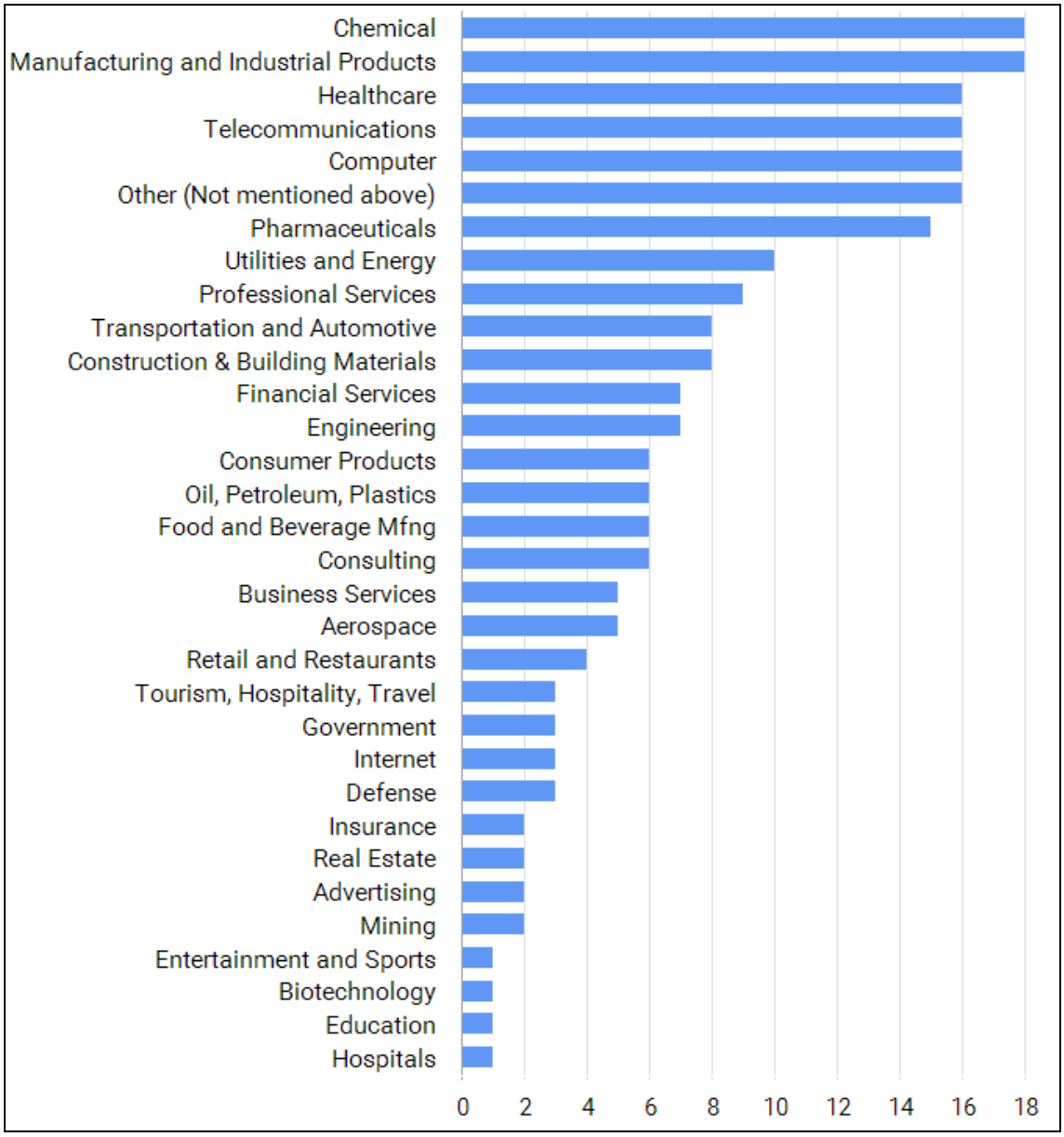

Figure 23 - Respondents by Sector

9.3 Descriptive statistic

The data collected is analyzed using comparative means analysis and the Statistical Package for the Social Sciences (SPSS) version 16.0. The results are discussed in the following sections.

9.3.1 Independent variable and conversion

The independent variable is collected using a categorical scale format based on the question: “Please indicate the total amount of the CI expenses (in USD) spent during the last year to support the previously selected SBU”. Instead of using an open-answer box in which respondents could include the exact or approximate expenses estimation, it is used a specific category to ensure answers. Only one respondent did not wish to reveal the expenses and the response rate is therefore almost 100%. The result of the data is shown in the following Figure and Table.

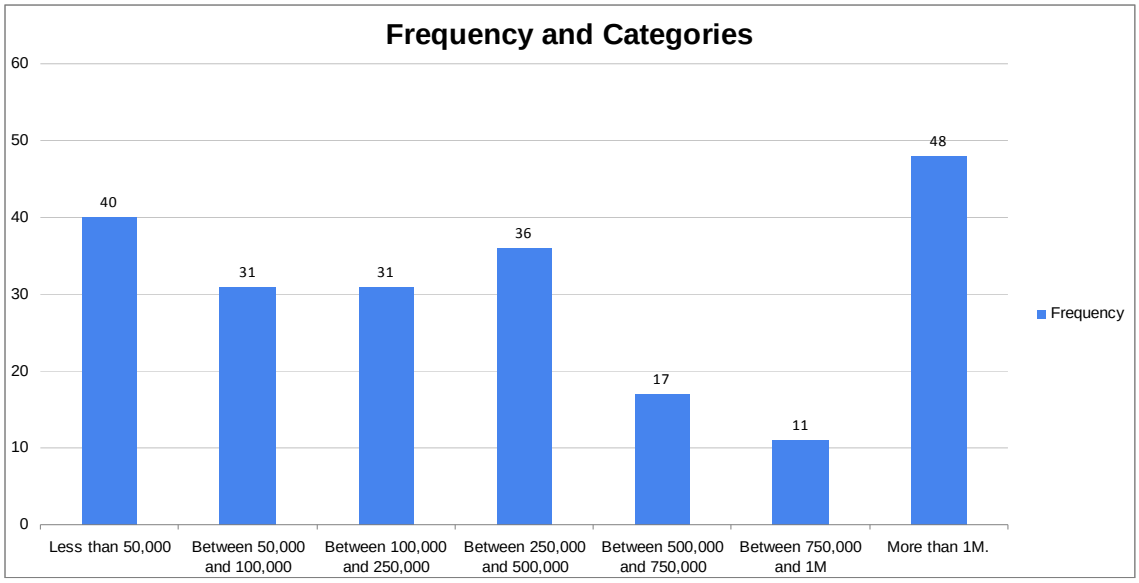

Figure 24 - Frequency of respondents on CI expenses (in USD)

Table 22 - Frequency and percentage of respondents on CI expenses (in USD).

Scale	***Frequency***	***Percentage***	***Accumulated Percentage***
Less than 50,000	40	18.69%	18.69%
Between 50,000 and 100,000	31	14.49%	33.18%
Between 100,000 and 250,000	31	14.49%	47.66%
Between 250,000 and 500,000	36	16.82%	64.49%
Between 500,000 and 750,000	17	7.94%	72.43%
Between 750,000 and 1M	11	5.14%	77.57%
More than 1M.	48	22.43%	100.00%
Total	214	100.00%	100.00%

However, in order to perform the analysis of the dependent variable (CI expenses), it is necessary to convert the seven categories into numerical variables. The means are calculated, of all variables expected for the category “more that 1M”, for which 1M is kept as the numerical value. The following Table shows the conversion that is applied:

Table 23 - Conversion of the dependent variable

Categorical Variable (USD)	***Numerical Variable (USD)***
Less than 50,000	25,000
Between 50,000 and 100,000	75,000
Between 100,000 and 250,000	175,000
Between 250,000 and 500,000	325,000
Between 500,000 and 750,000	625,000
Between 750,000 and 1M	875,000
More than 1M	1,000,000

9.4 Hypotheses testing

9.4.1 Hypotheses testing: Organization

The following section shows the results of the nine hypotheses regarding the organization listed in Chapter 6. Each hypothesis is discussed separately with the support of a descriptive and inference statistical analysis.

*H1.1 A higher level of **SBU Marketing Innovation** (launch of a lot of new products each year) will result in a higher level of CI expenses.*

Descriptive analysis of the data shows that the relationship stated in hypothesis 1.1 is not rejected because the tendency of the graph supports the hypothesis. However, the statistical test (Mann-Whitney) shows a p value that is slightly greater than α=0.05 (0.098>0.05). The following graph shows the different means of the CI expenses against the level of agreement. The difference between the two extreme mean values is 208,438 USD. This result shows that in the sample, expenses grows while the firm launches more products each year.

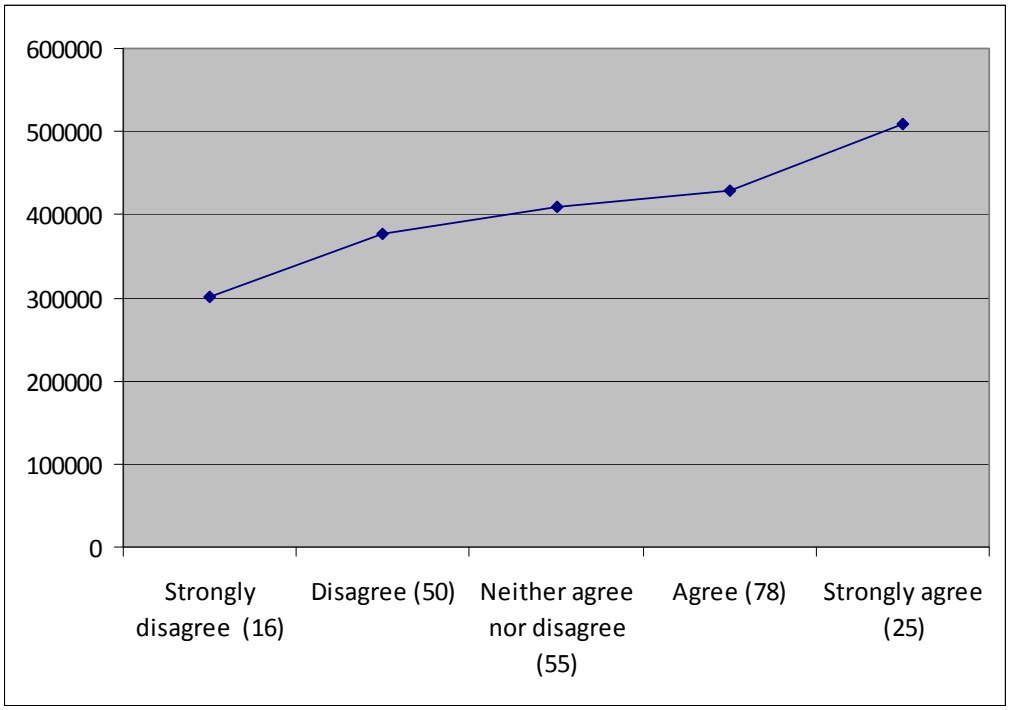

Figure 25 - Mean of CI expenses and SBU Marketing innovation.

The following Table shows the Mann-Whitney test for measuring the significance of the median difference between the two extreme values of the variable "SBU Marketing innovation".

Table 24 - Mann–Whitney U test for H1.1

Test	***Value***
Mann-Whitney U	139.000
Wilcoxon W	275.000
Z	-1.654
Asymptotic significance (bilateral)	0.098

*H1.2 A higher level of **SBU Technology Innovation** (investment of a lot in R&D each year) will result in a higher level of CI expenses.*

Analysis of the data shows that the relationship stated in hypotheses 1.2 is **confirmed** according to the level of significance (0.004<0.05).

The following graph shows the different means of CI expenses against the level of agreement. The difference between the two extreme mean values in this particular variable is 93,456 USD. Although growth is not as strong as in the previous hypothesis, the changes show that there is a positive relationship between the level of innovation in technology and CI expenses.

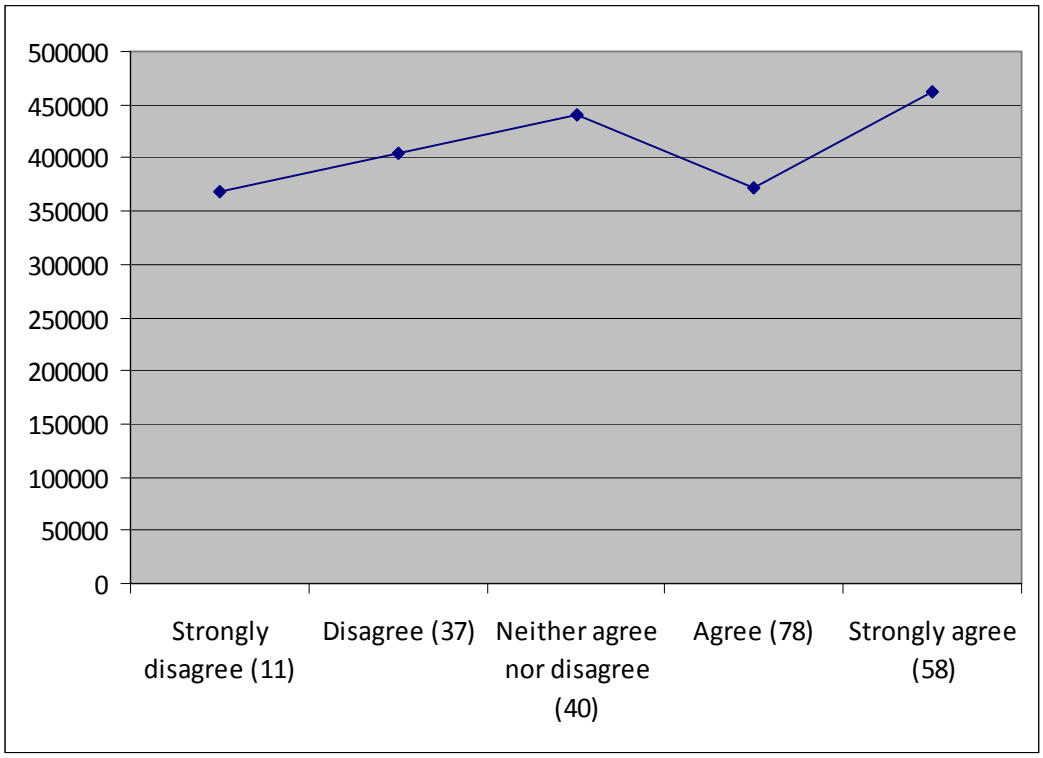

Figure 26 - Mean of CI expenses and SBU Technology innovation.

The following Table shows the Mann-Whitney test for measuring the significance of the median difference between the two extreme means of the variable "SBU Technology innovation".

Table 25 - Mann–Whitney U test for H1.2

Test	***Value***
Mann-Whitney U	148.500
Wilcoxon W	214.500
Z	-2.846
Asymptotic significance (bilateral)	**0.004**

*H1.3 A higher level of **USB Vertical Integration** (both forward and backward) will result in a higher level of CI expenses.*

The statistical test (Mann-Whitney) shows a p value that is clearly greater than α=0.05 (0.681>0.05). Descriptive analysis shows that the difference between the two extreme mean values is positive (43,667 USD).

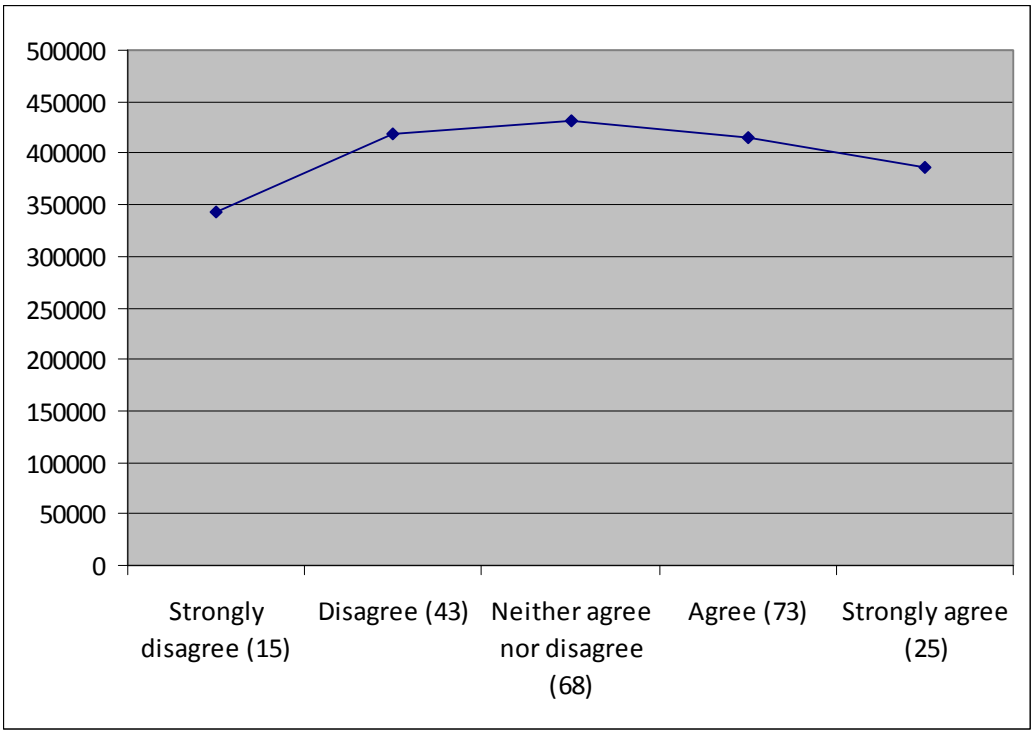

Figure 27 - Mean of CI expenses and USB Vertical Integration.

