



AN INTEGRATED ANALYSIS OF CORPORATE ENTREPRENEURSHIP AND ORGANIZATIONAL BEHAVIOUR IN THE SERVICE SECTOR

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To my loving husband and daughters

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Resumo

Uma Análise Integrada de Empreendedorismo Corporativo e Comportamento Organizacional no Sector dos Serviços

O principal objetivo deste trabalho é preencher as lacunas nos campos da gestão estratégica e do empreendedorismo relacionadas com o comportamento empreendedor dos trabalhadores, a partir da perspectiva do comportamento organizacional. Esta tese contribui para esses campos de investigação de variadas formas. Pela primeira vez, é proposta uma ontologia do empreendedorismo corporativo a partir da qual foi deduzido um modelo integrativo do processo. Utilizando dados de 127 empresas, confirmámos que tanto fatores externos como internos explicam o comportamento intraempreendedor, e que este está associado à inovação e performance das empresas. Este estudo também confirma que o comportamento intraempreendedor é particularmente importante para a inovação, nas empresas do sector dos serviços. Por fim, propomos e confirmamos empiricamente a existência de quatro tipos de empresas caracterizadas como biomas (configurações organizacionais) de “vida intraempreendedora” . Este estudo sugere implicações práticas para a gestão estratégica de recursos humanos, bem como pistas para futura investigação.

Palavras-chave: comportamento intraempreendedor, empreendedorismo corporativo, comportamento organizacional, gestão estratégica, serviços

Abstract

An Integrated Analysis of Corporate Entrepreneurship and Organizational Behaviour in the Service Sector

The main goal of this study is to fill-in gaps in the strategic management and entrepreneurship literatures concerning employees' entrepreneurial behaviour, from an organizational behaviour standpoint. This thesis contributes to these fields in several ways. It proposes for the first time, an ontology of corporate entrepreneurship from which an integrative model of corporate entrepreneurship was derived. Using data obtained from 127 firms, we confirmed that both external and internal factors explain intrapreneurial behaviour and that it is associated with innovation and firm performance. This study also confirms that intrapreneurial behaviour is particularly relevant for services' firms. Finally, we proposed and confirmed the existence of four types of firms characterized as different biomes (organizational configurations) of 'intrapreneurial life'. Our study has practical implications for human resources strategic management, and proposes several lines of future research.

Key words: intrapreneurial behaviour, corporate entrepreneurship, organizational behaviour, strategic management, services

Glossary of abbreviations

BSc – Bachelor of Science

CE – Corporate entrepreneurship

CEO – Chief executive officer

CFO – Chief financial officer

CMO – Chief marketing officer

EBIDTA – Earnings before interest, depreciation, and amortization

EP – Entrepreneurial proclivity

HRM – Human resources manager

IB – Intrapreneurial behaviour

MANOVA - Multivariate analysis of variance

MSc – Master of Science

NACE – ‘Nomenclature Generale des Activites Economiques dans l` Union Europeenne’ (General Name for Economic Activities in the European Union)

PhD – Doctor of Philosophy

R&D - Research & Development

ROA – Return on assets

ROE – Return on equity

ROI – Return on investment

SME – Small and medium enterprise

SPSS - Statistical Package for the Social Sciences

OB – Organizational behaviour

OCB – Organizational citizenship behaviour

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PART I – INTRODUCTION TO THE THESIS AND THEORETICAL BACKGROUND

Most of us have jobs that are too small for our spirit.

Jobs are not big enough for people

Terkel (1972)

Chapter 1. Introduction

This study is entitled *An Integrated Analysis of Corporate Entrepreneurship and Organizational Behaviour in the Service Sector*. Building on the previous theoretical and empirical studies of the entrepreneurship and strategic management fields, we intend to bring an organizational behaviour field view of employees' entrepreneurial behaviour. This research aims to provide a better understanding of how these behaviours might be fostered by appropriate organizational configurations and how important employees' entrepreneurial behaviour is for service sector's firms.

The individual was often thought to be the scope of entrepreneurship. Entrepreneurship was also considered by some researchers to apply primarily to small businesses creation. However, researchers have legitimized the concept of corporate entrepreneurship in the 1980s. Corporate entrepreneurship refers to "(...) formal and informal activities aimed at creating new business in established companies through product and process innovations and market developments (...) Corporate entrepreneurship also entails the strategic renewal of an existing business" (Zahra, 1991, p. 262)¹.

