

TITLE:

**HOW ORGANISATIONAL CULTURE AFFECTS INNOVATION IN
LARGE SIZED ICT FIRMS: A PILOT STUDY**

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SUMMARY:

This study seeks to identify characteristics, values and behaviours of organisational culture which either enhance or discourage innovation. The results and findings will arise from an empirical pilot study of qualitative nature over three companies on a case-study basis.

In accordance with the literature review, our empirical results reinforce the belief that the key feature of organisational culture which allows for innovation is the role and attitude displayed by senior managers, and their readiness to monitoring the firm's progress in innovation-led activities.

A major finding from this study states that decision makers do not need to be overly concerned with maintaining a loose corporate structure. A significant degree of bureaucracy coupled with a rigid structure does not necessarily inhibit innovation. In fact, for large multinational companies with subsidiaries, an innovation culture can be generated despite the prevalence of a certain level of rigidity, bureaucracy and hierarchical organizational structure.

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1. INTRODUCTION

The business world has witnessed a change from the 1990s whereby the competitive advantages increasingly arise from the continuous acquisition of knowledge. As such, various authors suggest this time period represents the rise of the “knowledge economy” (Voelpel et al., 2005; Gibbert, Leibold and Probst, 2003; Davenport and Voelpel, 2001). In order to create continuous and sustained value creation firms, must devise and implement an innovation culture which allows them to build the capabilities necessary to compete successfully both now and in the future (Voelpel et al. 2005)

For firms operating within the ICT industry, possessing an innovation culture is not simply an aid, it is a necessity. Companies that conduct business in high-technology industries must “innovate or die” (Angel, 2006;p.1) and the presence of an innovation culture serves as a critical success factor. Recently, the worldwide economic downturn has lead some researchers to suggest that firms which remain focused on innovation will garner greater opportunities than rivals who shun an emphasis on innovation to instead cope with current problems. Such researchers point to the introduction of innovative products like Kraft macaroni and cheese and Miracle Whip which were introduced during the Great Depression of the 1930s and Apple’s iPod which was released shortly after September 11th, 2001, as examples of the importance of maintaining an innovation culture during uncertain times (The Wall Street Journal, 2009).

Although relatively new as a theoretical concept, the significance of an appropriate innovation culture is gaining momentum within academic literature and while it is commonly applied to firms within high-technology industries, its beneficial aspects can also be applied to firms within other industries.

This research seeks to identify characteristics, values and behaviours of organisational culture which either enhance or discourage innovation.

The aim of this study is to contribute to the field by linking recent academic writings on innovation culture with its application at three large sized firms with subsidiaries in the ICT industry. The results and findings will arise from an empirical pilot study of qualitative nature over three companies on a case-study basis.

2. LITERATURE REVIEW

Starting with innovation definitions, to Gaynor (2002) innovation is depicted as a cultural element of an organisation which should be instilled by managers in order to communicate to employees the organisation’s mission, drive them to search for unique opportunities, ensure that those opportunities align with the organisation’s strategic direction, and both define the measurements needed to evaluate an those opportunities’ success and to continually reassess that opportunity in the future so as to ensure that it remains relevant and beneficial. This definition requires that the organisation must implement a system-wide dedication towards the pursuit of innovation if such unique opportunities are to be found and implemented continuously. Gaynor’s definition will be taken as a reference in this study as it has moved the discussion on innovation from the previous conceptualization of ideas, processes, products or procedures to a notion that innovation is a cultural element.

The significance of innovation applying to organisational culture is reflected in other works, such as Baldwin (1995), Martins and Terblanche (2003), Ahmed (1998), Angel (2006), Syrett (1997), McDermott and Sexton (1998) and Turock (2001). These authors all concur with Gaynor's emphasis on the role of organisational culture in allowing for innovative activities and provide explanations as to why this notion is correct.

Definitions of organisational culture are many in number with only subtle differences across them.

The literature stresses the value of innovation across a growing number of industries. Some authors emphasize that the ability to continuously innovate provides a source of competitive advantage (Zahra et al., 1999 and Mone et al., 1998). Therefore, organisations ought to consider how they can best prepare themselves to produce innovative products and/or strategies. Firms should focus on arranging or changing their organisational culture to one that will facilitate continuous innovation, since organisational culture emerges as a determinant of a firm's ability to successfully innovate (Muffato, 1998).

According to Poskiene (2006: 47), organisational culture "refers to the complex set of ideologies, traditions, commitments, and values that are shared throughout the organisation and that influence how the organisation conducts its whole performance becoming a potential source of innovation, advance and advantage". As such, inevitably "it is not the values individuals bring to the organisation that count, but the values the organisation brings to the individual". All in all, the author claims the relationship between innovation and culture is not necessarily proved by empirical research as it contains too many variables which simply cannot be expressed, measured or perceived.

Baldwin's (1995) research revealed the most successful firms do not simply use other firms' technology, but either develop new technology, refine other's technology, or improve their own technology, and such capabilities are only possible within a firm that values a strict focus on innovation throughout its organisational culture. Accordingly, he found that placing a greater emphasis on innovation appears to be a critical determinant of success.