The following Table shows the Mann-Whitney test for measuring the significance of the median difference between the two extreme means of the variable “SBU Technology innovation”.

Table 26 - Mann–Whitney U test for H1.3

Test	***Value***
Mann-Whitney U	173.000
Wilcoxon W	293.000
Z	-0.412
Asymptotic significance (bilateral)	0.681
Significance of second order derivative [2*(Sig. Unilateral)]	0.699

*H1.4 A broader level of the **USB Product Portfolio** (products and services) will result in a higher level of CI expenses.*

Descriptive analysis of the data shows that the relationship stated in hypotheses 1.4 is not rejected because the tendency of the graph supports the hypothesis. However, the statistical test (Mann-Whitney) shows a p value slightly greater than α=0.05 (0.085>0.05). The following graph shows the different means of the CI expenses against the level of agreement. The difference between the two extreme mean values is 282,500 USD. This difference between the two extremes is the largest of all the organizational variables. This result shows that the sample tends to dedicate more CI expenses when the product portfolio is larger.

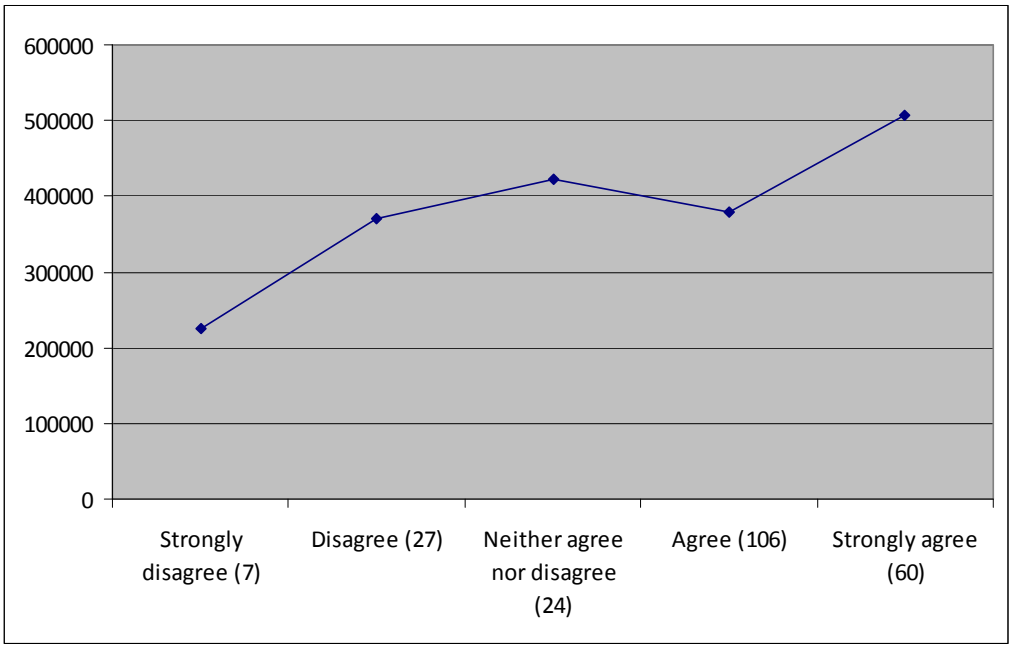

Figure 28 - Mean of CI expenses and USB Product Portfolio.

The following Table shows the Mann-Whitney test for measuring the significance of the median difference between the two extreme means of the variable "USB Product Portfolio".

Table 27 - Mann–Whitney U test for H1.4

Test	***Value***
Mann-Whitney U	127.500
Wilcoxon W	155.500
Z	-1.721
Asymptotic significance (bilateral)	0.085

*H1.5 A higher level of the **USB International In-House Sales Force** (entirely owned by the parent companies) will result in a higher level of CI expenses.*

The statistical test (Mann-Whitney) shows a p value that is clearly greater than α=0.05 (0.681>0.05). Descriptive analysis of the data shows that the relationship stated in hypotheses 1.5 does not show that CI expenses grows with a higher level of USB

international in-house sales force. In addition, the graph shows a major difference between the two extremes and the answer “Neither agree nor disagree”.

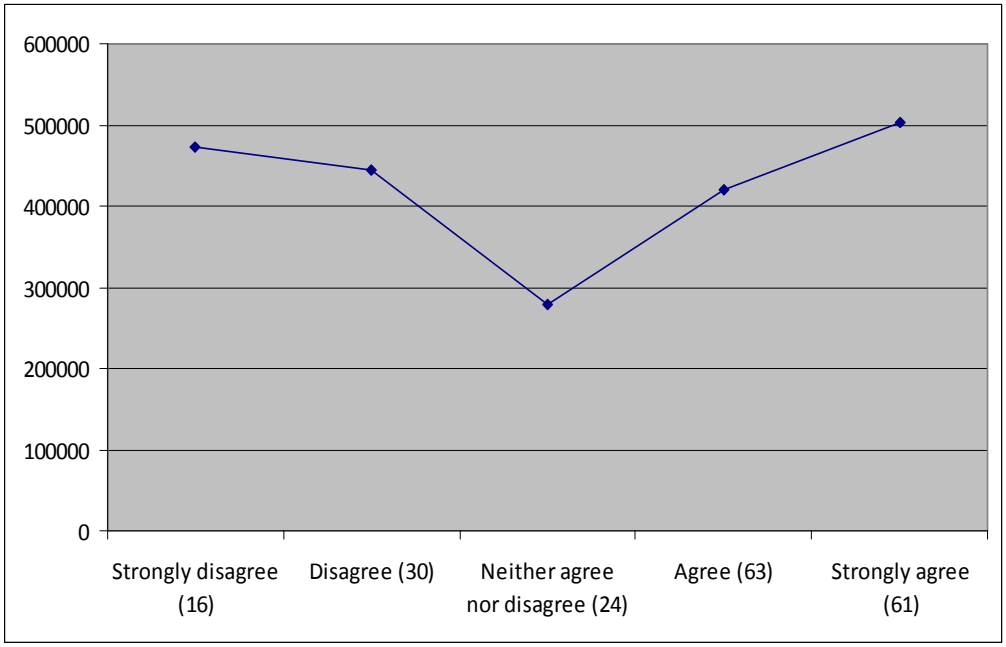

Figure 29 - Mean of CI expenses and USB International in-house sales force.

The following Table shows the Mann-Whitney test for measuring the significance of the median difference between the two extreme means of the variable “USB International in-house sales force”.

Table 28 - Mann-Whitney U test for H1.5

Test	*Value*
Mann-Whitney U	471.500
Wilcoxon W	607.500
Z	-0.211
Asymptotic significance (bilateral)	0.833

H1.6 A higher level of ***USB Direct International Presence*** *(The SBU uses only the parent company to sell in international markets) will result in a higher level of CI expenses.*

Descriptive analysis of the data shows that the relationship stated in hypotheses 1.6 is not rejected because the tendency of the graph supports the hypothesis. The difference between the two extreme mean values is positive (59,200 USD) and the graph is increasing slightly. However, the statistical test (Mann-Whitney) shows a p value that is greater than α=0.05 (0. 457>0.05). The following Figure shows the mean of CI expenses according to the growth of the level of international direct presence.

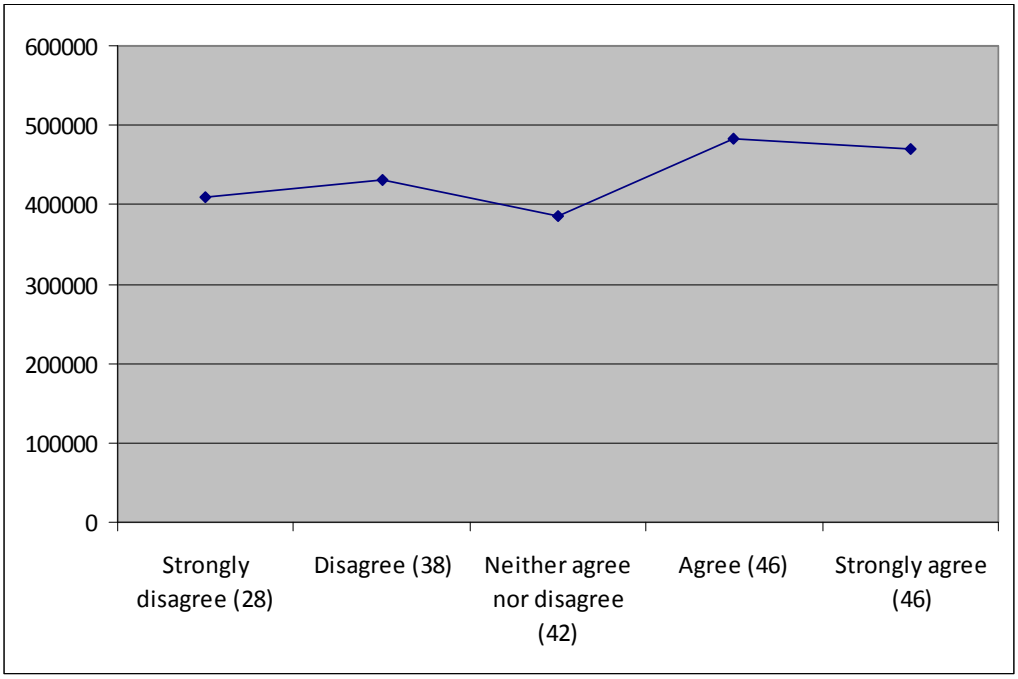

Figure 30 - Mean of CI expenses and USB Direct International presence.

The following Table shows the Mann-Whitney test for measuring the significance of the median difference between the two extreme means of the variable "USB International presence".

Table 29 - Mann-Whitney U test for H1.6

Test	***Value***
Mann-Whitney U	578.500
Wilcoxon W	984.500
Z	-0.744
Asymptotic significance (bilateral)	0.457

*H1.7 A higher level of **USB Growth** (strong revenue growth) will result in a higher level of CI expenses.*

Descriptive analysis of the data shows that the relationship stated in hypotheses 1.7 is rejected because the tendency of the graph does not support the hypothesis. However, the statistical test (Mann-Whitney) shows a p value that is slightly greater than α=0.05 (0. 13>0.05). The following graph shows that when a company is growing, it will not necessarily invest in CI. The difference between the two extreme mean values is negative (-298,934 USD). The following Figure shows the decrease in CI expenses against the level of agreement of the statement.

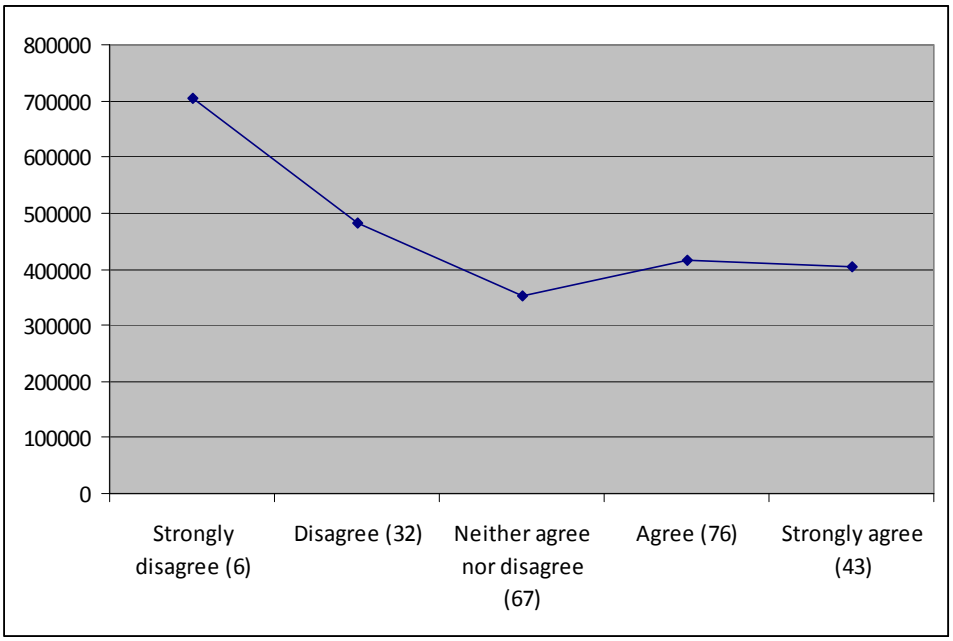

Figure 31 - Mean of CI expenses and USB Growth.

The following Table shows the Mann-Whitney test for measuring the significance of the median difference between the two extreme means of the variable “USB Growth”.

Table 30 - Mann-Whitney U test for H1.7

Test	***Value***
Mann-Whitney U	80.500
Wilcoxon W	1026.500
Z	-1.500
Asymptotic significance (bilateral)	0.134
Significance of second order derivative [2*(Sig. Unilateral)]	0.142

*H1.8 A higher level of **USB Decline** (steep revenue decline) will result in a higher level of CI expenses.*

The statistical test (Mann-Whitney) shows a p value that is clearly greater than α=0.05 (0. 842>0.05). However, descriptive analysis shows that the graph is slightly positive and supports the hypothesis statement. The difference between the two extreme mean values is 63,730 USD. The following graph shows the different means of CI expenses against the level of agreement. In this particular sample the curve of CI expenses against the decline is slightly convex. In addition, a particular note should be made as regarding the number of responses in the strongly agree scale (2).

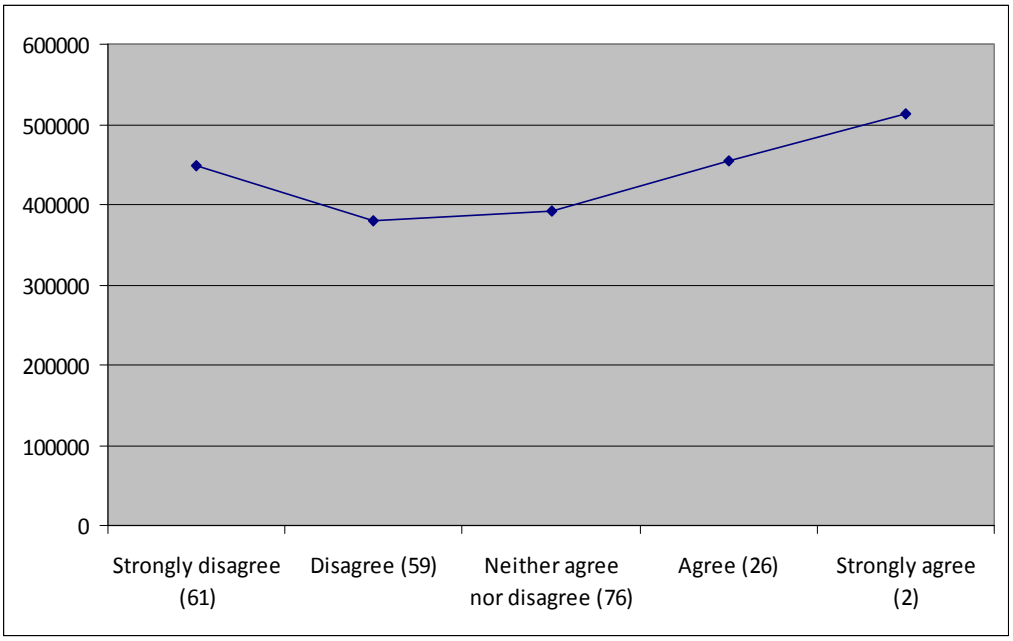

Figure 32 - Mean of CI expenses and USB Decline.

The following Table shows the Mann-Whitney test for measuring the significance of the median difference between the two extreme means of the variable "USB Decline".

Table 31 - Mann-Whitney U test for H1.8

Test	***Value***
Mann-Whitney U	56.000
Wilcoxon W	59.000
Z	-0.200
Asymptotic significance (bilateral)	0.842
Significance of second order derivative [2*(Sig. Unilateral)]	0.861

*H2.9 A higher level of **USB Size** (Nº of full-time equivalent employees) will result in a higher level of CI expenses.*

The descriptive analysis of the data rejects the hypothesis that larger firms have bigger CI functions. In fact, there is no linear correlation between USB size and CI investment.

Only a few large SBUs (>50,000 FTE) have a major CI expenses in place. The following scatterplot shows the distribution of expenses against SBU size.