Since the 1980s, the trend has been to use concepts from the strategy-making process literature to model corporate entrepreneurship (Lumpkin & Dess, 1996) following the work of Miller (1983), Miller and Friesen (1982), and Mintzberg (1973). Entrepreneurial organizations are those that try to obtain a competitive advantage by habitually making dramatic innovations and taking challenging risks (Miller & Friesen, 1982). "An entrepreneurial firm is one that engages in product-market innovation, undertakes somewhat risky ventures, and is first to come up with 'proactive' innovations beating competitors to the punch" (Miller, 1983, p. 771).

¹ In this document, we will use APA referencing style.

Many authors agree that corporate entrepreneurship is in many organizations much more a question of culture and employee behaviour² than of established R&D processes. Zahra (1996) states that corporate entrepreneurship implies creating a work environment that gives employees an opportunity to use their creative skills, quickening a company's response to the market and creating an organizational culture that fosters cross-functional collaboration. In a seminal work on the topic, Burgelman (1983) identifies corporate entrepreneurship with individual autonomous strategic behaviour. Autonomous strategic behaviour is the one where "entrepreneurial participants, at the product/market level, conceive new business opportunities, engage in project championing efforts to mobilize corporate resources for these new opportunities, and perform strategic forcing efforts to create momentum for their further development" (Burgelman, 1984, p.156). Either occurring with the support and stimuli of top management or emerging autonomously, entrepreneurial behaviour pertains to the individuals.

However, 30 years after the seminal works on corporate entrepreneurship several questions remain unanswered or not clarified:

- (1) What is in fact, and what is not, corporate entrepreneurship?
- (2) What can be the role of employees' entrepreneurial behaviour within a wider model of corporate entrepreneurship?
- (3) How different are services' firms from other types of firms, regarding the relevance of employees' entrepreneurial behaviour for innovation?
- (4) How can a firm move along the axis of the emphasis on employees' entrepreneurial behaviour, from lower to higher emphasis?

These unanswered questions suggest theoretical and practical issues that will be the focus of our study, therefore justifying its pertinence. Firstly, with the rise in academic interest for corporate entrepreneurship, have come multiple challenges. One challenge refers to the different terminology used by both researchers, and practitioners when referring to similar constructs. Another challenge, while reviewing the literature, is to establish exactly what phenomena are related to corporate entrepreneurship as different phenomena are often viewed as examples of corporate entrepreneurship (Covin & Miles, 1999).

² The entrepreneurial behaviour of employees is sometimes called 'intrapreneurship'. The notion of 'intrapreneur' is derived from the concept of entrepreneur from the entrepreneurship literature. However, the term 'intrapreneurship' is also used many times with a different meaning, referring to the firm as a whole, and with its innovation outputs.

Secondly, although entrepreneurship and the characteristics of entrepreneurs are relevant and a starting point to study entrepreneurial behaviour within established firms, specificities that are related to the fact that the intrapreneurs (i.e. employees) act within an organizational setting are many times missing from the strategic entrepreneurship literature. This is why an organizational behaviour perspective might be useful. Previous researchers in the entrepreneurship field have addressed issues such as structure, organizational culture, and other aspects related to entrepreneurial behaviour within an organizational setting, but there is still need for further research to provide insight on the complex social processes associated with entrepreneurial activity.

Thirdly, employees' entrepreneurial behaviour might be a particularly relevant concept in service sector's firms because of the strategic importance of employee-client interactions. Entrepreneurial behaviours might be important for the continuous tailoring of products and services focusing on the customer's lifetime value for the company. However, most research developed so far is mostly concerned with high-tech manufacturing firms and with more structured ways of corporate entrepreneurship, such as corporate venturing, rather than on employees' entrepreneurial behaviour. Moreover, considering the importance of entrepreneurship and innovation to the economic development of Portugal (Sarkar, 2010), and the importance of the services' sector in the Portuguese economy, employees' entrepreneurial behaviour in firms that operate in Portugal is certainly an under researched area. To our knowledge there is only one recent article published in a peer-reviewed journal that empirical tests and confirms the effects of intrapreneurship on firm performance (Felicio, Rodrigues, & Caldeirinha, 2012) in Portuguese firms. However, in this case, intrapreneurship does not refer specifically to the behaviour of individuals but to the overall entrepreneurial proclivity of a firm.