Martins and Terblanche (2003) convey that successful organisations blend an emphasis on innovation into their management processes and overall culture through two primary ways. First, via the socialisation processes present within an organisation whereby individuals learn the existing organizational norms and whether or not innovation serves as one of those norms. Secondly, since an organisation's basic values, assumptions and beliefs are exposed by the structures, policies, and management practices and procedures, they are linked to the levels of creativity and innovation in the workplace.

In this line, Ahmed (1998) contends that culture is the primary determinant of the level of innovative activity within a company but while many companies discuss about innovation, many fewer actually implement it. To a large extent, many companies are averse to the risks involved with innovation. Nonetheless, Angel (2006) remarks that firms must "innovate or die" (p.1) and despite difficult to implement, innovation remains a critical success factor.

While risks do exist in the implementation of an innovation culture, they are mainly short-term and cost-based, but also bring about the potential for opportunities which may offset such risks (Ahmed, 1998). Furthermore, there is no guarantee that implementing an innovation culture will lead to effective innovation, but nonetheless

the presence of an innovation culture is necessary to ensure that innovation is at all possible (Angel, 2006).

Innovation serves as a dynamic capability and is born out of an organisation's ability to be ambidextrous, referred as to the ability to simultaneously explore and exploit as well as increase variance at the same time (Hitt et al., 2005). Research carried out by Poskiene (2006) indicates that a strong and deeply-rooted organisational culture is a primary factor in allowing for sustained innovation. The author notes that a strong culture will likely only lead to a diminished ability to innovate if that culture inspires uniformity which limits individual creativity within the organisation.

Continued innovations in technology usually generate a business climate which is characterized by constant change and firms which want to remain competitive in the future must continuously innovate. Hitt, Ireland and Hoskisson (2005) thus implore firms to focus on producing continuous innovation or a steady stream of innovation.

All of these authors suggest that winning firms will be those who create the strategic management ability to innovate in response to a constantly changing environment.

Continuity in the innovative efforts is an idea also remarked by Kenny and Reedy (2007) who argue that an "innovative organisational culture is one in which continuous improvement throughout the organisation is the norm" (p.119). Innovation is not only derived from a small number of employees who perform a specific task (such as research & development), but it is a philosophy which is embedded throughout the organisation and is present amongst all employees (at least to some degree).

Unfortunately there is no uniform agreement amongst academic literature on the type of organisational culture needed to foster innovation. Moreover, a paradoxical relationship exists between culture and innovation as organisational culture can be a driver for, or impediment to, innovation (Kenny and Reedy, 2007). For instance, a strong organisational culture can lay the foundation for an innovative firm but may also serve to stifle creativity and discourage the interactions amongst employees which are vital to the innovative process. Thus, Kenny and Reedy (2007) maintain that the innovative capabilities of a firm are determined by the way in which a firm's culture is both created and implemented.

In Spain, AECA (1995) defines an innovative culture as a "way of thinking and behaving that creates, develops, and establishes values and attitudes within a firm, even though such changes may mean a conflict with conventional and traditional behaviour". This definition suggests four attitudes to be met in order to create a successful innovation culture: willingness among corporate managers to take risks, wide-spread participation amongst members of the firm, stimulating creativity, and shared responsibility. Moreover, Despande et al. (1993) propose the long-run competitiveness requests a unified culture which values innovation. This prediction is likely due to the idea that the culture of an organisation impacts the degree to which creative, innovative solutions to questions or problems are encouraged, supported and implemented (Kenny and Reedy, 2007). Thus, if a firm is unable to produce creative and innovative solutions to problems then that firm's chances for long-term survival and success are likely to be limited (Despande et al., 1993).

The significance of organisational culture is becoming so high that it has taken on nearly equal status to that of strategy, structure and control (Hofstead, 1991). In terms of

innovation cultures, there exist two primary stages to the innovative process; development and implementation. The first stage of development includes risk taking, searching for alternatives, and discovery. The second stage, implementation, entails testing, refining and implementing (Pandey and Sharma, 2009).

Read (2000) concludes in his literature review that the most important determinant of a beneficial innovation culture is the management's attitudes towards innovation. Managers who support innovation and an innovative corporate culture build organisations with stronger overall innovation cultures. This view is supported by Martins and Terblanche (2003) and Tushman and O'Reilly (1997)

Furthermore, O'Reilly (1989) contends that shared cultural norms determine the level and success of a firm's innovation culture, but that those norms need not be substantial in total numbers. He argues that firms such as Wal-Mart, Toyota, or Hewlett Packard hold a strong innovation culture which is underpinned by only a few shared values. However, the intensity of those shared values is exceedingly strong, and so is the firm belief on a few shared values which can create the appropriate organisational and innovation culture for a firm.

Leadership and top management support towards an innovative culture is also crucial, as remarked by several authors.

Schein (1992) sustains that it is the firm's leadership and their actions which promote an innovation culture, a view also supported by Tierney et al. (1999). For instance, 3M, a highly innovative firm, instituted a policy whereby employees are empowered to use 15% of their total work time to devise creative products or strategies which suit theirs or the firm's needs. Here, the organisation's leadership developed a mindset for employees whereby each day they considered where and how innovative practices and processes could be employed, eventually driving 3M towards recognition as a highly innovative and successful organisation.