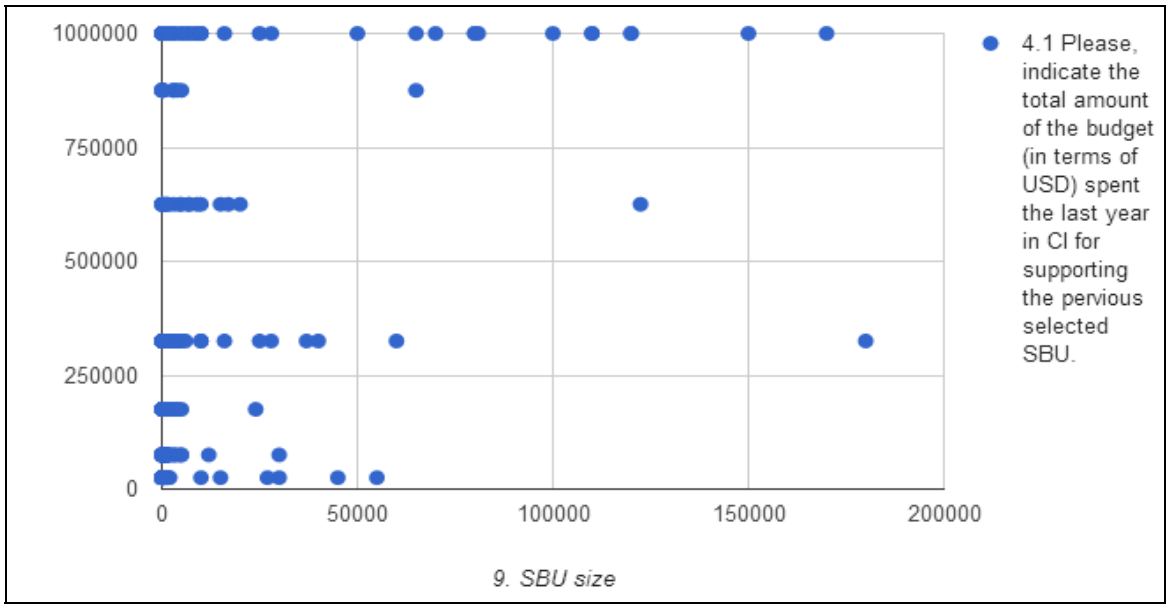

Figure 33 – SBU Size and CI expenses.

Although USB size is not related to CI expenses, it was possible to see that that CI functions in multi-business companies manage higher mean CI expenses than those in single business companies (482,667 USD and 260,616 USD respectively).

9.4.2 Hypotheses testing: Environment

*H2.1 A higher level of **Market Innovation** (new products are launched each year in the market/s in which the SBU operates) will result in a higher level of CI expenses.*

The statistical test (Mann-Whitney) shows a p value clearly greater than α=0.05 (0.388>0.005). However, descriptive analysis shows that the graph is slightly positive and supports the hypothesis statement. The difference between the two extreme

mean values is 124,071 USD. The following graph shows the different means of CI expenses against the level of agreement.

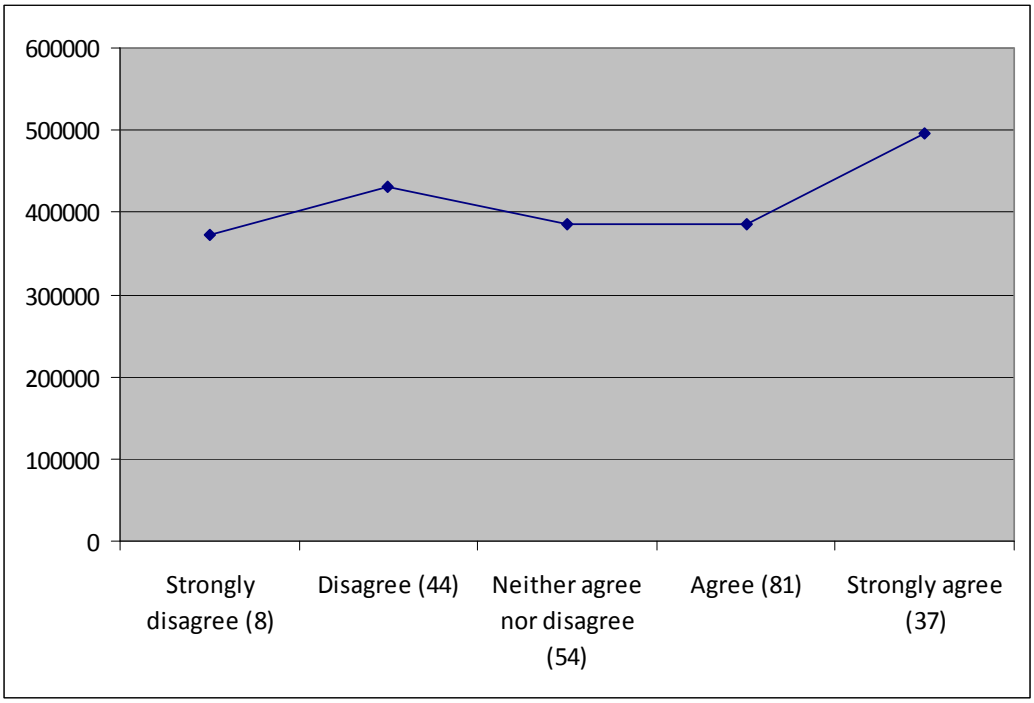

Figure 34 - Mean of CI expenses and Market Innovation.

The following Table shows the Mann-Whitney test for measuring the significance of the median difference between the two extreme means of the variable "Industry Technology innovation".

Table 32 - Mann–Whitney U test for H2.1

Test	***Value***
Mann-Whitney U	119.500
Wilcoxon W	155.500
Z	-0.863
Asymptotic significance (bilateral)	0.388
Significance of second order derivative [2*(Sig. Unilateral)]	0.405

H2.2 A higher level of ***Industry Technology innovation*** *(number of patent applications requested each year in the industry in which the SBU operates) will result in a higher level of CI expenses.*

The analysis of the data shows that the relationship stated in hypothesis 2.2 is **confirmed** according to the level of significance (0.037<0.05). The following graph shows the different means of CI expenses against the level of agreement. The difference between the two extreme mean values in the variable "Industry Technology innovation" is 153,191 USD. It is possible to see a clear growth curve highlighting the relationship between the level of Industry Technology innovation and CI expenses.

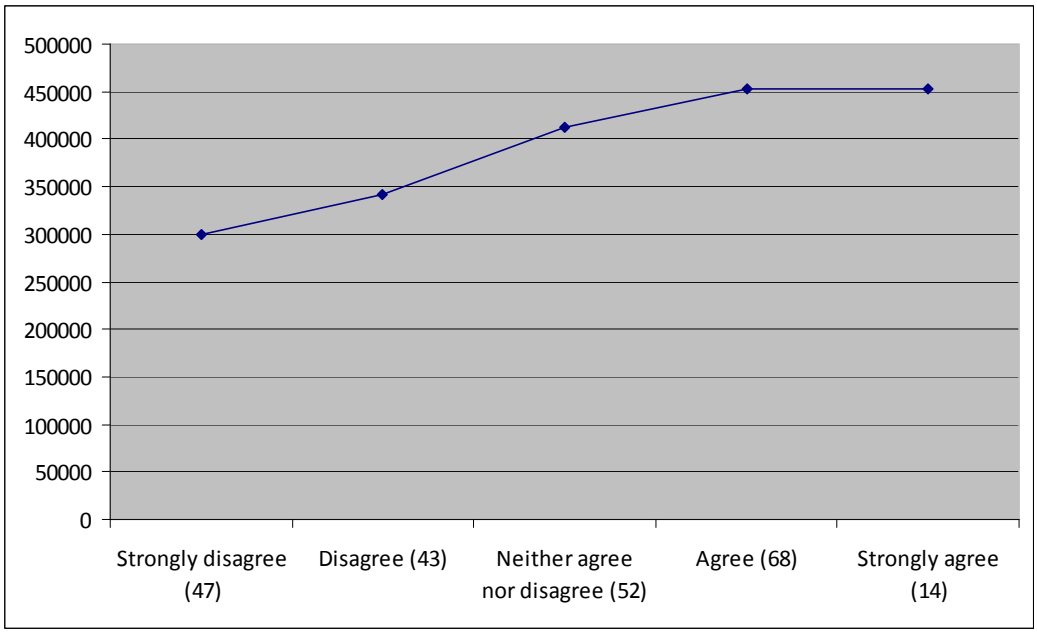

Figure 35 - Mean of CI expenses and Industry Technology innovation.

The following Table shows the Mann-Whitney test for measuring the significance of the median difference between the two extreme means of the variable "Industry Technology innovation".

Table 33 - Mann–Whitney U test for H2.2

Test	***Value***
Mann-Whitney U	209.500
Wilcoxon W	314.500
Z	-2.089
Asymptotic significance (bilateral)	0.037

By segmenting the companies that answered "strongly agree", it was possible to see that CI activities were not manly focused on technology intelligence, with a mean of 12.5% of resources allocated to it. In contrast, the majority of resources were devoted to "Competitor Intelligence" and "marketing/market Intelligence", with figures of 29.3% and 23.4% respectively. In addition, in a recount of the sectors of this subgroup (58 responses) the results showed that although the Computer had almost 20% of the respondents (9), there were other industries in which respondents answered "strongly agree" in SBU Technology Innovation.

H2.3 A lower level of ***Regulatory Constraints*** *(regulations or government rules) will result in a higher level of CI expenses.*

The analysis of the data shows that the relationship stated in hypothesis 2.3 is **confirmed** according to the level of significance (0.005<0.05). The following graph shows the different means of CI expenses against the level of agreement. The difference between the two extreme mean values in the variable "Regulatory Constraints" is 305,809 USD. It is possible to see a clear growth curve highlighting a strong relationship between the level of Industry Technology innovation and CI expenses.

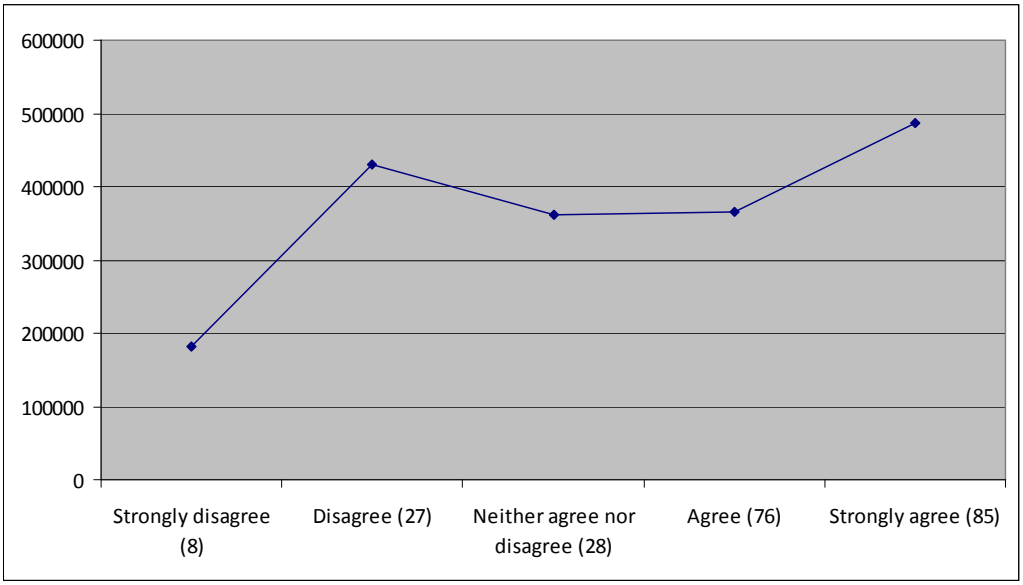

Figure 36 - Mean of CI expenses and Regulatory Constraints.

The following Table shows the Mann-Whitney test for measuring the significance of the median difference between the two extreme means of the variable "Regulatory Constraints".

Table 34 – Mann-Whitney U test for H2.3

Test	***Value***
Mann-Whitney U	139.500
Wilcoxon W	175.500
Z	-2.792
Asymptotic significance (bilateral)	0.005

*H2.4 A higher level of **Industry Alliance** (strategic alliances between firms) will result in a higher level of CI expenses.*

The statistical test (Mann-Whitney) shows a p value clearly greater than α=0.05 (0. 966>0.05). Descriptive analysis rejects slightly the hypothesis 2.4. The difference between the two extreme mean values is negative -6,977 USD and the graph is convex

with a strong difference between the extremes and the “Neither agree nor disagree” means (approx. 196,000 USD). The following graph shows the different means of CI expenses against the level of agreement.

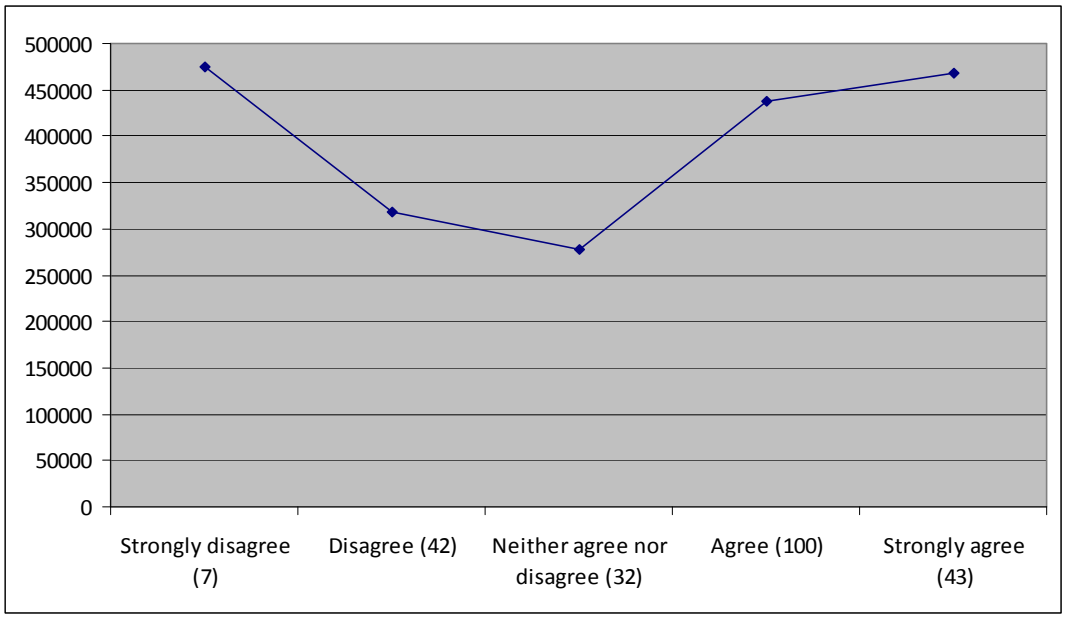

Figure 37 - Mean of CI expenses and Industry Alliance.

The following Table shows the Mann-Whitney test for measuring the significance of the median difference between the two extreme means of the variable “Industry Alliance”.

Table 35 - Mann–Whitney U test for H2.4

Test	***Value***
Mann-Whitney U	149.000
Wilcoxon W	1095.000
Z	-0.043
Asymptotic significance (bilateral)	0.966

*H2.5 A higher level of **Globalization** (international competitors) will result in a higher level of CI expenses.*

Although the difference in means between the extremes shows a strong and positive value (233,252 USD), the statistical test (Mann-Whitney) shows a p value that is greater than α=0.05 (0. 18>0.05). Descriptive analysis of the data shows that the relationship stated in hypothesis 2.5 is not rejected because the tendency of the graph supports the hypothesis. Thus, the level of globalization may be related to CI expenses and hence the hypothesis cannot be rejected.

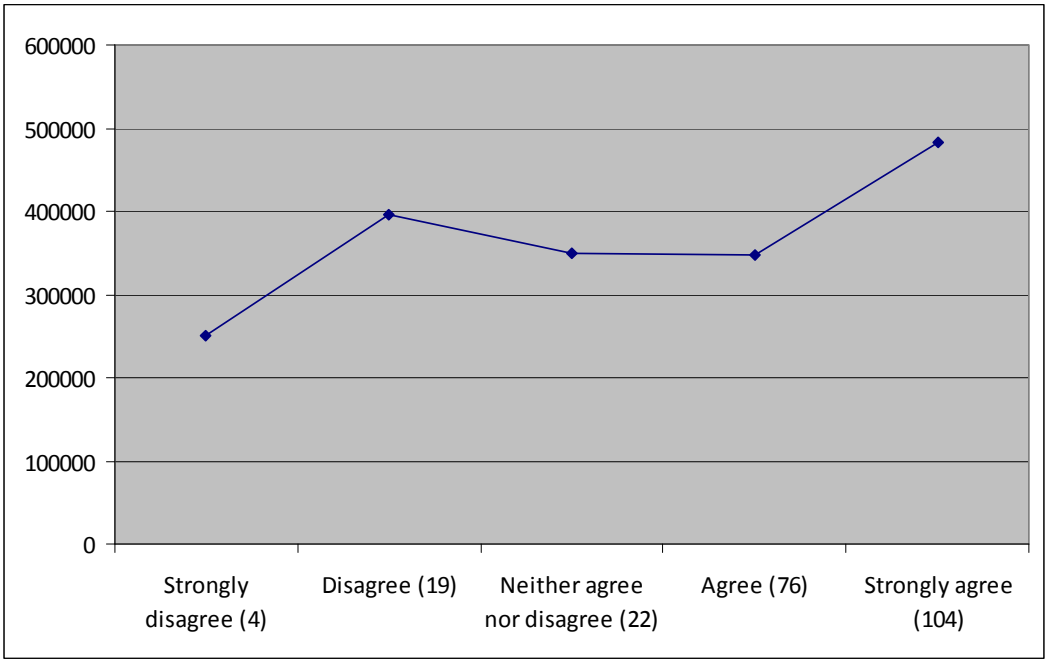

Figure 38 - Mean of CI expenses and Globalization.