Fourthly, there are still few studies that really help practitioners on how to implement the necessary conditions to foster employees' entrepreneurial behaviour, since the study of the "how" of entrepreneurship within an established organizational setting is a relatively more recent stream for entrepreneurship research.

In summary, our research will bring theoretical and practical contributions. On the one hand, we intend to fill-in the aforementioned gaps in previous research. On the other hand, this will provide practitioners with necessary knowledge to develop more entrepreneurial firms through employees' behaviour.

The specific goals of our work are:

- (1) to clarify the construct of corporate entrepreneurship

- (2) to demonstrate the need for an organizational behaviour approach to the topic
- (3) to study the relation between employees' entrepreneurial behaviour and innovation
- (4) to study how the relation mentioned in objective (3) is different in services' firms versus non-services' firms
- (5) to study how employees' entrepreneurial behaviour affects firm performance, financial and non-financial
- (6) to test some of the above relations while controlling for internal given factors, such as company size or age, and external factors, such as industry's level of hostility
- (7) to identify the specific organizational configurations and management practices firms can use to foster entrepreneurial behaviour from employees

Researchers start a project with certain assumptions about how they will learn and what they will learn during their study (Creswell, 2009). We place our approach to this research under the post-positivism paradigm. Post-positivism is a conceptual framework created in a moderately controlled environment that produces replicable and generalizable data (Delarue, Van Hootegeem, Procter, & BurrIDGE, 2008). Post-positivism is generally identified with the scientific method, reflecting a deterministic philosophy (in which causes probably determine effects or outcomes). This paradigm assumes there are laws or theories that govern the world, so the researcher begins with a theory, collects data that either supports or refutes the theory, and then makes necessary revisions (Creswell, 2009).

This study will be conducted using both quantitative and qualitative approaches to data collection, because qualitative and quantitative methods can complement each other. Post-positivists in contrast to positivists apply a modified deductive approach, which means that qualitative data does not have to be excluded from the study and can be used to support or inform the quantitative data and results. On the one hand, quantitative methods are used to gather data addressing the research questions and to confirm and extend the current body of knowledge (Creswell, 2009). For this purpose, our study will be operationalized using self-report surveys where the participants are the top executives of the firms. On the other hand, qualitative method is used as an inquiry process that includes the provision of insight into human or social problems (Creswell, 2009). Our intention is to probe key issues regarding intrapreneurial behaviour and to explore relationships between selected variables providing a more in-depth analysis. We will operationalize this method, using multiple case studies, and multiple data sources within each case, to enrich the findings.

This thesis is divided into three main parts. **Part I** has two chapters. **Chapter 1** is the introduction, where we presented the rationale for the research on employees' entrepreneurial behaviour. There, we also identified the objectives of the study and outlined the fundamental research options, concerning paradigm and method. **Chapter 2** presents the theoretical background to study employees' entrepreneurial behaviour. This background originates from the entrepreneurship, strategic management and organizational behaviour literatures. This chapter describes the seemingly inevitable convergence of these fields in what concerns the study of employees' entrepreneurial behaviour.

Part II assumes the form of five standalone but interconnected articles. Each article addresses a particular set of our global research objectives. **Article 1** is of a more theoretical nature, and intends to address the construct and model issues around corporate entrepreneurship literature. In this article, we propose a preliminary ontology of corporate entrepreneurship, which future scholars may use to clarify the concepts in the domain. Our ontology also describes how corporate entrepreneurship works inside the firm, while defining the specific constructs used by researchers in modelling this reality. **Article 2** presents and discusses results of the quantitative empirical research on employees' entrepreneurial behaviour in firms that operate in Portugal. A model of employees' entrepreneurial behaviour is derived from literature and tested, using linear regression. The results reveal the importance of employees' entrepreneurial behaviour for firm performance. **Article 3** presents and discusses the results of quantitative empirical research concerned with how intrapreneurial behaviour explains innovation. The model was tested using hierarchical multiple regression. This article also establishes the differences in the association between intrapreneurial behaviour and innovation, in services' vs. non-services' firms. In **Article 4**, we propose a typology of firms using a biology-derived analogy - firms as biomes, i.e. 'habitats' that are more or less favourable for employees' entrepreneurial behaviour. This typology was empirically tested, using cluster analysis, and the differences between the biomes were established using MANOVA analysis. **Article 5** presents and discusses case studies that illustrate organizational configurations associated with each of the main biomes.