Zairi and Al-Mashari (2005) maintain that senior managers play a crucial role in building an effective and sustainable innovation culture. Particularly in terms of developing new products (a capability provided by a proper innovation culture) the role of senior managers includes four primary areas: leadership, responsibility, flexibility, and employee empowerment. A properly implemented and maintained innovation culture ought to allow senior managers to excel in the aforementioned areas and allow the firm itself to compete effectively by blending the present consumer needs in the market simultaneously with process innovations which provide firms the capability to meet those consumer needs.

Zairi and Al-Mashari (2005) suggest a funnel approach to innovation culture implementation which involves senior managers directing a gate-keeping system which traces the role of innovation in a successful product launch. A key feature of this framework is the final post-launch review stage which determines whether corporate targets have been met. If so, then this ought to cause the innovation process to be redeployed and thus allow innovation to become a continuous activity (Zairi and Al-Mashari, 2005: 192).

Implementation of an innovation culture and use of the funnel approach will only prove sustainable if it is combined with organisation-wide behaviour modification. Even a modern IT infrastructure will not lead to a sustainable innovation culture without the organisation's continual effort in adapting its behaviours. IT support should be seen as

the umbilical cord which links the organisation's culture of innovation with the supply chain, brand development and other stakeholders (Zairi and Al-Mashari, 2005).

Once the value and importance of an innovation culture has been largely stated, this literature review will proceed towards identifying the factors which can serve to inhibit the creation or implementation of an innovation culture within a firm.

To Wycoff (2003), it is widely accepted the majority of new business initiatives fail. Firstly, and most significantly, Wycoff (2003) reveals that culture serves as the most common reason for innovation failure. She remarks that firms lacking an appropriate corporate culture which encourages new ideas and supports risk taking are likely to suffer difficulty generating and implementing innovative ideas. Additionally ownership plays a crucial role within the innovative process as managers who do not fully support (or accept, "ownership" of) innovation initiatives typically see those initiatives fail. Furthermore, the resources which a firm allocates towards innovation initiatives also matter. Firms must allow employees to devote sufficient time and energy towards devising innovative strategies and processes, in addition to providing the financial resources which an innovation initiative is likely to require (Wycoff, 2003: 18). The innovations proposed must be properly aligned with the company's overall strategy and should be created by looking both inside and outside the organisation in order to locate truly new and different ideas.

On the other hand, in difficult economic climates the emphasis on innovation may tend to diminish. However, Perel (2005) suggests that the common business practice of bracing for an economic downturn by implementing short-term, cost-saving strategies like lay-offs and budget cuts, actually hurt the firm in the long-run.

When firms fear a poor economy and try to adjust their business models they inevitably turn to install cost-saving measures and one of the first areas impacted by budget cuts is typically innovation. Rather than realizing that innovations drive future, long-term success, firms fear the present moment and thus tend to scale back on researching and experimenting with innovations. However, this strategy is faulty as innovations created today can drive business growth in the future, and examining the causes of a downturn (rather than simply reacting to it) may allow the firm to devise innovative processes to better weather a downturn in the future (Perel, 2005).

Businesses which simply try to improve upon what is already present within the market are unlikely to grow and survive in the long-run. It is now imperative that firms embrace the innovation economy and build organisations which emphasize the importance of an innovation culture. In order to accomplish this, firms need to recognize that everyone both inside and outside the organisation serve as a potential innovator. This recognition ought to allow the firm to adapt and acknowledge that in order to increase overall creativity and innovation it needs to enhance its abilities in self-organisation and action learning in order to improve its long-run chance of survival (Voelpel et al., 2005).

To end this literature review, the table below lists the primary authors consulted and summarizes their contribution to the field.

Table 1: Literature Review Summary

AUTHOR	RESULTS
Gaynor, 2002	Innovation as a cultural element of the organisation. Innovation should be viewed as a management discipline
Poskiene, 2006	Firm's culture creates innovation, but an innovation culture is difficult to prove via empirical research

Kenny and Reedy, 2007	No agreement among academics as to the specific type of organisations culture needed to foster innovation. A strong culture can lay the foundation for innovation, but can also stifle the creative process
Mone et al (1998, Zahra et al (1999)	Ability to continuously innovate provides a source of competitive advantage
Zairi & Al-Mashari, 2005	Senior managers influence on the firm's innovation culture in four main areas: leadership, responsibility, flexibility and employee empowerment
Wycoff, 2003	Primary factors inhibiting innovation are: an overly risk-averse culture, employees lack of freedom to consider new ideas, no specific system for testing innovative ideas
Perel, 2005	Firms should maintain a focus on innovation even during difficult economic times as innovation provides the base for future success

Source: own compilation

3. EMPIRICAL RESEARCH:

3.1. Objectives

Based on the recognition of the importance attached to organisational culture which values innovation, this paper seeks to identify through an empirically based case-study, those features of organisational culture which facilitate innovation and to determine those features that serve to inhibit innovation, in a technology-intensive framework.

This objective is linked to two basic research questions:

RQ1. What values, behaviours and other features attached to an innovation culture and believed to contribute to long-term success are present in subsidiaries pertaining to large ICT corporations?