The following Table shows the Mann-Whitney test for measuring the significance of the median difference between the two extreme means of the variable "Industry Globalization".

Table 36 – Mann–Whitney U test for H2.5

Test	***Value***
Mann-Whitney U	126.000
Wilcoxon W	136.000
Z	-1.342
Asymptotic significance (bilateral)	0.180

*H2.6 A higher level of **Industry Rivalry** (rapid growth in the Industry in which the SBU operates) will result in a higher level of CI expenses.*

The statistical test (Mann-Whitney) shows a p value clearly greater than α=0.05 (0.404>0.05). Descriptive analysis, however, supports the hypothesis 2.6 and shows that the difference in means between the extremes is positive (82,143 USD), although there is a lower mean value of CI expenses in the "Neither agree nor disagree" answers.

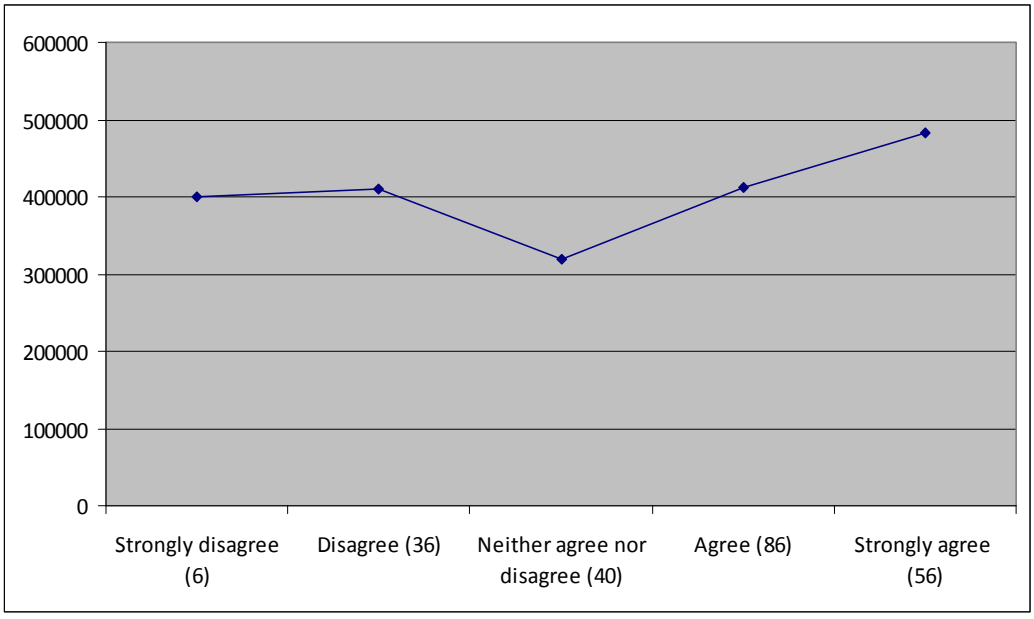

Figure 39 - Mean of CI expenses and Industry Rivalry.

The following Table shows the Mann-Whitney test for measuring the significance of the median difference between the two extreme mean of the variable “Industry Rivalry”.

Table 37 - Mann–Whitney U test for H2.6

Test	***Value***
Mann-Whitney U	133.500
Wilcoxon W	154.500
Z	-0.835
Asymptotic significance (bilateral)	0.404

*H2.7 A higher level of **Industry Growth** (Rapid growth in the industry in which the SBU operates) will result in a higher level of CI expenses.*

Hypothesis 2.7 is rejected. It shows a low level of significance (0.411>0.05). Also descriptive analysis shows that the difference in means between the extremes does not support the hypothesis (-92,414 USD) as supposed.

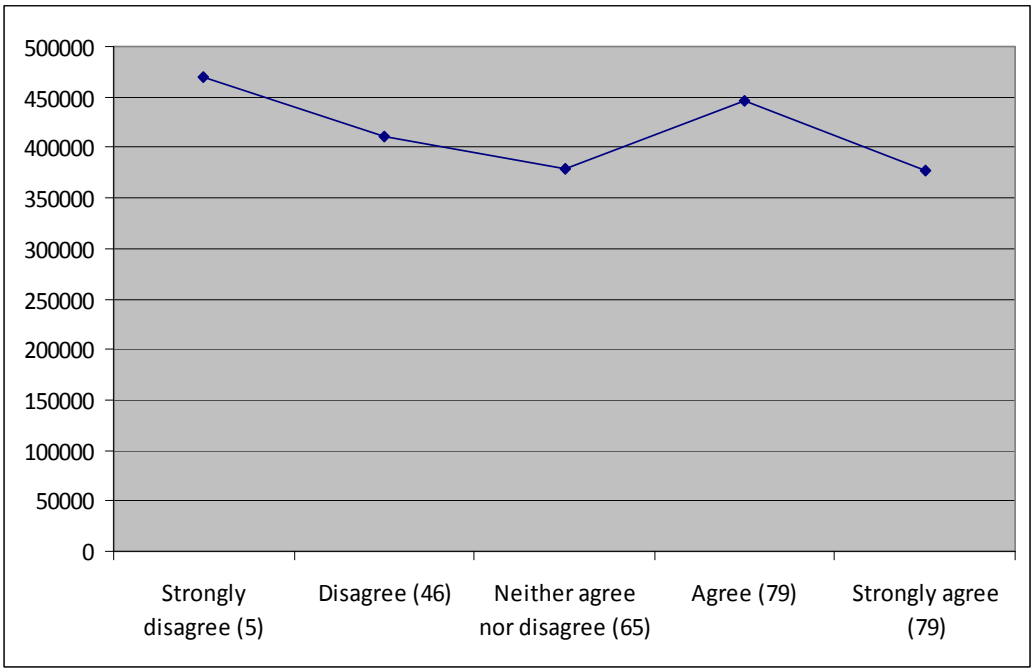

Figure 40 - Mean CI expenses and Industry Growth.

The following Table shows the Mann-Whitney test for measuring the significance of the median difference between the two extreme means of the variable “Industry Growth”.

Table 38 - Mann–Whitney U test for H2.7

Test	***Value***
Mann-Whitney U	56.000
Wilcoxon W	491.000
Z	-0.823
Asymptotic significance (bilateral)	0.411

*H2.8 A higher level of **Industry Decline** (Rapid decline in the industry in which the SBU operates) will result in a higher level of CI expenses.*

Descriptive analysis of the data shows that the relationship stated in hypothesis 2.8 is not rejected because the tendency of the graph supports the hypothesis. However, the statistical test (Mann-Whitney) shows a p value that is greater than α=0.05 (0. 314>0.05). The difference of the means between the extremes is positive (173,837), although the graph is slightly convex.

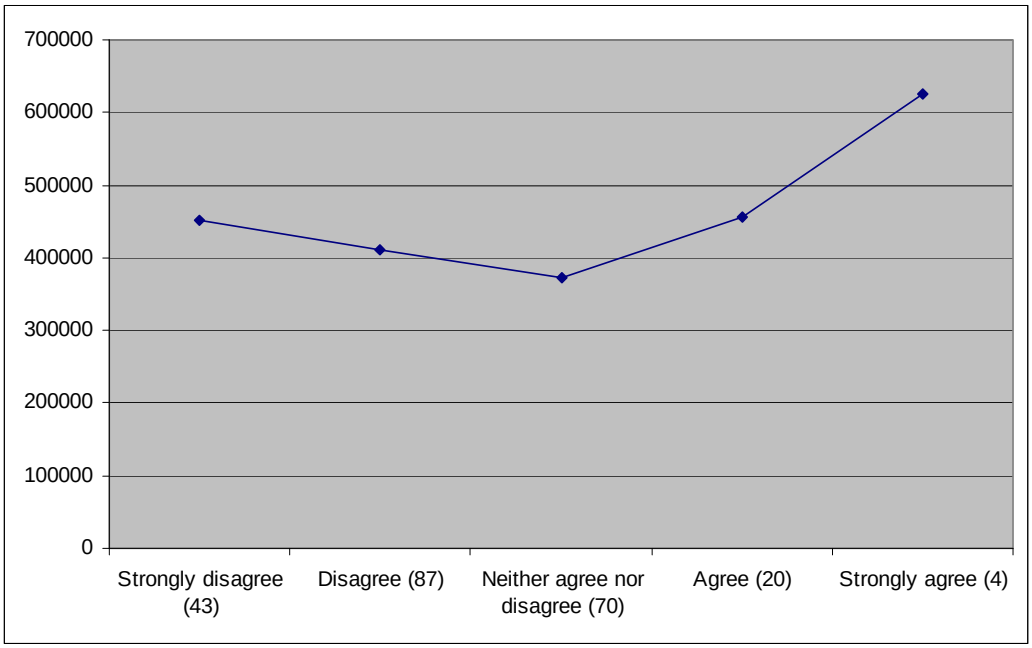

Figure 41 - Mean of CI expenses and Industry Decline.

The following Table shows the Mann-Whitney test for measuring the significance of the median difference between the two extreme means of the variable "Industry Decline".

Table 39 - Mann–Whitney U test for H2.8

Test	***Value***
Mann-Whitney U	60.000
Wilcoxon W	1006.000
Z	-1.007
Asymptotic significance (bilateral)	0.314

9.5 Hypotheses testing: Contingency variable

Hypothesis 3 states that industry variables have a moderating effect on the relationship between the organizational characteristics and CI expenses. The contingency Table

shows the moderation effects of the environmental variable which strengthens the relationship between organizational variables and CI expenses. It is not possible to test any of the answers statistically because the sample is very small in the majority of the subgroups. However, in descriptive terms, the following aspects can be observed:

- Firstly, all the environmental variables show reinforcement in the relationship between the organizational variables and CI expenses. Some contingencies, such as Regulation Constraints, for instance, are supporting and enhancing the relationship (measured through mean difference) between the independent and the dependent variable. This enhancement of the relationship is measured by the increase in the mean difference. Other variables smooth out the difference. In contrast, there are some contingencies that have opposite effects, such as “regulatory constraints” on organization “technology innovation”, for instance.
- The second observation is that the moderation effect of each contingency on each organizational variable is different and therefore it is not possible to see a common effect of each environmental variable.
- The third observation is that the relationship between technology innovation and CI expenses is the only one that is strengthens under the influence of all environmental variables.
- Finally, looking at the numbers of pairs of responses, it is possible to observe that in some cases, the limited number of answers available means that there is not even one respondent. In some cases, the data is not available and therefore the pairs are null and void.

Table 36 shows the contingencies. The color of each cell highlights is the effect of the contingency on the relationship between the independent and the dependent variable. Contingencies which enhance the relationship are displayed in dark orange, those

which weaken the relationship in light orange and those which have the opposite effect in blue. In addition, the Table shows the pair of respondents in each subgroup.

Table 40 – Contingencies H3

Organizational Variables		Contingencies – Environmental Variables															
		E1 - Marketing		**E2 -Technology**		**E3 - Regulation**		**E4 - Alliance**		**E5 - Globalization**		**E6 - Rivalry**		**E7 - Growth**		**E8 - Decline**	
Difference between Means	*Delta*	S. Disagree	S. Agree	S. Disagree	S. Agree	S. Disagree	S. Agree	S. Disagree	S. Agree	S. Disagree	S. Agree	S. Disagree	S. Agree	S. Disagree	S. Agree	S. Disagree	S. Agree
O1 Marketing	208.438	-479.167	596.429	68.750	205.208	0	99.107	25.000	386.364	325.000	191.667	512.500	-25.000	-662.500	92.857	-59.921	-1.000.000
O2 Tech.	93.456	300.000	502.632	-75.000	443.478	850.000	141.667	475.000	428.571	-	231.944	675.000	475.000	300.000	543.750	264.706	-
O3 Vertical	43.667	-325.000	18.750	-475.000	-345.000	300.000	24.206	-175.000	-18.750	325.000	-144.545	-25.000	-479.167	-325.000	-87.500	-228.333	-
O4 Portfolio	282.500	187.500	584.722	233.333	176.923	375.000	211.607	425.000	75.000	-	197.727	512.500	178.125	-325.000	483.333	557.143	1.000.000
O5 Inter	28.612	-408.333	-128.676	590.000	-31.618	50.000	14.250	625.000	-483.333	-	-52.618	1.000.000	42.669	0	194.444	-116.364	2.325.000
O6 Direct Inter	59.200	800.000	-54.167	487.500	117.500	-266.667	23.958	562.500	27.500	-	-20.264	825.000	-80.208	675.000	417.857	108.081	825.000
O7 Growth	-298.934	-275.000	-538.462	-300.000	-531.818	-	-391.667	-375.000	-495.833	-	-582.750	175.000	-553.571	-325.000	365.625	-689.706	-
O8 Decline	63.730	-241.667	571.429	-125.000	441.176	-75.000	56.944	-475.000	513.462	-325.000	577.941	-325.000	-420.833	-175.000	-484.375	549.074	-

O1 Marketing	16 and 25	6 and 0	1 and 14	4 and 2	3 and 8	1 and 1	7 and 8	3 and 2	2 and 11	0 and 1	3 and 12	0 and 2	6 and 5	2 and 1	7 and 1	9 and 7	1 and 0
O2 Tech.	11 and 58	1 and 1	0 and 19	3 and 0	1 and 23	1 and 1	1 and 3	1 and 3	1 and 14	0 and 0	3 and 36	0 and 3	1 and 20	1 and 1	0 and 12	1 and 17	0 and 0
O3 Vertical	15 and 25	2 and 0	3 and 4	3 and 2	2 and 5	1 and 1	9 and 7	1 and 0	6 and 8	0 and 1	5 and 11	1 and 0	3 and 6	1 and 0	3 and 2	5 and 12	0 and 0
O4 Portfolio	7 and 60	4 and 0	0 and 18	3 and 3	3 and 13	1 and 2	1 and 28	1 and 3	1 and 10	0 and 0	3 and 33	0 and 2	1 and 16	1 and 0	0 and 9	0 and 14	0 and 1
O5 Inter	16 and 61	1 and 3	2 and 17	1 and 5	2 and 17	0 and 2	8 and 25	0 and 4	2 and 12	0 and 0	8 and 37	0 and 1	7 and 19	1 and 1	2 and 9	5 and 11	0 and 3
O6 Direct Inter	28 and 46	2 and 1	3 and 12	1 and 2	5 and 12	3 and 2	12 and 16	1 and 4	5 and 12	0 and 0	14 and 23	2 and 1	8 and 18	1 and 1	2 and 7	9 and 11	1 and 2
O7 Growth	6 and 43	2 and 1	1 and 13	1 and 3	2 and 11	0 and 0	3 and 15	1 and 1	1 and 12	0 and 0	4 and 25	0 and 2	2 and 14	1 and 0	1 and 16	1 and 17	0 and 0
O8 Decline	61 and 2	3 and 0	14 and 1	3 and 0	17 and 1	1 and 0	27 and 2	2 and 0	13 and 1	1 and 0	34 and 1	1 and0	18 and 0	2 and 0	16 and 1	27 and 1	0 and 0

Number of respondents for each pairs

9.5.1 Normal distribution test

As described in the methodology section, the Student's T-test cannot be applied because of the abnormal distribution of the organizational and environmental variables. For this reason, a non-parametric test is used. For instance, in the variable "Industry Globalization" there is a major difference between the means of the two extremes but the relationship between "industry globalization and CI expenses is not significant due to the high dispersion of the CI expense variable in both "strongly agree" and "strongly disagree" answers. The following histograms show that the sample does not follow a normal distribution.