Part III outlines the conclusions of the global research, and identifies the thesis contributions and limitations. Implications for managers are presented, as well as recommendations for further research.

Chapter 2. Theoretical background to study employees' entrepreneurial behaviour

Section 2.01 Introduction

Our intended line of research can be placed in the 'meeting point' between the entrepreneurship, strategic management and organizational behaviour literatures. Therefore, the purpose of this chapter is to review how fundamental assumptions within these literatures enlighten the study of employees' entrepreneurial behaviour. Section 2.02 introduces corporate entrepreneurship within the wider field of entrepreneurship, explaining how that particular branch of entrepreneurship approached the strategic management field of research. Section 2.03 presents the main paradigms on strategic management, and explains in more detail why resource-based view theories are particularly relevant for the present study, justifying the strategic importance of employees' behaviour. Section 2.04 reviews the fundamental models of the organizational behaviour field concerned with how organizational and personal dimensions explain individual behaviour. The chapter summary highlights construct issues in the corporate entrepreneurship literature, and stresses how the convergence of strategic entrepreneurship and organizational behaviour models enhance our understanding of the strategic relevance of individual entrepreneurial behaviour at all levels of the organization.

Section 2.02 From the individual entrepreneur to the entrepreneurial firm

This section reviews the origins of entrepreneurship literature and the contributions of the most relevant scholars in the field. It demonstrates that although historically considered the role of the businessperson in the economy, entrepreneurship has been gaining a broader meaning.

(a) Branches in entrepreneurship literature

Entrepreneurship research can be organized into three branches: (1) researchers who study 'what' entrepreneurs do; (2) those who study 'why' entrepreneurs act as they do; and, (3) researchers that study 'how' entrepreneurs act (Stevenson & Jarillo, 1990).

Scholars with an approach to entrepreneurship derived from Economy are usually concerned with answering the 'what' question. Schumpeter (1934; 1942) is probably the most relevant reference within this perspective. This area is concerned with the actions of the entrepreneur and their effects in the economic system. In fact, this was exactly the concern of

Richard Cantillon, who in the XVIII century was the first to advance the concept of 'entrepreneur'. Cantillon argued that entrepreneurship was associated with uncertainty and risk. Jean Baptiste Say, in 1803, broadened the definition to include elements concerned with the role of the entrepreneur in bringing together the factors of production (van Praag, 1999).

Schumpeter (1934) considers entrepreneurship the way by which the economy develops. This scholar argues that entrepreneurship is about creating new products, processes, sources of supply, etc., which create disequilibrium in the market. Schumpeter's (1942) 'creative destruction', by which wealth is created when new goods or services disrupt existing market structures because they cause the shift of resources away from existing firms to new the firms, emphasizes the role of innovation in the entrepreneurial process.

According to Stevenson and Jarillo (1990), the study of the effects of entrepreneurship in the overall economy has the following characteristics: (1) It abstracts from the individual entrepreneur; (2) It recognizes the entrepreneurial function as responsible for economic improvement; and, (3) It creates a basis for the distinction between the roles of 'investor', the 'manager' and the 'entrepreneur'. In fact, Schumpeter (1934) clearly separates the concept of entrepreneur from that of businessperson. Though not using the word, Schumpeter (1934, p. 74) is already suggesting the concept of 'intrapreneur':

"We call entrepreneurs not only those 'independent' businessmen in an exchange economy who are usually so designated, but all who actually fulfil the function by which we define the concept, even if they are, as is becoming the rule, "dependent" employees of a company, like managers, members of boards of directors, and so forth, or even if their actual power to perform the entrepreneurial function has any other foundations, such as the control of a majority of shares. As it is the carrying out of new combinations that constitutes the entrepreneur, it is not necessary that he should be permanently connected with an individual firm; many 'financiers,' 'promoters,' and so forth are not, and still they may be entrepreneurs in our sense. On the other hand, our concept is narrower than the traditional one in that it does not include all heads of firms or managers of industrialists who merely may operate an established business, but only those who actually perform that function".