RQ2. What are the most common obstacles encountered by subsidiaries from large ICT corporations when trying to implement an innovation culture?

These objectives are expected to be fulfilled through a pilot empirical case-study over three large ICT companies.

3.2. Hypotheses

These objectives and research questions lead to the formation of two hypotheses:

H1. In large sized ICT companies, with headquarters and subsidiaries, the presence of the following triggers of innovation is expected to be high in the subsidiaries:

- . The firm allows employees freedom from rules.
- . The firm conducts meetings which are participative and informal
- . Management at the firm are outward looking, open-minded and willing to consider external ideas.
- . The firm values face to face communication with little bureaucracy.
- . The firm emphasizes creative interaction amongst all employees.
- . The firm is flexible regarding changing needs.
- . The structure of the firm is non-hierarchical.

H2. In large sized ICT companies with headquarters and subsidiaries, the presence of the following obstacles to innovation is expected to be low in the subsidiaries:

H2.1. The firm is characterized by rigid departmental separation and functional specialisation.

H2.2. The firm is a hierarchical and bureaucratic organisation.

H2.3. The firm is characterized by long decision chains leading to a slow decision-making process.

H2.4. The firm provides little individual freedom.

H2.5. The firm is risk-averse.

H2.6. The firm is characterized by many rules and set procedures.

H2.7. The firm is characterized by formal reporting standards.

3.3. Research Methodology

This study is descriptive in nature and rely on qualitative data obtained from first-person interviews and received questionnaires. A case study methodology will be employed and three separate interviews will be conducted with managers whereby the same set of questions will be asked to each. Then, additional data will be obtained from more respondents located at the headquarters or at a larger subsidiary.

The development of the questionnaire relied heavily on information gained from the literature review. After reviewing the work of several theorists regarding organisational cultures in general and innovation cultures specifically, several variables were uncovered and determined to be appropriate indicators. All of the variables presented in the hypotheses have been incorporated into the questionnaire. The qualitative data obtained will then be analyzed in order to provide a clear understanding of each firm's attitude towards innovation and the likely effectiveness of its innovation culture.

The empirical analysis is addressed to subsidiaries of three large sized firms in the ICT industry: IBM, Cap Gemini and Analog Devices. The three subsidiaries are located in the same city, Valencia (Spain) and their employment ranges between 60 and 220 workers, most of them highly qualified.

Firms within the ICT industry were chosen for analysis because of their reliance on technology and subsequent need to innovate constantly so as to take profit from current technological trends.

Furthermore, these firms were deemed appropriate for analysis as they emphasize innovation within its company mission statement. The questionnaire was designed to reveal whether each firm actually enjoyed an organisational culture conducive to innovation.

The questionnaire was administered to the three managers of the subsidiaries in Valencia (Spain), and two other questionnaires were supplied to other larger subsidiaries, either inside or outside Spain. By analysing the data obtained from multiple office locations it is hoped that a better overall picture of the organisation's innovation culture can be compiled.

The questionnaire is grouped in several sections to better organize the process of analysis. Sections 1, 2 & 3 provide information about the firm's structure. Section 4 regards the firm's products and services. Section 5 describes the behaviour of the firm's senior managers. Groups 6, 7 and 8 reveal information pertaining to the firm's general, lower-level employees. Respondents were asked to evaluate statements through a 1 to 5

Likert scale, whereby 1 represents a negative impact upon innovation and 5 a largely positive impact.

4. RESULTS AND FINDINGS:

The following section is devoted to present and analyze the data obtained from each company via the questionnaire. Each firm is studied separately in its own section through a brief introduction to the firm itself, followed by a discussion of the results. Finally, fulfilment of the two hypotheses of the study will be tested.

4.1. Capgemini

Cap Gemini is one of the world’s 5 largest IT services and consulting companies. The firm was founded in 1967 in the French city of Grenoble as Sogeti, and takes its current name after the takeover in 1975 of two large IT services companies; CAP and Gemini Computer systems. Today, the firm employs more than 90,000 people amongst offices in over 30 countries with its world headquarters based in Paris, France. Capgemini offers services in four primary areas: consulting, outsourcing, technology, and local professional services.

Four fundamental objectives serve to drive Capgemini and ensure that all its businesses operate under the same management philosophy with the same operational goals in mind. Firstly, the firm values an open and collaborative approach which allows staff to work alongside the firm’s clients and partners to devise solutions and strategies which are tailored to individual client or partner’s needs. Capgemini also maintains a focus on providing a substantial return on investment to shareholders facilitated through its strict adherence to profitable, yet sustainable, long-term growth. Finally, the firm also places a high emphasis on the training and development of its staff in order to ensure that clients and partners are working alongside some of the most talented people within the industry.

Due to both the firm and its clients’ reliance on technology, Capgemini maintains a consistent focus on developing and implementing innovations designed to provide long-term, sustainable, growth. This focus on innovation has allowed the company to establish itself as a market leader in providing well planned and well executed innovative strategies.

In 2008 Capgemini achieved total revenues of over 8.7 billion Euros and expects continued, but slow-paced, growth over the next few years. The company seeks to conduct business amongst all of the following industries: banking, finance, insurance, energy, utilities, manufacturing, retailing, distributing, the public sector, telecommunications, and media and entertainment.