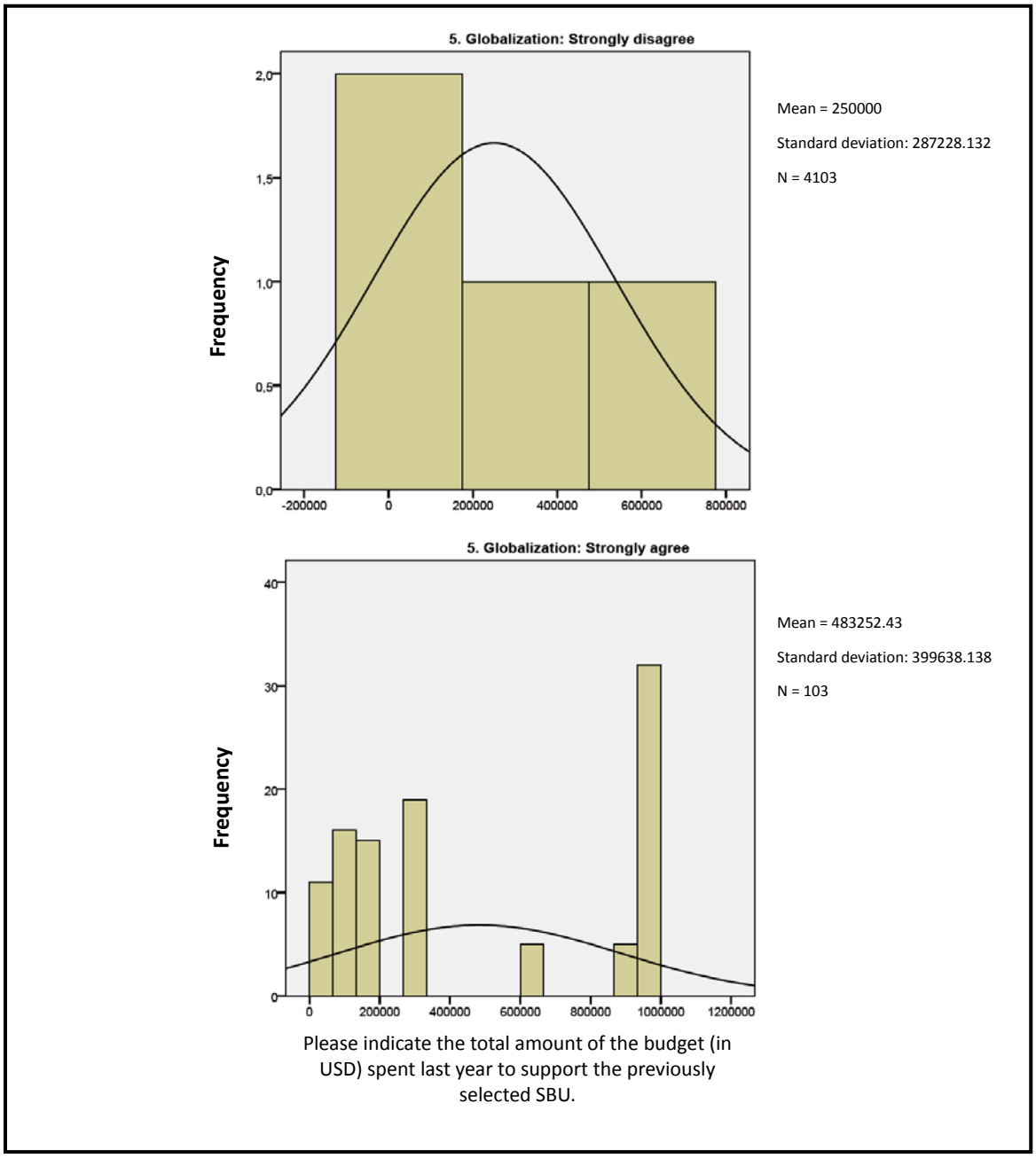

Figure 42 - Distribution of Sample in "Industry Globalization".

Normality can also be tested using the Kolmogorov-Smirnov test. The following Table shows that in almost cases the normality assumption in both groups (strongly agree disagree) is not met.

Table 41 - Kolmogorov-Smirnov test

	O1 - SBU Marketing innovation	***O2 - SBU Technology innovation***	***O3 - SBU Vertical integration***	***O4 - SBU Product portfolio***	***O5 – SBU Intern. In-house sales force***	***O6 – SBU Direct Intern. presence***	***O7 - SBU Growth***	***O8 - SBU Decline***
N. ***Strongly Agree***	25	58	25	60	61	46	43	2
Normal parameters Means*	510000	509482.76	387000	507500	502049.18	469021.74	405232.56	512500
Typical deviation	396797.072	393249.719	382638.864	397723.927	391506.042	389200.919	362881.906	689429.112
Extremes difference: Absolute	0.199	0.249	0.244	0.227	0.232	0.231	0.239	0.26
Extremes difference: Positive	0.199	0.249	0.244	0.227	0.232	0.231	0.239	0.26
Extremes difference: Negative	-0.181	-0.204	-0.179	-0.206	-0.193	-0.196	-0.147	-0.26
Z de Kolmogorov-Smirnov	0.997	1.9	1.222	1.757	1.811	1.569	1.565	0.368
Asymptotic Significance (bilateral)	0.273	0.001	0.101	0.004	0.003	0.015	0.015	0.999

N. ***Strongly Disagree***	16	11	15	7	16	28	6	61
Normal parameters Means*	301562.5	170454.55	343333.33	225000	473437.5	409821.43	704166.67	448770.49
Typical deviation	327040.868	189016.594	378845.364	217944.947	412761.912	405536.869	423502.263	379649.68

Extremes difference: Absolute	0.284	0.239	0.253	0.183	0.265	0.261	0.323	0.267
Extremes difference: Positive	0.284	0.239	0.253	0.183	0.265	0.261	0.242	0.267
Extremes difference: Negative	-0.199	-0.221	-0.2	-0.179	-0.211	-0.196	-0.323	-0.189
Z de Kolmogorov-Smirnov	1.136	0.792	0.978	0.484	1.062	1.383	0.792	2.086
Asymptotic Significance (bilateral)	0.152	0.558	0.294	0.973	0.21	0.044	0.557	0

(*)The distribution of contrast is normal.

9.6 Conclusion of Research results

Based on the analysis described in this chapter, it is possible to state that only three of the sixteen (16) hypotheses tested in this study have the full support of the Mann–Whitney U test and the relationship between the independent and the dependent variables is significant.

The variables from the accepted hypotheses are SBU Technology Innovation (Organization Characteristic) described by hypothesis 1.2 (see table 24) and Technology Innovation and Regulatory Constraints included in the Environmental variables described by hypothesis 2.2 and 2.3 respectively (see tables 31 and 32). Although thirteen (13) hypotheses are not significant by the Mann–Whitney U test, descriptive analysis shows that eight (8) have a positive impact on CI expenses. In other words, descriptive analysis shows a possible relationship between the independent and dependent variables by interpreting the respective graphs. In addition, descriptive analysis shows that five variables have not a positive impact to CI expenses. Thus, these variables are not contributing to CI expenses.

Lastly, the variable “SBU Growth” and “Industry Growth” both show a negative graph (see Figure 29 and 38) contrary to hypothesis 1.8 and 2.7. In other words, when the variables grow CI expenses declines. These are not supported by descriptive analysis.

Regarding industry contingencies it is not possible to test the moderating effect upon the relationship between organization variables and CI expenses due to the limited number of responses. However, descriptive analysis shows that the environment could have some effect on the relationship between organization characteristics and CI expenses. In particular, SBU Technology Innovation is the only variable that is positively influenced by any environment contingencies (see Table 38). The following Table

summarizes the findings regarding organizational characteristics in relation to CI expenses.

The following chapter provides the main conclusions about the study.

Table 42 – H1 overall results and statistic and descriptive analysis

Hypotheses – Organization Characteristics	***Mean (between strongly disagree and strongly agree)***	***p-value***	***Mann–Whitney U test***	***Descriptive Analysis***
H1.1 SBU Marketing innovation	208.438	**0.098**	Not Significant	**Shows Relationship**
H1.2 SBU Technology innovation	93.456	**0.004**	**Significant**	**Positive Impact**
H1.3 SBU Vertical Integration	43.667	0.681	Not Significant	**Shows Relationship**
H1.4 SBU Product Portfolio	282.500	**0.085**	Not Significant	**Shows Relationship**
H1.5 SBU International in-house sales force	28.612	0.833	Not Significant	**Shows Relationship**
H1.6 SBU Direct International presence	59.200	0.457	Not Significant	**Shows Relationship**
H1.7 SBU Growth	-298.934	0.134	Not Significant	No Relationships
H1.8 SBU Decline	63.730	0.842	Not Significant	**Shows Relationship**
H1.9 SBU Size*	-	-	-	No Relationships

(*) Descriptive analysis only

Table 43 – H2 overall results and statistic and descriptive analysis

Hypotheses – Environmental Characteristics	***Mean (between strongly disagree and strongly agree)***	***p-value***	***Mann–Whitney U test***	***Descriptive Analysis***
H2.1 Marketing Innovation	124.071	0.388	Not Significant	**Shows Relationship**
H2.2 Industry Technology Innovation	153.191	**0.037**	**Significant**	**Positive Impact**
H2.3 Regulation Constraints	305.809	**0.005**	**Significant**	**Positive Impact**
H2.4 Industry Alliance	-6.977	0.966	Not Significant	**Rejected**
H2.5 Globalization	233.252	0.180	Not Significant	**Shows Relationship**
H2.6 Rivalry Intensity	82.143	0.404	Not Significant	**Shows relationship**
H2.7 Industry Growth	-92.414	0.411	Not Significant	**Rejected**
H2.8 Industry Decline	173.837	0.314	Not Significant	**Shows Relationship**

Chapter 10: CONCLUSIONS

10.1 Introduction

The study is set up to explore the positive impact of organizational and environmental variables on CI expenses. The study also sought to understand whether the environment strengthens the relationship between the organizational characteristics and CI expenses.

Literature on environmental scanning and with specific reference to CI is inconclusive with regard to the monetary resources devoted to CI. The study sought to answer the following three questions:

- Do organization's strategic business unit characteristics affect CI expenses?
- Do environmental characteristics affect CI expenses?
- Do environmental conditions affect the relationship between organization and CI expenses?

The comments that follow present a synthesis of the empirical findings as well as the main contribution that can be extracted from this study, the limitations of the methodology and of the results obtained, as well as suggestions for future research. In the final section, practical implications for managers and CI users are added.

10.2 Empirical findings

The main empirical findings are summarized in Chapter 9 which dedicated entirely on the analysis of data gathered from CI practitioners. This section synthesizes the empirical findings to answer the study's three research questions. For each question a conclusion to the key aspects is provided. In addition, a table summarizes the conclusion for each organizational and environmental variable (Table 44 and 45).

1. Do organization's strategic business unit characteristics affect CI expenses?

   – Only one of the nine organizational variables satisfied the 0.05 criterion. "**SBU Technology Innovation**" with a 0.004 error results statistically significant and the result can therefore be generalized to the entire populations. According to

the data when a firm has a very strong technology orientation, it is likely to invest more in CI than firms that are less technologically oriented. Thus SBU Technology Innovation has a positive impact to CI expenses.

- If a larger error is acceptable (<0.10), two additional variables of the organization could be considered to be statistically significant and related to CI expenses: **SBU Marketing innovation** and **SBU Portfolio**. Both satisfy the 0.10 criterion and would be significant. Thus, these variables show a positive impact on CI expenses but only using descriptive analysis.
- Based on descriptive analysis, it is possible to state that, in addition to the variables that are significant, only three organization variables have a positive impact on CI expenses as assumed in the hypothesis. The difference between the extreme mean ("Strongly disagree" and "Strongly agree") is positive. This showed that each variable had a certain impact on CI expenses.
- The results for "**SBU Growth**" is opposite as expected. The graph shows a sharp negative curve between any intermediate intervals of CI expense means. In other words, the mean investment of those respondents who chose "strongly agree", is inferior to that of those who chose "strongly disagree". Thus, SBU growth is negative in relation to CI expenses.
- Contrary to expectation, descriptive analysis shows that CI expenses are not related to **USB Size** although larger firms may tend to invest more resources in CI (see Figure 31). In addition, small SBUs show very different resources allocated to CI.

Table 44 –Results and practical implications of Organizational Variables

Hypotheses	**Mann-Whitney U test**	**Descriptive Analysis**	**Main results and practical implications**
H1.1 SBU Marketing innovation	Not Significant** *(p-value: 0.098)*	**Shows Relationship** *(+208,438 USD)*	SBU marketing innovation is not significant, although descriptive analysis shows that the variable impact positively CI expenses in the sample. If a larger error is accepted (p-value<0.10), then it is possible to state

			that those companies / SBUs that are intensively focused on Marketing Innovation need to invest in CI.
H1.2 SBU Technology innovation	**Significant** *(p-value: 0.004)*	**Positive Impact** *(+93,456 USD)*	SBU Technology innovation is significant and has a positive impact on CI expenses. Thus companies that are heavily technologically focused need to invest in CI. Those that are starting-up a technology company or SBU also need to take CI into consideration by allocating resources to it.
H1.3 SBU Vertical Integration	Not Significant *(p-value:* 0.681*)*	**Shows Relationship** *(+43,667 USD)*	SBU vertical integration is not significant. Additionally descriptive analysis shows a slightly impact on CI expenses when firms are more integrated (forward and backward). A generalization cannot be made as the variable is not significant.
H1.4 SBU Product Portfolio	Not Significant** *(p-value:* 0.085*)*	**Shows Relationship** *(+282,500 USD)*	SBU Product portfolio is not significant, although descriptive analysis shows that the variable strongly impact positively CI expenses. If a larger error is accepted (p-value<0.10), then it is possible to state that those companies / SBUs that have a large portfolio need to invest in CI.
H1.5 SBU International in-house sales force	Not Significant *(p-value: 0.833)*	**Shows Relationship** *(+28,612 USD*	SBU International in-house sales is not significant. Additionally descriptive analysis shows a very weak impact. A generalization cannot be made as the variable is not significant.
H1.6 SBU Direct International presence	Not Significant *(p-value:* 0.457*)*	**Shows Relationship** *(+59,200 USD)*	SBU Product portfolio is not significant, although descriptive analysis shows that the variable impact positively CI expenses. Thus the result cannot be extrapolated to the entire population.
H1.7 SBU Growth	Rejected *(p-value:* 0.134*)*	**Rejected** *(-298,934 USD)*	SBU Growth Decline is not significant. It is contrary to expectation. Descriptive analysis shows that the variable has a strong negative impact on CI expenses.

H1.8 SBU Decline	Not Significant *(p-value:* 0.842*)*	**Shows Relationship** *(+73,730 USD)*	SBU Decline is not significant, although descriptive analysis shows that the variable impact slightly positively CI expenses. Thus the result cannot be extrapolated to the entire population.
H1.9 SBU Size*	-	**No relationships** *(-))*	SBU size has not positive impact on CI expenses. Descriptive analysis shows that: A) large corporations in the sample have very large CI expenses. B) Small SBUs and firms in the sample have very large or small CI expenses.

(*) Descriptive analysis only. (**) significant is larger error is accepted: p-value<0.10.

2. Do environmental characteristics affect CI expenses?

   - Descriptive analysis shows that environmental characteristics are impacting CI expenses, although only two variables were significant. "**Industry Technology Innovation**" and "**Regulations constraints**" are the two environmental variables which are significant and have a positive impact on CI expenses. Both supported the hypothesis and show that an increase in the intensity of technology innovation and a reduction in regulatory constraints are strongly and positively impacting CI expenses.
   - A few variables show convexity and others steady intervals, such as SBU product portfolio, industry marketing innovation or regulatory constraints. In principle, this type of curve would not affect significance. Indeed, technology innovation, which had a similar curve, was significant.
   - Particularly interesting is the fact that variables like "SBU Growth" and "**Industry Growth**" both decline in CI expenses while the variable grows.

Table 45 –Results and practical implications of Environmental Variables

Hypotheses	***Mann-Whitney U test***	***Descriptive Analysis***	***Main results***
H2.1 Marketing Innovation	Not Significant *(p-value: 0.388)*	**Shows Relationship** *(+124,071 USD)*	Marketing innovation is not significant. However, descriptive analysis shows that the variable has a positive impact on the CI expenses in the sample.
H2.2 Industry Technology Innovation	**Significant** *(p-value: 0.037)*	**Positive Impact** *(+153,191 USD)*	Industry Technology innovation is significant and has a positive impact on CI expenses. Thus, companies who are focused on industries where technology innovation is strong need to invest in CI. Those that are starting-up a company in this type of industry also need to devote resources to CI.
H2.3 Regulation Constraints	**Significant** *(p-value: 0.005)*	**Positive Impact** *(+73,730 USD)*	Regulatory Constraints is significant and has a positive impact on CI expenses. Thus, companies who are focused on industries where there are less regulatory constraints need to invest in CI.
H2.4 Industry Alliance	Not Significant *(p-value: 0.966)*	**Rejected** *(-6,977 USD)*	Industry Alliances is not significant. However, descriptive analysis shows a negative impact on CI expenses. Thus, firms in the sample reduce CI expenses when industry alliances are stronger.
H2.5 Globalization	Not Significant *(p-value: 0.180)*	**Shows Relationship** *(+233,252 USD)*	Industry Globalization is not significant. However, descriptive analysis shows that the variable has a strong positive impact on the CI expenses in the sample.
H2.6 Rivalry Intensity	Not Significant *(p-value: 0.404)*	**Shows relationship** *(+82,143 USD)*	Industry Rivalry Intensity is not significant. However, descriptive analysis shows that the variable has a positive impact on the CI expenses in the sample.
H2.7 Industry Growth	Not Significant *(p-value: 0.411)*	**Rejected** *(-92,414 USD)*	Industry Growth is not significant. Descriptive analysis shows a negative impact of the variable on CI expenses. Firms in the sample reduce CI expenses

			when the industry declines.
2.8 Industry Decline	Not Significant *(p-value: 0.314)*	**Shows Relationship** *(-173,837 USD)*	Industry Decline i is not significant. However, descriptive analysis shows that the variable has a positive impact on the CI expenses in the sample.