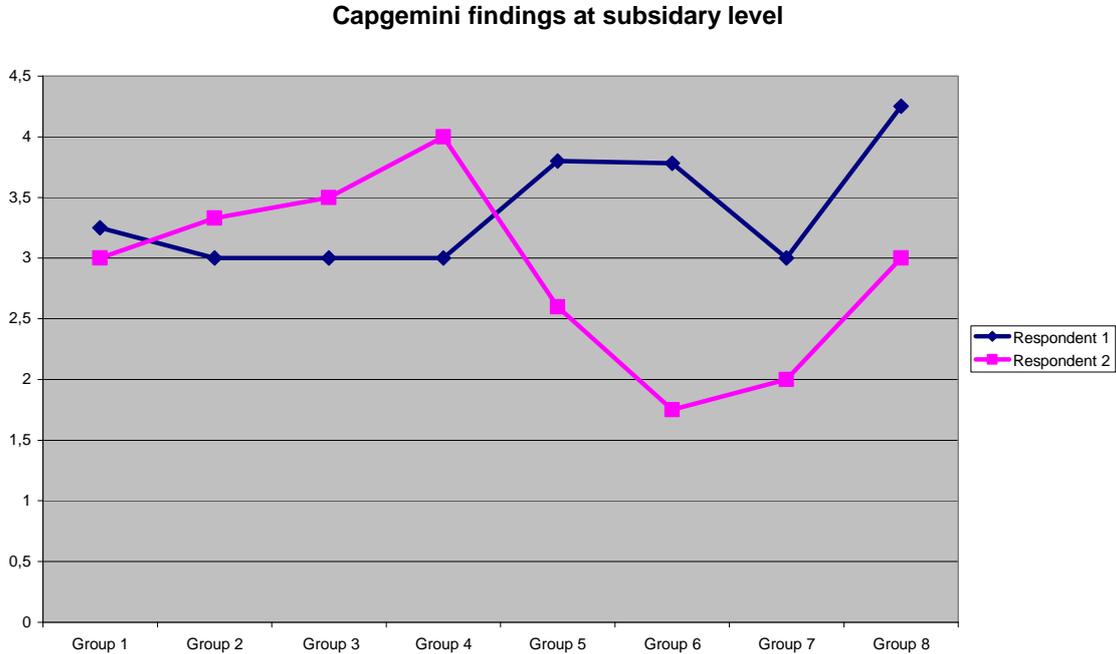
The results of data collected from Capgemini subsidiaries are analyzed below and the data is displayed in Table 4.1 and Graph 4.1. These data represent the opinions of two senior managers at two different Capgemini subsidiaries in Spain. Respondent 1 was the Director at Capgemini’s Valencia subsidiary, and Respondent 2 was the Vice President of Innovation & Alliances at Capgemini’s Spanish headquarters in Madrid.

Table 4.1: Capgemini Subsidiaries

	Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8
Respondent1	3.25	3	3	3	3.8	3.78	3	4.25

Respondent2	3	3.33	3.5	4	2.6	1.75	2	3
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GRAPH 4.2.



Results from Group 1 reveal that neither respondent felt strongly that the firm held the characteristics typically associated with supporting and encouraging innovation. In only Group 8 the mean score was higher than 4 for one respondent.

The majority of the mean scores range between 3 and 4, indicating a neutral position about the pro-innovation statements in the questionnaire.

While scores from both respondents are fairly similar for Groups 1,2,3 and 4, the respondents answers to the questions in Groups 5, 6, 7 and 8 differed significantly and suggest a divergent individual behaviour at each subsidiary within Capgemini group, and the lack of a ubiquitous corporate culture common to headquarters and subsidiaries. Capgemini’s ability to produce innovations seems somewhat limited by significant divergences in organisational culture across subsidiaries.

The Group 5 questions, related to the management of Capgemini, reveal a divide between the two subsidiaries. Both respondents felt very differently about the outward looking and open-minded nature of management at their respective subsidiary, with Respondent 1 at the Valencia subsidiary agreeing that management was outward looking and open-minded while Respondent 2 at the Madrid subsidiary disagreed. Subsidiary 1 located in Valencia is believed to maintain an open-minded approach to new ideas, beneficial to build a culture more innovation-driven. The cultural differences amongst the locations are to some extent explained by the personalities of the senior managers at each location.

Results from Group 6 display the largest level of disagreement. Respondent 1 generally agrees that Capgemini allows employees freedom to perform tasks as they deem appropriate and to allocate time during their normal workday towards developing new

strategies and ideas, while Respondent 2 view towards this procedures is not so positive for the Madrid subsidiary.

Findings in Group 7 suggest Capgemini's organisation culture fails to strongly encourage the sharing of new ideas. Despite being better than for Madrid, the neutral scores for the Valencia subsidiary indicate room for improvement in this area.

In Group 8, both managers consider the firm values properly the innovative employees, teambuilding and collaboration. Respondent 1 is again more optimistic and believes the employees usually behave in a creative way.

4.2. IBM

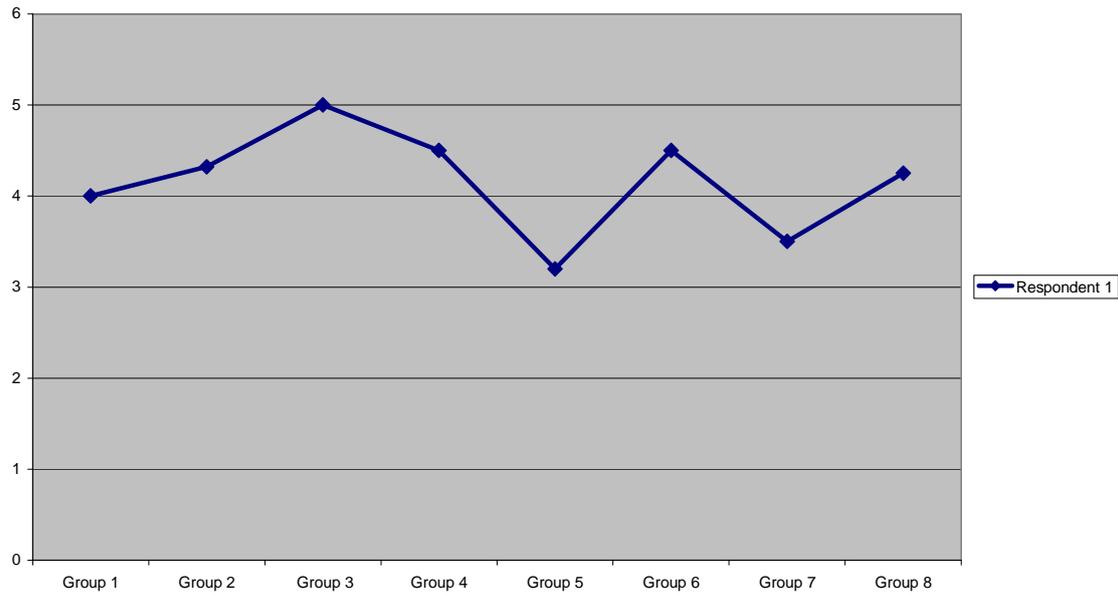
IBM is among the most well-known and respected IT companies in the world. The firm's headquarters are located in Armonk, New York, but it owns offices in over 170 countries around the world. The firm employs more than 388,000 people and posted revenues in 2008 of just over \$103.6 billion. IBM describes itself as a multinational computer technology and IT consulting corporation, and it is regarded as the world's largest computer company and systems integrator. The company is both the largest and most profitable IT firm in the world and also holds more U.S. technology patents than any other technology company.

Primary corporate values at IBM include dedication towards all its client's success, producing innovations serving to either the firm or its clients, and building relationships which are based upon trust and responsibility. The firm's tenure of more technology based patents than any other company reveals its innovative past while its future plans remain focused on producing continuous innovations which will drive the IT industry.

IBM's commitment to innovation persists today as evidenced by its creation of the Global Innovation Outlook (GIO) in 2004, which implies opening IBM's annual technology and business forecasting processes in order to involve as many minds as possible. IBM believes that innovation driven by collaboration is the right path towards generation of some of the truly revolutionary innovations of the future; from innovations which create new markets to innovations which redefine old markets.

Results from the Valencia IBM subsidiary are displayed in Graph 4.2. Respondent in the interview was the CEO of the Valencia subsidiary who also held the position of Business Development Manager for general business systems and technologies in Southwest Europe.

GRAPH 4.2: IBM findings at the subsidiary level



The results are fairly positive and reveal the respondent's conviction that innovation behaviours are properly encouraged in the subsidiary. The scores for Groups 1,2,3,4,6 and 8, all above 3,5 points, highlight the IBM's subsidiary under analysis contain the structure, management style and employee behaviour is adjusted to an innovation culture. The extremely high score for Group 3 indicates IBM allocates significant time and resources to its R&D department and to support R&D practices.

The lowest score is obtained in Group 5. This challenging result shows that despite employees are encouraged to think critically about their job functions, once a final decision is made by senior managers, those employees are then expected to obey.

According to the respondent, in Group 7, employees feel comfortable sharing new ideas, but the company does not put forward mechanisms to allow employees to learn from mistakes by others.

4.3. Analog Devices

Analog Devices was founded in 1965 and today ranks as one of the largest and most profitable semi-conductor companies in the world. The firm began operations in Massachusetts, U.S.A., but maintains offices around the world with a presence in countries like Germany, Ireland, Australia, Israel, China, Tokyo, Taiwan and Spain. The firm serves over 60,000 customers and specializes in producing data conversion and signal conditioning technology, with its components used in a wide array of technological equipment. Analog Devices components can be found in industrial and medical equipment, wireless communications infrastructure, automotive applications, and consumer electronics.

The core business of Analog Devices is in providing high-performance integrated circuits which are used in analogical and digital signal processing applications. The firm is a global manufacturer of such high-performance integrated circuits, employing 8,500 people worldwide and with 2008 revenues of \$2.6 billion.

The company describes itself as a leading firm in the signal processing industry, a position deeply rooted on the firm’s commitment to excellence, R&D activities and overall innovation. Without the capability to produce consistently well designed and high-performing products the firm would face a significant competitive disadvantage. Thus, the firm’s ability to develop innovative products and processes represents a key explanatory factor in its long-term success.