3. Do environmental conditions affect the relationship between organization and the CI expenses?

   - Descriptive analysis indicates that environmental characteristics are strengthening the relationship between the organizational characteristics and CI expenses. The same analysis showed that "**Regulation constraints**" strengthens the relationship between organization and CI expenses. In particular, the relationship between the "**SBU Technology innovation**" variable and CI expenses was seen to increase under the effect of strong "**Regulation constraints**".
   - However, it was not possible to test the contingency effect statistically due to the limited number of responses in each subgroup. Thus, the question whether environmental conditions are strengthening the relationship between organizational variables and the CI expenses remains partially unanswered.

As concluding remarks, it is possible to state that CI expenses is individually influenced by both organizational and environmental characteristics. Only three variables are significant and if a larger error is assumed, two additional variables are significant for the organizational characteristics. If the sample is larger, it is expected that there would be more significance between the variables.

10.3 Theoretical Implication

In this section, the potential theoretical contribution is reviewed and discussed. There are some similarities as well as differences between the literature reviewed in the previous chapters and in particular, Chapter 4. A mention must be given to the fact that there are a very limited number of empirical studies that can be directly compared to this study because CI expenses were not used as an independent variable. In addition, the review of literature shows the following:

A) The study measured several variables in contrast to other studies that were focusing broadly on the environment uncertainty (May, et al. (2000; Boyd and Fulk, 1996; Elenkov, 1997; Ebrahimi, 2000a; Correia, 2001; McGee and Sawyerr, 2003; Xu, et al. 2003; Garg, et al. 2003; Liao, et al. 2008; Lesca, et al. 2012; Xue Zhanga, et al. 2012).

B) A number of studies used specific organizational or environmental characteristics to measure the positive impact on environmental scanning frequency or time spent (Aguilar, 1967, Dollinger, 1984; Ghoshal, 1985; Sawyerr, 1993; Miller, 1993; Ahituv, et al. 1998; Ebrahimi, 2000a; Correia and Wilson, 2001; Raymond, et al. 2001) and CI (Qiu, 2008).

C) Although some studies introduced some of the environmental characteristics discussed in this study, these were not specifically linked to the expenses devote to scanning or CI (Yasai-Ardekani and Nystrom, 1996; Hambrick and Abrahamson, 1995; Daft et al. 1988; Ahituv, et al. 1998).

Wherever a direct comparison of empirical studies may not be possible (between the independent and dependent variables used in this study), scanning frequency or time will be an analogue indicator of CI expenses in order that the theoretical contribution of this study and the way in which the results are linked with other empirical works can be appreciated. As discussed initially in Chapter 3, scanning the environment is a key asset strongly related to the information gathering processes (Aguilar, 1967). In order

to perform scanning, resources need to be invested (Aguilar, 1967; Garg, et al. 2003). In addition, the discussion will be enriched by the description of exploratory studies and anecdotal observation. The following discussion shows the theoretical contribution organized into three main sections and includes those variables that are significant. In addition, a discussion of the contribution made by descriptive analysis is also provided.

Organizational characteristics

- This study strongly supports the positive impact of "**SBU Technology innovation**" on CI expenses. This pattern is consistent with the findings presented by Raymond, et al (2001), and the observations made by Yasai-Ardekani and Nystrom (1996), Calof (1999), Hannula and Pirttimäki (2003). However, this finding contradicts those of Miller (1993). Miller (1993, p.15) stated that "although management theory suggests linkages between technological uncertainty and firm strategic decisions, the empirical results cast doubts on the extent to which technological uncertainty perceptions generalize across top managers in the same firm." However, concurring with Raymond, et al. (2001), this study shows meaningful results based on a sample which was not selected using only technological attributes. In other words, technology innovation is not limited only to technological firms as shown by Raymond, et al. (2001) but can be found in a wide range of industries and can impact CI expenses. Secondly, the cross-industry study clearly shows that (a) for SBUs with high levels of technology innovation, CI is needed and (b) the scope of CI is not restricted to technology but also includes marketing. Such observations could not be found in studies focusing on a particular group of companies such as Savioz, (2003) or APQC (2000) for instance.

- Descriptive analysis shows that "**SBU Size**" has not a positive impact on CI expenses. In small business unit companies, the CI expenses seem not to be impacted and can be relatively high or low. Larger strategic business units tend

to have more resources invested in CI. This pattern is consistent with the findings of qualitative studies presented by Savoiz (2003) and (APQC 2000, 2001). It is also consistent with Comai, et al. 2005; Comai, 2006) and environmental scanning systems (Keegan 1974; Stubbart, 1982; Diffenbach, 1983; Subramanian, et al. 1993) were focused on large firms. However, the result contradicts Yasai-Ardekani and Nystrom, (1996) who demonstrated that environmental scanning frequency has a positive correlation with the size of the firm, although the variable used was the number of people assigned to the R&D department in technological SMEs. Descriptive analysis also shows that small SBUs can devote very large resources to CI. This finding is consistent with the work carried out by Capatina, et al. (2012) who stated that companies differ greatly in the amounts of expenses allocated to CI. However, the findings of this study partially contradict Buchwitz (2003, p.203) who stated that the budgets are limited and may not totally support the observation made by Smeltzer, et al. (1988), Fann and Smeltzer (1989), Fuller (1994), Wright, et al. (2002) and Hall and Bensoussan (1997) who stated that SME have informal CI activities. It is also possible to state that anecdotic observations were not able to establish a correlation between the size and CI budget and therefore is consistent with the variety of the findings in this study.

- With regard to the other seven organizational variables, descriptive analysis shows that six ("**SBU Marketing innovation**", "**SBU Vertical Integration SBU**", "**SBU International in-house sales force**", "**SBU Product Portfolio**", "**SBU Direct International presence**" and "**SBU Decline**") have a positive impact on CI expenses. However, "**SBU Growth**" does not follow the same pattern. In addition, SBU Growth is opposite as expected and it has a quite strong negative impact on CI expenses.

Environmental Characteristics

The study shows that "**Industry Technology Innovation**" is significant and has a positive impact on CI expenses which is consistent with the findings of Daft et al. (1988), Sawyerr (1993) Ahituv, et al. (1998). Ahituv, et al. (1998) showed that uncertainty as regards the technology sector is significantly and positively correlated with scanning activity in those firms that are successful with new products. Daft et al. (1988) find a moderate correlation between uncertainty and scanning for high and low performing firms. This result also supports the anecdotal observations of several observation Ashton and Klavans (1997), Coburn (1999), Hawkins (2005), Viitanen and Pirttimäki (2006) and related studies that defend this proposition (see Table 12). Another interesting piece of contribution is that both hypotheses about SBU technology innovations as well as Industry technology innovations are accepted and the variables are significant. This result fully supports the important attention that was giving to technology intelligence and technology watch from specialized literature (Ransley, 1996; Asthon, 1997; Palop and Vicente, 1998; APQC, 2001; Raymond, et al. 2001; Savioz, 2003). Thus, those companies that work in these industries and are technologically innovative need to have a strong CI function in place.

- The study also shows that "**Industry Regulation constraints**" is significant and has a positive impact on CI expenses. This result is consistent with Cho (2006) who demonstrated that environmental scanning will become broader in post-deregulation environments. However, the result can not be directly compared with the findings of other empirical studies as for instance Ahituv, et al. (1998) and Daft et al. (1988). These studies were measuring the level of uncertainty about regulations, instead of measuring the level of regulations constraints. Ahituv, et al. (1998) the authors find that the correlation between scanning and

regulatory uncertainty was modest but significant and only focused on those firms that were slightly successful with new products. Daft et al. (1988) also showed modest but significant correlations between uncertainty of the regulatory sector and scanning behavior.

The positive impact of Industry Regulation on CI expenses also supports the observation made by Gibbons (1992), Mire (1999) and Cho (2006). In addition, the result supports anecdotal evidence put forward by APQC (1999a, p.24) and Marceau and Sawka (1999). Although these other studies focused on a particular industry (Cho, 2006), the result of this study shows that lower level of regulation constraints impacts every industry and every country circumscribed form the population used in the study. In contrast, the study slightly contradicts the results of work by Ebrahimi (2000a) which showed that political factors in the remote environment are not top of the list in manager-perception of environmental uncertainty. In addition, the result that industry regulation constraints is significant, support the idea that Institutional Theory have an important impact on the structure and function of the organization as discussed by Scott (1987) and North (1990). Elenkov (1997a) stated that institutional environmental affect the perceived uncertainty of Bulgarian firms. Grater CI expenses are able to cope better with environmental changes with improved functions. Thus, larger CI functions are able to cope better with environmental changes with more resources.

- With regard to the other six environmental variables, descriptive analysis shows that only four ("**Marketing Innovation**", "**Globalization**", "**Industry Rivalry Intensity**", and "**Industry Decline**") have a positive impact on CI expenses. However, "**Industry Alliance**" and "**Industry Growth**" do not follow the same pattern. In addition, all hypotheses that are stated in this study regarding the environment indicate that the variables have some impacts (positive or negative) on CI expenses. This is consistent with the findings of Daft et al.

(1988) and Ahituv, et al. (1998). The authors studied the environmental scanning frequency of firms in relation to the perceived uncertainty of five types of environments, which were all positively correlated with environmental scanning.

Environmental contingencies

- The study is not able to show whether **environmental variables** are strengthening the relationship between organization and CI expenses or at least have some impact on CI as suggested by Weill and Olson (1989). The difficulty in detecting moderating effects in field studies was discussed by McClelland and Judd (1993). Even though descriptive analysis is able to show some potential effects of the eight environmental contingencies, the findings seem to follow the same patterns as other studies (Raymond, et al. 2001; Garg, et al. 2003; Kirschkamp, 2008;). Additionally, other works indicate that CI is influenced by other contingencies such as cultural factors, for instance (Raymond, et al. 2001; Wright and Calof, 2006; Fleisher and Wright, 2009).

- Although, it is not possible to measure whether environmental variables are strengthening the relationship between organizational variables and CI resources, the findings contribute to the current literature on the contingency theory. The link between CI and theory is only descriptively shown from the data and remains only partially consistent with the findings. Thus, the findings associated with hypothesis 3 must be limited to exploratory research.

There are other aspects which could also be considered of interest. In the first place, this study made a contribution by challenging several untested assumptions commonly discussed in CI literature. The fact that the data shows that several hypotheses about the organization and the environment were statistically supported or rejected is an

important step to better understanding which characteristics has a positive impact on the CI expenses and are therefore, more closely connected to the needs of a CI function and at what level. Up until now, there were several organizational and environmental characteristics that were believed, from anecdotal observation and exploratory research, to be major contributors in the development of CI. For instance, the result of the pilot study (see Figure 20 in chapter 8) defined several characteristics that were strongly influencing CI expenses. In particular, in organizational characteristics, "Organization size" or "Growth intensity" and in environmental characteristics, "Industry Rivalry Intensity", were the variables which achieved the highest level of agreement and were given the most importance by experts. Thus, understanding which variables have a positive impact on or do not impact CI expenses, helps people working in CI or executives justify the resources invested in CI more objectively and add value to the profession.

An additional contribution of this study may relate to the **holistic and global approach** through which several assumptions were challenged. This study is the first cross-industry and cross-country study aiming to understand the impact of a number of variables on CI expenses. The review of literature showed that other studies used CI practitioners (Table 13 in Chapter 7) but in all cases, the focus was on other issues.

Thirdly, it can be concluded from this study that **intelligence-focused practitioners** (competitive, market and marketing intelligence professionals, etc.) may be one of the best sources for describing the type, scope and level of investment in CI or in environmental scanning activities. Asking decision makers or executives about scanning behavior may introduce biases "from the top" that may preclude more precise results from those in job positions closer to the actual facts of CI practice. In addition, there could be a personal, even though not deliberate, interest in justifying current organization CI activity practices. Hambrick (1982, p.169) found that the scanning process of executives was not in the same line or even consistent with the organization strategy. In addition, he noted that the results "may be due to a general tendency among executives to scan according to their own personal or functional interest".

Thus, studying CI professional people is very important to understanding how this profession behaves, what the results are and which elements can have an important repercussion on CI activities.

Although the current literature review in CI and environmental scanning did not yet analyze a specific set of organizational and environmental variables in relation to CI expenses, some similarities can be found. Thus, the theoretical cases for environmental scanning and Competitive intelligence needs to be revisited in order to further understand how the environment and organizational variables impact CI expenses and the scanning behavior. The following table summarizes the findings according to other empirical studies discussed previously. The table also includes exploratory studies and anecdotal observations.

Table 46 –Support of current literature and Results of Organizational Variables

Organizational Variable / Hypothesis	**Discussed by (Exploratory studies or Anecdotal observations)**	**Consistent with (empirical studies)**	**In Contradiction with (empirical studies)**
1.1 SBU Marketing innovation	Kotler (1997); Cervera, et al. (2001); Lynn, et al. (2003); Langerak, et al. (2004); McDonald and Madhavaram (2007); Qiu (2008); Carbonell and Rodríguez (2010).	-	-
1.2 SBU Technology innovation*	Aguilar (1967, p.37-38); Porter (1985, p.164); Ransley, 1996; Asthon, (1997) Kahner (1997, p.31); Palop and Vicente, 1998); Gates (1999); Calof (1999); Rouach and Santi, (2001); APQC (2001); Bouthillier and Shearer (2003, p.26). Hannula and Pirttimäki (2003).	Raymond, et al. (2001) related to the CIT activities.	-
1.3 SBU Vertical Integration	Fuld (1995); APQC (1999a, p.24); Marceau and Sawka (1999); Gibbons (1992); Mire (1999); Pfeffer and Salancik (2003 p.126); Cho (2006).	-	-
1.4 SBU Product Portfolio	Fuld (1995, p.32); Elenkov (1997a); Prescott (2001, p.6).	Partially with Ahituv, et al. (1998)	-
1.5 SBU International in-house sales force	Diffenbach (1983); Kotler (1997); Calof (1997); Prescott (2001); Viviers and Calof (2002); Comai and Tena (2004a); Viviers and Muller (2004); Hirvensalo (2004).	-	Partially with Raymond, et al. (2001) related to the CIT activities.
1.6 SBU Direct International	Yasai-Ardekani and Nystrom (1996); Pirttilä (1997); The Future Group (1997); Correia and Wilson (1997	-	-

presence	and 2001); APQC (1999); Prescott and Miller (2001); Viviers and Calof (2002); Hannula and Pirttimäki (2003); Viviers and Muller (2004); Hirvensalo (2004); Tena and Comai (2004a and 2004b); Anton (2005). Pelsmacker, et al. (2005); Adidam, et al. (2009).		
1.7 SBU Growth	Kahner (1997, p.28); Tena and Comai (2004a); Comai, et al. (2006).	Partially with Raymond, et al. (2001) related to the CIT activities.	-
1.8 SBU Decline	Tena and Comai (2004a); Comai (2006).	-	-
1.9 SBU Size	Smeltzer, et al. (1988); Diffenbach, (1983) Comai, et al. (2005); Savioz, (2004, p.246); Barendregt (2010)	Aguilar (1967) showed that were not difference between sizes and scanning frequency.	Yasai-Ardekani and Nystrom, (1996) demonstrated that larger organizations is positive correlated to environmental scanning frequency. Raymond, et al. (2001) related to the CIT activities.

* significant

Table 47 –Support of current literature and Results of Environmental Variables

Environmental Variable / Hypothesis	**Discussed by (Exploratory or Anecdotal observations)**	**Consistent with (empirical studies)**	**In Contradiction with (empirical studies)**
2.1 Marketing Innovation	Slater and Narver (1995); Lynn, et al. (2003); Carbonell and Rodríguez (2010).	Smeltzer, et al. (1988) and Ebrahimi (2000) based on the ranking of the remote environment. based on the	-
2.2 Industry Technology Innovation*	Porter (1985, p.164); Miller (1993); Ashton and Klavans (1997); Coburn (1999); Tao and Prescott (2000, p.68); APQC (2001); Raymond, et al. (2001); Savioz (2003, p.19);Hawkins (2005, p.16); Blenkhorn and Fleisher (2005, p.8); Viitanen and Pirttimäki (2006); Pascheles (2007), Barnea (2014).	Ahituv, et al. (1998) for the firm that are more successful with new product. Daft et al. (1988) moderate correlations for high and low performing firms. Sawyerr (1993) partially Raymond, et al. (2001) related to the CIT activities.	-
2.3 Regulation Constraints*	Hambrick and Finkelstein (1987); Gibbons (1992); Mire (1999); Marceau and Sawka (1999); Miree, (1999); Oster (1999, p.44-47); APQC (1999a, p.24) ; APQC (2000, p.24), Tao and Prescott (2000, p.68); Mysore and Lobo (2000); Crouhy, et al. (2000, p.1); Tena and Comai (2001), McGonagle and Vella (2002, p.63); Blenkhorn and Fleisher (2005, p.9); Hawkins (2005, p.16); Chan Kim and Mauborgne (2005, p.52-53); Cho (2006). Baaziz and Quoniam (2014).	Cho (2006) demonstrated that environmental scanning will become broader in post-deregulation environment.	Ebrahimi (2000) this study was concentrated on measuring Political factors of the remote environment.