Each year the company allocates a significant percentage of its profits to research and development, as well as to customer service with the goal of creating innovative signal processing technology leading its customers to produce better products than their competitors. The firm’s success in this area is evidenced by the high profits it earns and future success is ensured by the company’s longstanding policy of re-investing profits back into engineering and customer service so as to create self-perpetuating cycle of innovation.

The empirical study on Analog Devices was undertaken at both the subsidiary and the headquarters levels. Results displayed in Table 4.3 and Graph 4.3 represent the scores agreed by the CEO of the Science Center of the company at the Valencia subsidiary, as Respondent 1, and the opinions expressed by the Director of New Technologies at Analog Devices headquarters in the United States, as Respondent 2, but referred also to subsidiaries of the company, well known by him. Science Centers like the one located in Valencia are relatively small in size, with a number of employees ranging between 25 and 80 highly qualified engineers.

TABLE 4.3: Analog Devices Findings at subsidiary level

	Group1	Group2	Group3	Group4	Group5	Group6	Group7	Group8
Resp 1	2.75	4	4.5	5	4	4.25	3.5	4
Resp 2	2.75	4	4.5	4.2	5	3.5	4.5	4.25

GRPH 4.3: Analog Devices findings at subsidiary level



The results reveal a strong agreement between both respondent. In none of the eight question groupings the mean scores deviate by more than one full point.

The lowest scores are obtained in Group 1, suggesting the respondents view the corporate structure of the firm at the subsidiary level as not suited towards innovation. The degree of department separation is seen as rigid and so the functional specialization by departments, turning the decision chains too long. This situation unconstructive to innovation might be explained by the need to comply with a set of routines in R&D and project development activities.

Contrary to the findings from Group 1, the improved results for Groups 2 and 3 suggest the organization structure at the firm's subsidiaries level encourages an innovation culture. Here, both respondents strongly felt that Analog Devices places a high emphasis on R&D activities and the company properly plans and implements initiatives leading to worthy innovations. Consequently, Analog Devices is a corporation particularly committed and supportive to innovation, regardless rigidity and bureaucracy at the decision taking level.

The remaining scores from Groups 4,5,6,7, and 8, all reveal scores above 3,5. Respondents disagree especially in Groups 5 and 7, being more optimistic the representative of the headquarters, whereas the answers by Respondent 1 are more favourable in Groups 4 and 6. On the whole, the results lead to conclude that the management style and the employees behaviour are conducive to generate an innovative climate in the Analog Devices subsidiaries.

This section comes to its end with a brief comparison of the three companies.

Table 5.4 and Graph 5.4 place Capgemini with the lowest mean scores for seven out of the eight question groupings, while Analog Devices and IBM display very similar, and positive mean scores in half of the groupings. These results propose a corporate culture in IBM and Analog Devices more likely to support and encourage innovation at the subsidiary level than does Capgemini.

4.4. Hypotheses contrast:

In order to fulfil Research Question 1 and to test Hypotheses 1, a set of general components inducing an innovation culture was found through our empirical analysis, as follows:

- . Willingness to accept risk
- . Emphasis on R&D activities and a proper allocation of resources to these activities
- . Supply of unique products and services that require a high degree of technological excellence
- . Acquisition, support and encouragement of creative employees

In accordance with the literature review (Tushman and O'Reilly, 1997, Read, 2000, Martins and Terblanche, 2003), our empirical results reinforce the belief that the key feature of organisational culture which allows for innovation is the role and attitude displayed by senior managers, and their readiness to monitoring the firm's progress in innovation-led activities.

The managers acting as respondents largely share the view that encouraging staff to think creatively and independently needs to be properly balanced against efficiency and profitability, a purpose not always at reach. Our empirical study highlights the need to avoid conflict between mechanisms launched to urge innovative ideas and processes, and the operational efficiency.

As for Research Question 2 our findings reveal the difficulties in ICT subsidiaries to get rid of the headquarters rigid, hierarchical and bureaucratic organizational structures.

This finding is inconsistent with our literature review which pointed out the risks by a rigid and bureaucratic organisational culture to counteract innovative initiatives (Hitt, Ireland and Hoskisson, 2005, Zairi and Al-Mashari, 2005, Poskiene, 2006, Kenny and Reedy, 2007). But unexpectedly, the somewhat rigid and bureaucratic corporate structures prevailing at both Analog Devices and Capgemini subsidiaries, has not been detrimental to spread and encourage and innovation-led culture and maintain the capacity to innovate in satisfactory levels for the headquarters.

Table 5.5 details the acceptance or rejection of the components taking part in Hypothesis 1

TABLE 5.5: Hypothesis 1

HYPOTHESIS 1: In subsidiaries from large ICT companies, the presence of each of the following characteristics is expected to be high:	Acceptance / Rejection
. The firm allows employees freedom from rules	REJECT
. The firm conducts participative and informal meetings	ACCEPT
. Managers are outward looking, open-minded and willing to consider external ideas	ACCEPT
. The firm values face-to-face communication with little bureaucracy	REJECT
. The firm emphasizes creative interaction amongst all employees	ACCEPT
. The firm is flexible regarding changing needs	ACCEPT
. The organizational structure of the firm is non-hierarchical	REJECT

Table 4.5 reveals a partial acceptance of Hypothesis 1, as for out of the seven sub-hypotheses are accepted.

A moderate to high level of bureaucracy and a hierarchical structure are present in two out of the three firms under study. These features are believed to inhibit innovation as argued by most authors in the literature review. However, this organizational rigidity has not prevented Analog Devices or Capgemini from attaining an innovation culture satisfying to the company nor has it hampered the firm's long-term success. A major lesson emerges from this finding: in subsidiaries from large ICT companies, an innovation culture can be generated despite the prevalence of a certain level of rigidity, bureaucracy and hierarchical organizational structure. However, in order to confirm this finding, a larger empirical study should be implemented.

Table 5.6 shows the results for Hypothesis 2.

TABLE 5.6: Hypothesis 2

HYPOTHESIS 2: In subsidiaries from large ICT companies, the presence of each of the following characteristics is expected to be low:	Acceptance / Rejection
. The firm is characterized by rigid departmental separation and functional specialization	REJECT
. The firm is a hierarchical and bureaucratic organization	REJECT
. The firm is characterized by long decision chains	REJECT
. The firm provides little individual freedom	REJECT
. The firm is risk-averse	ACCEPT
. The firm is characterised by many rules and set procedures	REJECT

. The firm is characterised by formal reporting standards	REJECT
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As pointed out in the above Table, Hypothesis 2 is rejected. Two of the three companies under analysis recognize a broad presence of most of the components and behaviours gathered in the table, and believed to be detrimental to innovation culture.

Similarly to Hypothesis 1, these results lead to the conclusion that the difficulties attached to managing subsidiaries from large sized ICT firms prevail over their willingness to innovate. This conclusion diverges from the results supported by the literature review.

5. CONCLUSIONS:

A firm's ability to produce consistent and beneficial innovations primarily derives from the organisation's culture. Although the culture takes a greater role than individuals within a firm culture, the significance of the role played by senior managers should not be overlooked. To become a fully innovative organisation, senior managers must maintain a constant focus on innovation management, encourage employee creativity and actively monitor the organisation's progress in order to ensure a culture conducive to the constant generation of valuable innovations.

The vast majority of employees in medium to large companies are a product of the organisation's culture and they have to act in accordance with it. However, the relatively small group of senior managers are the ones responsible to stimulate and maintain the organisation's culture, and therefore their individual contribution should not be ignored.

Furthermore, this study revealed a divide between theory and practice. Our results showed a lack of fulfilment of some of the statements reported by the literature. Specifically, the empirical results over three large sized ICT companies show a rigid and hierarchical structure discovered by the empirical study over three large sized ICT companies should, according to the literature, be consistently negative to the innovative capacity of these firms. The right atmosphere to properly innovate requests open-minded thinking and a relaxed, open and rule-free environment, components that have not been found in the three companies under study.

The relatively high degrees of bureaucracy and hierarchical behaviour in both Analog Devices and Capgemini organisational structures at the subsidiary level, apparently has not prevented them from acquiring high levels of success for a prolonged period of time and a remarkable capacity to develop and launch innovations. Thus, our empirical study reveals that the organisational rigidity, largely believed to hamper the innovative capacity, seem not to have adversely affected the ability to innovate in the companies visited.

Certain results obtained in this study are likely to be applicable to other industries. The difficulties registered by the three ICT companies visited are probably inherent in any medium to large sized corporations requiring a well-defined structure in order to effectively manage their subsidiaries.

It should be noted the significant value innovation acquired for firms in the ICT industry, with their products and services being dependent upon technology advances. Such firms must allocate more time and resources towards R&D activities because the pace of technological change is rapid. But, regardless the industry, innovation can serve as a valuable source of competitive advantage.

As for management implications, both the literature review and the results of this study insist on several behaviours leading to an innovation-driven culture. To be outward looking, open-minded and willing to consider external ideas, coupled with encouraging employee creativity and monitoring business practices in order to ascertain where innovative processes or procedures are needed. Senior managers are expected to conduct frequent meetings in order to openly discuss and debate employees ideas. If the firm's culture causes employees to be timid regarding challenging established practices and procedures, the firm's ability to innovate effectively is likely to be reduced. From the three companies visited, IBM placed a much greater emphasis on allowing employees the freedom to think critically about how their roles and job functions could be improved.

The major finding from this study states that decision makers do not need to be overly concerned with maintaining a loose corporate structure. A significant degree of bureaucracy coupled with a rigid structure does not necessarily inhibit innovation. In fact, for large multinational companies with subsidiaries, a tight structure is necessary in order to operate an efficient and profitable enterprise.

Finally, due to the subjective nature of qualitative interviews and specially, the pilot nature of this study, the findings and conclusions drawn from this research are limited. The respondents to the questionnaire are all senior managers at either their respective firms' headquarters or at a subsidiary, and while their insights are valuable, the conclusions drawn are weakened by the small sample size of respondents.

To end, it must also be noted that at present, no accurate, reliable and widely shared empirically proved method exists for measuring a firm's innovation culture (Zairi and Al-Mashari, 2005).

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