2.4 Industry Alliance	Raymond, et al. (2001) related to the CIT activities.		-
2.5 Globalization	Babbar (1993); Kahner (1997, p.29-30); Coburn (1999, p.3-4); Blenkhorn and Fleisher (2005, p.13); Tao and Prescott (2000, p.68); Bouthillier and Shearer (2003, p.26); Chan Kim and Mauborgne (2005, p.8); MacDonald and Blenkhorn (2005); Comai, et al. (2006).	-	-
2.6 Industry Rivalry Intensity	Mintzberg, (1979); Porter (1980, p.71); Sammon, et al. (1984, p.172); Nevanlinna (1997, p.70-74); Kahner (1997, p.29-30); Oster (1999); Fahey (1999); Mysore and Lobo (2000); Tao and Prescott (2000, p.68); McGonagle and Vella (2002, p.66); Bouthillier and Shearer (2003, p.26); McGonagle and Vella (2002, p.64-66); Koskinen (2005, p.7); Hawkins (2005, p16); Chan Kim and Mauborgne (2005, p.52-53); Baaziz and Quoniam (2014).	Raymond, et al. (2001) related to the CIT activities. Peyrot, et al. (2002) modest correlation between market competitiveness and CI use.	-
2.7 Industry Growth	Aguilar (1967, p.37-38); Barnea (2014).	-	-
2.8 Industry Decline	Tena and Comai (2001).	-	-

Significant

10.4 Practical Implications

This study provides implications for managers. There are three main aspects that firms can benefit from the results of this study. The three aspects that may benefit from the study are:

- **The firm has not or little CI activities**. In the case that a firm has no CI activity in place or it has not structured around the key aspects can use the variables to understand the need of CI. For instance, SBU Technology innovation has a positive impact on CI expenses, therefore a company that works in an intensive technology orientation, need to have a CI function in place or at least considering it as a need. This application can be made with the other environmental characteristics that are positive related to CI as well as those characteristics that are highlighted as potential contributors to CI from descriptive analysis. There are no doubts, that technology focused firms are the best candidate for establishing strong CI functions.

- **Re-allocation CI expense**: The study provides additional practical applications for those companies that need to better prioritize the resources spent on CI. According to Garg, et al. (2003) "managers first must prioritize those external and internal areas deserving their attention and then gather and interpret the most critical data". Thus, firms can see which characteristics may predominate another and can therefore reallocate CI activities to those SBUs that have strong organizational and environmental characteristics in which the link between these and CI is demonstrated form the result of this study. The reallocation of CI expenses done accordingly to these variables will definitely add value or at least provide more efficiency to CI. Additionally, it shows were CI needs to be spent and it may help the definition of the key intelligence topics as suggested by

Herring (1999). However, the re-allocation of CI capabilities may involves a re-design of the CI function. The reallocation, however, does not become spontaneously as discussed by Hamrefors (1998a and 1998b). It needs to be consistent with the organizational and environmental variables that have the greatest impact on CI. Firms, can definitely use the list of variables described in this study to accomplish this task.

- An additional practical application under this perspective is when CI does not need important investment. CI activities can remind informal or at least downsized when the characteristics of USB and the characteristics of the industry are week in level. In this particular case it is possible to justify those companies that have informal scanning activities (Jain, 1984,) informal CI units (Sawka, 2006) or no CI functions at all as illustrated by Tena and Comai (2004). However, this particular situation can be given if the variables are rigorously evaluated and if this is not the case, it fails in the following situation.

- **Value of CI**: Finally, those companies suffering blindspots which considers CI superfluous or not necessary now can be persuaded with the right arguments. Particularly, this issue affects CI managers directly when they need to prove or show effectiveness to executive and top management (Herring, 1996) and fight for the annual budget. Stubbart (1982) stated that "an environmental scanning units, owing to the difficulty of measuring their output and its value, often are a prime target of budget-cutters." There are two way that the study may help CI managers to maintain their CI expenses with reasonable arguments. First, the variables of this study can be used to show how good a company is with respect to the others considering that the best in class have the higher level of investment in the particular variable. On the other hand, it provides arguments to show that CI can be deployed according to the result of 225 CI practitioners to overcome personal influence as suggested by Hambrick (1982, p.169), who

asserted that executives tend to “scan according to their own personal or functional interests”.

All the above points describe possible situations of a firm and the value to use the results of the study into a benchmark or self assessment activity. Firm can therefore use the results about organizational and environmental characteristics separately or in conjunction to deploy or adjust CI activities according to the firm char and the surrounding of each SBU. However, a final comment should be made regarding the use of the results. Those variables which are significant can be used to prescribe a CI function. In other words, when a firm or SBU is strongly technologically innovative and is oriented towards a highly technology-innovative or regulated industry, then a CI function may be prescribed. This means that, technology-oriented firms or SBU that are not using CI may suffer or, according to Porter (1980), may not be able to appropriately analyze industries or competitors. They will, therefore, potentially suffer subsequently in the results of any action taken without appropriate intelligence or cause performance (Garg, et al, 2003). With regard to the descriptive variables, caution must be applied since the study may intend to be exploratory as far as the results are concerned.

10.5 Observations and additional thoughts

Finally, practical implications for managers and users of CI will be added.

- **Decision maker’s role**: Decision makers and executives have a role in the allocation of resources to CI. As discussed in the previous chapters, one of the main problems facing CI may reside in the lack of credibility. Varughese and Buchwitz (2003, p.203) noted that “in larger organizations the lack of financial support for the CI function may stem from the lack of recognition of the need

for CI". Thus, regardless of the perceived needs behind the decision, top management support may be influential in the level of CI expenses and therefore the external or internal variables act as contingencies on this particular and unique relationship.

- **Excess of Information:** The excess of information can have a negative effect on scanning. For instance, processing too much information during a decision-making process may overwhelm the cognitive capacities of executives resulting in limited search activity. We may call this a "bounded rationality" CI effect (Cyert and March, 1963).
- **Organization Location of CI at Corporate Vs at USB units**: An additional practical remark concerns the position of the CI function within the organization. While some companies have a centralized and corporate-located CI function, other firms have decentralized and SBU-focused systems. A relevant question that arises from reading the results of this study is: does a corporate CI function receive more financial support than one which is located at the SBU? Looking at the results, it is not possible to state whether SBU – located CI is working with lower expenses than CI corporate functions. The only information that could be seen was that single business companies have a mean CI expense that is lower than those departments which are managing CI function in multibusiness companies, as seen in the previous discussion. However, how close CI is to top management or key executives, it may play a role in obtaining financial support as discussed in the previous remark. On the other hand, the BI functions that suffered more were those that were embedded in a functional department. Even though several operational intelligence functions showed good results and performance (APQC, 1999a), this aspect may indicate which type of CI function has the highest potential to be successful and obtain the highest financial support from the organization.

Despite its limitations, this study made a significant step towards understanding which organizational and environmental characteristics are related, and how they are related, to competitive intelligence expenses. The study looked at a number of variables that allowed us to delve deeper into the systemic interrelations that might explain the decision to invest in CI. In spite of what is often reported about environment trails, the study showed which variables have a significant contribution to CI and which do not. The benefit of understanding which variables are strongly connected to CI, allow the correct amount of resources to be allied to the CI function and potential biases to be avoided.

10.6 Limitations of the study

The study applied a quantitative approach for evaluating a model relating certain organizational and environmental variables to CI expenses and was conducted using a sample of CI practitioners from the database LinkedIn. As a direct consequence of this methodology, the study met with a number of limitations, which should be considered.

- **Number of responses**: The number of responses seems to be the main constraint for not achieving the level of significance of the relationship between the independent and the dependent variable. It is not possible to say that a higher number of respondents would guarantee a superior level of significance for each variable. However, a low response rate may increase the risk of sampling bias and cause problems when generalizing the findings. Other studies show that a lower response rate does not necessarily mean lower accuracy (Visser, et al. 1996). In particular, the number of responses did not allow in this case to study potential environmental contingencies. Based on the sample size it was also not possible to analyze the results by country or industry to make comparisons.

- **Sample Sourcing**: LinkedIn has a very large number of members who are working in the CI field and it is the most extensive network used by professional people in general. However, this database may include some limitations with regard to identification, access and retrieval, when it comes to extracting a sample for research purposes, as was the case in this instance. LinkedIn may not provide the most complete picture of the target population. Other social networks, such as Xing, which has a larger number of German CI professional members and other regionally-focused networks may show similar characteristics. In Asia in particular, several social networks are available which may include CI professionals. In addition, CI practitioners may not use any CI terms in their job title or may not disclose the job function for confidential reasons. This situation makes it more difficult to identify this professional group in databases in general. One option would be to ask the CI person in charge in the company or use snowballing techniques to get in contact with peers. Thus, we do not know how many people work in CI even in the population working in CI listed in Linkedin. In addition, the search option offered by LinkedIn may limit the contact and the message that can be sent to potential sources of information. Time is a very important constraint to overcoming these barriers and therefore makes this data base not extraordinarily best suited for the sampling process.

- **One Source vs two sources**: The source used in the sample was the CI practitioner who was considered to be the person with the best knowledge to answer the questionnaire. However, having only one source per company may add some biases to this study. This limitation was also indicated in other studies such as, Hambrick (1982), for instance.

- **Questionnaire scale**: Some graphs showed that respondents were choosing the middle answers of the Likert scale ("Neither agree nor disagree"). The results

showed that respondents were keener to use central answers than the extremes. For instance, the category “agree” in the 5-point scale was the most popular with almost. Avoiding extreme response categories is called the “central tendency bias” (Nicholls, 2010). Although respondents, who were very sure, would have probably used the extreme, this aspect may have limited the analysis of means. In addition, the category used to measure CI expenses and their conversion into mean values, may not reflect the expenses precisely. Moreover, 49 respondents (22% of the sample) were selecting the “more than 1 million” option. However, the value (in USD) for those respondents who answered “more than one million” is unknown.

- **Weight of the Variables**: Another aspect that needs to be taken into consideration is that there is no weighting of each organizational variable as regards CI. In other words, the research design did not include establishing which variable is the most influential in allocating CI expenses. Some clues could probably be drawn from those variables which show the biggest difference between strongly disagree and strongly agree. If this difference is taken as an indicator, it is possible to create a ranking of variables. However, it is not impossible to discern from this study which variable makes the highest contribution towards explaining the level of CI expenses.

- **Invitation process**: Several factors may have contributed to the low response rate. In the first place, CI professional people were invited using a LinkedIn messaging tool and may have confused the invitation with other types of communication that LinkedIn and other individuals use. Linkedin members may have ignored the invitation due to the fact that this medium may be widely used by others to promote products and services. Secondly, professional CI people may not be allowed to fill out a questionnaire asking for information about the company and its CI activity. Thirdly, a few professional CI people

replied to the invitation to participate saying that current company policy did not allow them to participate in the survey. Lastly, the period in which the questionnaire was launched was August and a proportion of managers were on holiday. It is possible that some invitations were missed in the inbox or simply ignored.

- **Selection of Independent Variables**: The study uses only two sets of variables: the organization and the environment. Other variables were not included in the study such as organizational culture, for instance, or the role of managers in the CI process. As discussed in chapter 4, these aspects were taken into consideration but not included in the empirical model. Thus, it cannot be ruled out a priori, that there are other variables influencing the level of resources devoted to CI. The hypotheses tested were based on a review of literature and the suggestions made from experts in the pilot study. Therefore, the variables used in the study are not exhaustive and there are other potentially relevant organizational and environmental characteristics that were perhaps omitted.

10.7 Recommendations for Future Research

The results of this study identified some areas for future work. It dealt with organizational and environmental variables, as well as CI expenses, simultaneously. The exact mechanism underlying this type of cause and effect relationship needs to be explored further.

- **Larger study**: The study can be expanded to include a larger sample of CI professional people. A greater number of respondents would allow less variability in the answers and would procure higher levels of significance. However the actual impact of such a measure is unknown. In addition, some

environmental characteristics may also differ from country to country as suggested by Wright and Calof (2006). Thus a larger study may show whether there is a significant difference in those variables that supported the hypothesis but only based on descriptive analysis.

- **Management implication in CI budgeting process**: There is a need to understand the role of managers and executives when the budget is prepared and evaluated in the organization. Level of implication of decision makers in the CI cycle or process as shown by Williams and Prescott (2003b). Ghoshal (1985 p.347) discussed management implications as regards scanning behavior. He found that "the operational scanning system depends on managers' perception of the predictability and heterogeneity of the environment and of the extent of structure in their tasks". This would suggest measuring the extent to which decision makers have an influence on the CI budget. Some questions relating to this point could be: Who is involved in the CI budgeting decisions and with what leverage? Which are the factors, in addition to organizational and environmental characteristics that influence CI budgeting process and budget size? Which are the most important elements evaluated by executives to get support for or reject CI budget? Once these questions and others have been answered, it will be possible to obtain a broader picture of how organizational and environmental variables are related to CI expenses.

- **Excellence in Intelligence activities even if they are informal**: Several companies may not have a formalized CI functions in place but instead, they adopt informal processes of gathering and sharing intelligence across the organization. However, informal information or intelligence flows do not mean that the knowledge shared is not effective or does not provide a competitive advantage. I concur with Savioz (2003) who found some instances of excellence in CI without having it formalized in the company. Therefore, although in some

cases CI is not formalized by the employment of a specific CI job position it may be being used informally throughout the organization. Thus a comparison of companies with a formalized CI function and companies without any CI management position (full- or part-time) would be an important step in understanding how organizational and environmental characteristics influence the information gathering process and the decisions behind it.

- **Performance:** How performance may relate to CI expenses was not empirically studied. Although some anecdotal observations were concentrated on establishing the level of return of investment or linking CI to performance (Durán Machicado, 2015), it is not clear whether companies are more likely to invest more in CI. This topic was also suggested by Ghoshal (1985, p.367) since "often, given the nature of the task, the actual expenses are hidden".

- **Qualitative information**: More knowledge could be gained from qualitative research in this area. Case studies and interviews may allow identification of the budgeting mechanism and estimation and the need for the expenses according to the organizational and environmental characteristics. In addition, other industry related characteristics can be indentified and added to the study.

- **LinkedIn as a source for empirical studies**: Finally, this study showed that LinkedIn is a potential source for gathering contacts and making sample selections based on job title. Although the success rate in this study (15.5%) may be below the mean of other studies using traditional sampling approaches, it is a valid alternative for sampling when access to professional people may be difficult (Badr, et al. 2006; and Wright, et al. 2009), restricted, only possible through commercial databases (Viviers, et al. 2005) or directories (Hawkins, 2005), consortiums (APQC, 1999) or accessible through professional associations (Prescott and Bhardwaj, 1995; Tao and Prescott, 2000; Badr, et al.;

2004). Social networks can be very powerful in achieving mass access to sources. For instance the study carried out by Comai (2011) on Google tools used for Competitive intelligence achieved 466 respondents. However, careful attention needs to given to the identification of the target population as well as the sampling process. Thus, further research is needed in the field to demonstrate whether social networks can be a very good alternative for social science studies.

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APPENDIX I: QUESTIONNAIRE PILOT STUDY

Cover Letter

Dear Sir,

Please kindly let me invite you to join a PhD research phase which aims to define several environmental and organizational contingencies for CI.

This invitation has been sent to 40 highly recognized experts in CI from the following fields: practitioners, consultants and scholars. Through publicly available literature and SCIP membership directory, I have come to identify you and your colleagues as a potential collaborator for my research.

One of the study's ultimate objective is the writing of my PhD dissertation based on the findings of a second questionnaire which includes the model of this research stage. For this reason, your contribution is very important for the whole study.

The completion of the questionnaire will not take more that 20 min.

I appreciate your time and I would like to thanks in advance for your efforts. It is also possible to have a follow-up study which incorporates new factors that will be suggested in this research stage. Feedback and confidentiality will be guaranteed.

Best regards,

Alessandro Comai

PhD Candidate ESADE

Questionnaire 1

Defining the External and Internal Factors related to a formal CI program

Introduction

Competitive Intelligence (CI) is a combination of internal en external resources able to produce a significant advantage for the company. However, the level of formalization of the CI function in the firm has not yet been identified according with the external and internal environment.

It has long been argument that external environmental factors influence the decision into adopting a proactive position with CI. At the same time, it has also discussed that organization characteristics will have an important impact to the CI function. However, there are no studies that have evaluated jointly which variable/factors are the most important contingency upon the formal CI system.

Thus, this first survey allows me establishing what are the most important internal and external factors that are related to the CI function.

NOTE: Setting the context

It has been discussed that some factors you will rate may depend from the "context" which a firm or an organization is facing. Several contexts can be identified as felicitators of barriers of some factors. It is supposed that for instance the industry, business model, position in the value chain or period of time can have a certain role.

This may represents a limitation for my study. However, considering if we consider all possible context can enormously make difficult the way to study contingency, I appreciate to judge the factors in a broad perspective which will be based indeed on in your experience.

Evaluation method of the factors

The questionnaire uses two measurements process:

1) Firstly, I will ask you to mark (with a X) the number that most closely matches your opinion. *Note: There are no correct answers. As you respond to the questions, please reflect on your own experiences. Please rate between 1 and 5 as described in the following Table:*

1	2	3	4	5
Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree

2) Secondly to rate the relative weight of each factors according to the contribution to CI. To accomplish this evaluation, please consider the following steps:

   a. Assign "1" to the least important group of factor.

   b. Rate ALL the others groups against it. If you rate "1" it means that the group of factors are equivalent to the one being compared with. If you rate 1.5 then it means that the group of factors are 50% more important to the one being compared with. If you rate 2, that means that it is one time more important or double and if you rate 3 it is two time more important and so on...

Feedback

After analyzing the questionnaire, I will send an e-mail with the result of this questionnaire to all of those that have participated. Feedback is planned by the end of June 2005.

Confidentiality

I assure you that your identity and that of your company will be treated as strictly confidential. The information you provide will not be shared with any other person and all references to your company's data will be blinded in any report resulting from this research.

A. PERSONAL INFORMATION

First Name	
Surname	
Company/Organization	
Position in the company/Organization	
e-mail	
Years in the field of CI	

B. EXTERNAL FACTORS

What are the Environmental Factors that in your experience influence the company to adopt a formal CI function?

1	2	3	4	5
Strongly Disagree	disagree	Neither agree nor disagree	agree	Strongly Agree

NOTE: Assign "1" to the least important group of methods/techniques and rate ALL the others groups against it. If you rate "1" it means that the group of methods are equivalent to the one being compared with. If you rate 1.5 then it means that the group of methods are 50% more important to the one being compared with. If you rate 2, that means that it is one time more important or double and if you rate 3 it is two time more important and so on...

	External Environmental Factors	1	2	3	4	5	Relative Weight
1	**Industry Rivalry Intensity** *(Includes the intensity about the actual number of competitors)*	☐	☐	☐	☐	☐	
2	**Regulation Intensity** *(Includes Regulation changes and the swift to different type of economies, as well as government laws)*	☐	☐	☐	☐	☐	

3	**Globalization Intensity** *(Includes global marketing, global presence and the integration of different kind of markets)*	☐	☐	☐	☐	☐	
4	**Industry Entry barrier level** *(Includes new/potential competitors might do)*	☐	☐	☐	☐	☐	
5	**Level of technical innovation** *(Includes new technology, disruptive technology etc.)*	☐	☐	☐	☐	☐	
6	**Industry Network Intensity** *(Includes alliances, partnerships, collaboration within companies in the value chain or within other organization or competitors)*	☐	☐	☐	☐	☐	
7	**Product life cycle length** *(Includes new product/services development intensity)*	☐	☐	☐	☐	☐	
9	**Changes in customer/client needs**	☐	☐	☐	☐	☐	

	(includes socio-demographic preference and /or affected structural changes, consumer behaviour changes)						
10	**Degree of industry overlapping with others** *(Includes Industry Boundaries / stability and neatness of boundaries)*	☐	☐	☐	☐	☐	
11	**Industry growth intensity** *(includes companies that are in a Fast moving products)*	☐	☐	☐	☐	☐	
12	**Level of Environmental Changes** *(Overall change of he industry)*	☐	☐	☐	☐	☐	

If you believe that I have left out a factor within this group, please suggest a suitable factor here:

C. ORGANIZATIONAL FACTORS

What are the Organizational Factors that in your experience influence the company to adopt a formal CI function?

1	2	3	4	5
Strongly Disagree	disagree	Neither agree nor disagree	agree	Strongly Agree

NOTE: Assign "1" to the least important group of methods/techniques and rate ALL the others groups against it. If you rate "1" it means that the group of methods are equivalent to the one being compared with. If you rate 1.5 then it means that the group of methods are 50% more important to the one being compared with. If you rate 2, that means that it is one time more important or dobble and if you rate 3 it is two time more important and so on...

	Organizational Factors	1	2	3	4	5		Relative Weight
1	**Technology intensity in products**	☐	☐	☐	☐	☐		
2	**Technology intensity in the manufacturing process**	☐	☐	☐	☐	☐		
3	**Level of vertical integration**	☐	☐	☐	☐	☐		
4	**Level of diversification**	☐	☐	☐	☐	☐		
5	**Export intensity**	☐	☐	☐	☐	☐		

6	**Organization size**	☐	☐	☐	☐	☐		
7	**Growth intensity**	☐	☐	☐	☐	☐		
8	**Level of hierarchy**	☐	☐	☐	☐	☐		
9	**Level of formal culture**	☐	☐	☐	☐	☐		

If you believe that I have left out a factor within this group, please suggest a suitable factor here:

THANK YOU!

Please email the completed questionnaire to the following:

Alessandro Comai

alessandro.comai@esade.edu

When I have analyzed the responses I will send you a summary of this preliminary assessment.

APPENDIX II: QUESTIONNAIRE FINAL STUDY

Cover Letter Final study

Dear _____,

I am working in my final PhD Dissertation on Competitive/marketing Intelligence at Esade Business School (Barcelona, Spain). I am interested in studying how Competitive Intelligence is related to several organizational and environmental factors.

The study is based on quantitative data and therefore I need a large sample of respondents to acquire a good understanding about how these variables work together. I have prepared an on-line questionnaire and I would like to invite you to participate. Your opinion is very important and I will be very delighted if you would accept my invitation.

The link of the questionnaire is the following:

https://docs.google.com/forms/d/1tFgx-LPN-B3hveQAgPmmiqewlB1NGKZeSWngyeSLfX4/viewform

If you have any questions or doubts, please do not hesitate to contact me.

Best Regards,

Alessandro Comai

****

BSc. in Engineering, MBA, DEA Esade, PhD Candidate (Esade).

cell: +34.666784756

skype: acomai

email: alessandro.comai@gmail.com

Questionnaire Final Study

Link to Questionnaire sample1

https://docs.google.com/forms/d/1tFgx-LPN-B3hveQAgPmmiqewlB1NGKZeSWngyeSLfX4/viewform

PHD Dissertation Questionnaire

Organizational and Environmental factors and the CI function

*Obligatorio

ESADE
Business School

Introduction

The environmental and the firm's characteristics may effect the implementation and deployment of a Competitive Intelligence (CI) function. Although many experts in CI have discussed these issues, they have not been studied in a systematic and quantitative manner.

The objective of this questionnaire is to measure several environmental and organizational factors and see how these variables impact CI.

The focus of the survey

One of my concerns has been where to focus the research, given that in general, a corporation might operate through a mix of different CI functions. A previous study done with 200+ multinationals shows that a firm may operates through a strategic CI, usually centrally located in the parent company and and/or through a SBU focused CI.

I have taken a Strategic Business Unit (SBU) perspective to narrow the research in a specific organizational and environmental area. A SBU may be defined by the following characteristics:

1. It is a single business or collection of related businesses that can be planned as a set of resources related to specific markets and share the strategy decision process,
2. It incorporates a unique set of products or services aimed at a homogeneous market,
3. It has its own set of competitors,
4. It has a manager who is responsible for strategic planning and profit performance and who controls most of the factors affecting profit (as for instance marketing).

Sources: Ansoff (1990); Kotler (1997); Walker, Boyd and Larréché (1995).

Confidentiality & Feedback

I would like to assure you that your identity and that of your company will be treated as strictly confidential. The information you provide will not be shared with any other person and all references to your company's data will remain anonymous in any report resulting from this research.

A summary of the aggregate results from the analysis based on the responses will be provided to you when completed. However a more exhaustive discussion about the results will be published in my PhD dissertation expected during the first semester of 2016.

Section 1 – CI position in your organization

1. **What is the structure of your organization?** *
   In the following section, I want to understand how your company is organized in term of SBU and extent of diversification. A SBU can encompass an entire company, or can simply be a smaller part of a company.
   Marca solo un óvalo.

   ◯ As a single business unit organization. *Pasa a la pregunta 3.*
   ◯ As a multi-business organization. *Pasa a la pregunta 2.*

2. **Please select one statement to indicate where Competitive Intelligence (CI) activity takes place in your organization** *
   Marca solo un óvalo.

   ◯ CI activity is taking place only at corporate-parent-holding unit level
   ◯ CI activity is taking place only at the business unit level
   ◯ CI activity is taking place only at the functional level – for example marketing or R&D
   ◯ CI activity is taking place both at corporate - parent - holding unit level and at the business unit level, however the main emphasis is at the COPORATE level
   ◯ CI activity is taking place both at corporate - parent - holding unit level and at the business unit level, however the main emphasis is at the BUSINESS unit level
   ◯ Otro: _____

Section 2 - Organizational Factors

This section focuses on the SBU characteristics. Please, select the SBU you know best and refer always your answers to that SBU while completing the questionnaire. If you take a Corporate perspective, please make sure that this perspective is taken into account for each answer.The period of time discussed is the year 2014.

Please, select the option that most closely matches the characteristic of the SBU.

3. **1. SBU Marketing innovation** *
   The SBU launches a lot of new products each year.
   Marca solo un óvalo.

   ◯ Strongly agree
   ◯ Agree
   ◯ Neither agree nor disagree
   ◯ Disagree
   ◯ Strongly disagree

4. **2. SBU Technology innovation** *
   The SBU invests a lot in R&D each year.
   Marca solo un óvalo.

   - ◯ Strongly agree
   - ◯ Agree
   - ◯ Neither agree nor disagree
   - ◯ Disagree
   - ◯ Strongly disagree

5. **3. SBU Vertical integration** *
   The SBU is totally vertically integrated both forward and backward in the supply/value chain. If you select "Strongly agree, then the SBU is totally vertically integrated both forward and backward in the supply/value chain.
   Marca solo un óvalo.

   - ◯ Strongly agree
   - ◯ Agree
   - ◯ Neither agree nor disagree
   - ◯ Disagree
   - ◯ Strongly disagree

6. **4. SBU Product portfolio** *
   The SBU has a broad portfolio of products and services.
   Marca solo un óvalo.

   - ◯ Strongly agree
   - ◯ Agree
   - ◯ Neither agree nor disagree
   - ◯ Disagree
   - ◯ Strongly disagree

7. **5. International own sales force** *
   The sales force in international markets are entirely owned by the parent companies.
   Marca solo un óvalo.

   - ◯ Strongly agree
   - ◯ Agree
   - ◯ Neither agree nor disagree
   - ◯ Disagree
   - ◯ Strongly disagree
   - ◯ Not applicable (since operation are in one country only)

8. **6. Direct International presence** *

   The SBU utilizes only the parent company to sell in international markets. If you select "Strongly disagree" then, the SBU utilizes only third parties to sell in international markets (alliance, representative, distributors or agents, …).
   Marca solo un óvalo.

   - ◯ Strongly agree
   - ◯ Agree
   - ◯ Neither agree nor disagree
   - ◯ Disagree
   - ◯ Strongly disagree
   - ◯ Not applicable (since operation are in one country only)

9. **7. SBU Growth** *

   The SBU experiences strong revenue growth.
   Marca solo un óvalo.

   - ◯ Strongly agree
   - ◯ Agree
   - ◯ Neither agree nor disagree
   - ◯ Disagree
   - ◯ Strongly disagree

10. **8. SBU Decline** *

    The SBU experiences steep revenue decline.
    Marca solo un óvalo.

    - ◯ Strongly agree
    - ◯ Agree
    - ◯ Neither agree nor disagree
    - ◯ Disagree
    - ◯ Strongly disagree

11. **9. SBU size** *

    Please indicate in the following box the Nº of full-time equivalent employees in 2014

    _____

Section 3 - Environmental factors

This section wants to understand the level or degree of several environmental factors in which the SBU operates.

Please select the condition that most closely matches your perception about the environmental variable. As you respond to the questions, please reflect on your own experiences, and make as accurate an assessment as possible.

PS: In the following statements, I always talk about industry or market when referring to the SBU environment. Please, adapt this term to the one that you mostly use or are used to.

12. **1. Market innovation** *

A lot of new products are lunched in the market/s, in which the SBU operates, each year.
Marca solo un óvalo.

- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

13. **2. Industry Technology innovation** *

A lot of patent applications are requested in the industry, in which the SBU operates, each year.
Marca solo un óvalo.

- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

14. **3. Regulatory Constrains** *

The market/s, in which the SBU operates, have/has a lot of regulations or government rules. If you select "Strongly disagree" then the market is a free economy or there are insignificant regulations or government rules.
Marca solo un óvalo.

- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

15. **4. Industry Alliance** *

In the industry, in which the SBU operates, there are a lot of strategic alliances between firms.
Marca solo un óvalo.

- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

16. **6. Industry Rivalry** *

The Industry, in which the SBU operates, has a lot of industry barriers to entry.
Marca solo un óvalo.

- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

17. **5. Globalization** *

The market/s, in which the SBU operates, has/have a lot of international competitors.
Marca solo un óvalo.

- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

18. **7. Industry Growth** *

The Industry, in which the SBU operates, grows fast.
Marca solo un óvalo.

- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

19. **8. Industry Decline** *

The Industry, in which the SBU operates, declines fast.
Marca solo un óvalo.

- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

Section 4 - CI Function

This section focuses on the CI function's assets and investments.

Hint: You can estimate the total CI budged invested for the SBU by using the following items:

• CI personnel Salary (Full-time or par-time),
• Operating supplies/equipment (IT, Maintenance, subscriptions),

• Education (Trainings, seminars, meetings, ...),
• Travel,
• Commercial databases (market research, financial, patents, companies, risk,...),
• Outsourcing (consulting, research, ...).

20. **4.1 Please, indicate the total amount of the budget (in terms of USD) spent the last year in CI for supporting the pervious selected SBU.** *

Marca solo un óvalo.

- ◯ Less than 50,000
- ◯ Between 50,000 and 100,000
- ◯ Between 100,000 and 250,000
- ◯ Between 250,000 and 500,000
- ◯ Between 500,000 and 750,000
- ◯ Between 750,000 and 1M
- ◯ More than 1M

21. **2. CI scope** *

Please, select the percentage of the type of CI function that support the SBU. The total sum of all shuold be 100%. (Example: If you select 80% for "Market or Marketing Intelligence" and then "Competitor Intelligence" this last one should be 20% as the total sum is 100%).

Marca solo un óvalo por fila.

	0%	20%	40%	60%	80%	100%
Market or Marketing Intelligence	◯	◯	◯	◯	◯	◯
Technology or IP Intelligence	◯	◯	◯	◯	◯	◯
Competitor Intelligence	◯	◯	◯	◯	◯	◯
Customer Insight	◯	◯	◯	◯	◯	◯
Strategic Foresight	◯	◯	◯	◯	◯	◯
Economic or Gepolitical Intelligence	◯	◯	◯	◯	◯	◯
Risk Intelligence	◯	◯	◯	◯	◯	◯
Other (Not mentioned above)	◯	◯	◯	◯	◯	◯

22. **3. CI Age** *

Please, indicate how old is your CI function within your organization.

Marca solo un óvalo.

- ◯ Less than 1 year
- ◯ Between 1 and 2 years
- ◯ Between 2 and 5 years
- ◯ Between 5 and 10 years
- ◯ Between 10 and 15 years
- ◯ More than 15 years

5. Demographic information and Conclusion

23. **5.1 Plase indicate your Industry** *

Marca solo un óvalo.

- Advertising
- Aerospace
- Biotechnology
- Business Services
- Chemical
- Computer
- Construction & Building Materials
- Consulting
- Consumer Products
- Defense
- Education
- Engineering
- Entertainment and Sports
- Environmental
- Financial Services
- Food and Beverage Mfng
- Government
- Healthcare
- Hospitals
- Heating, Air Conditioning, Plumbing
- Insurance
- Internet
- Manufacturing and Industrial Products
- Mining
- Oil, Petroleum, Plastics
- Pharmaceuticals
- Professional Services
- Real Estate
- Retail and Restaurants
- Telecommunications
- Textiles and Apparel
- Tourism, Hospitality, Travel
- Transportation and Automotive
- Utilities and Energy
- Other (Not mentioned above)

24. **5.2 Please, indicate your Country** *

.....

25. **5.3 Please, indicate your Company name**

Optional

.....

26. **5.4 Please, indicate your Name and Surname**

Optional

.....

27. **5.5 Your e-mail address**

Optional - However, it is recommended for receiving Updates, Feedback and the Result of this work.

.....

28. If you want to write any comments, please use the following space.

.....

.....

.....

.....

.....

THANK YOU very much for your help and time.

Please, send the questionnaire using the following button.

Best regards,
Alessandro Comai

****

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skype: acomai
email: alessandro.comai@gmail.com