The second branch of research on entrepreneurship includes authors with a perspective on entrepreneurship emanating from Sociology and Psychology, such as McClelland (1961), and Collins and Moore (1964). The individual entrepreneur's background, goals, values and motivations are the objects of research of this branch, but the environment as a determinant of

the individual's motives is also considered relevant. Some authors in this area of research consider entrepreneurship as "a psychological characteristic of individuals, which can be described in terms such as creativity, daring, aggressiveness, and the like" (Wilken, 1979, p. 58). The work of Collins and Moore (1964) – 'The Enterprising Man' – was determinant for that line of research. McClelland's (1961) work – 'The Achieving Society' – promoted another line of research within this branch that views entrepreneurship as a social role. According to McClelland (1961), the 'need for achievement' in the populations of some societies is related to high economic and social growth. On the other hand, the author argues that environmental characteristics influence personal motives, which in turn influence entrepreneurial behaviour.

The understanding of the 'why' of entrepreneurship has been subject to criticism. Some authors (e.g. Carland, Hoy, Boulton, & Carland, 1984) argue that the excessive focus on the individual has collated entrepreneurship to small business ownership. Notwithstanding, this approach to entrepreneurship has brought some advancements to the field (Stevenson & Jarillo, 1990) by stressing that: (1) it is individuals who carry out entrepreneurial activities, (2) the characteristics of those individuals matter, but (3) environmental variables are also relevant.

Recently, a third branch of research, with a Management/Business approach to the field, is more concerned with the 'how' of entrepreneurial management, focusing on understanding and improving managerial practice. This branch eventually led the interest in entrepreneurship to encompass entrepreneurship within the organizational setting, i.e. corporate entrepreneurship.

We should retain several ideas from all three branches of entrepreneurship as relevant for this study:

(1) Entrepreneurship is carried out by individuals, but we should make the distinction between the roles of businessman and entrepreneur, justifying that entrepreneurship happens also inside the organization by the action of entrepreneurial employees that carry out 'new combinations', i.e. that innovate;

(2) Entrepreneurship is relevant to economic growth. Therefore, if economies grow through business growth, and if the entrepreneur can be virtual anyone that innovates, then employee entrepreneurial behaviour might be associated with firm performance;

(3) Environment influences the behaviour of the individual entrepreneurs. As we are interested in entrepreneurship within an established firm, then it is relevant to study the environment at two levels, the external environment where the firm operates, but especially

variables of the internal environment (e.g. structure, organizational culture) that more directly affect employees' behaviour.

We understand that the three branches of entrepreneurship research are not mutually exclusive and it is possible to find in the entrepreneurship literature definitions of entrepreneurship that in fact provide a link, between many of the propositions and findings of earlier researchers. "...entrepreneurship as a scholarly field seeks to understand how opportunities to bring into existence "future" goods and services are discovered, created and exploited, by whom and with what consequence" (Venkataraman, 1997, p. 120). "Entrepreneurship is the process of creating something with value by devoting the necessary time and effort, assuming the accompanying financial, psychic, and social risks, and receiving the resulting rewards of monetary and personal satisfaction and independence" (Hisrich, Peters, & Shepherd, 2005, p. 8). The definition proposed by Venkataraman (1997) can easily be applied to firms, and the one proposed by Hisrich *et al.* (2005), to intrapreneurs.

By the turn of the century, corporate entrepreneurship had become an established stream of research within the entrepreneurship field but also a focus for strategic management scholars. Early strategy literature equated entrepreneurship with going into business, and the basic "entrepreneurial problem" (Miles & Snow, 1978) was to address the principal question of strategy content, that is 'what business shall we enter'. As the field of strategic management developed, however, the emphasis shifted to entrepreneurial processes, that is, the methods, practices, and decision-making styles managers use to act entrepreneurially (Lumpkin & Dess, 1996).

In the following section, the evolution of corporate entrepreneurship as a field of research is explained in more detail.

(b) Corporate entrepreneurship as a field of research

As explained in subsection (a), the individual has historically been seen as the scope of entrepreneurship and this was considered by most researchers to apply primarily to small businesses creation. However, since the 1980s researchers began to emphasize entrepreneurship as a way for achieving firm growth and strategic renewal (Guth & Ginsberg, 1990) and legitimized the concept of corporate entrepreneurship (Stevenson & Jarillo, 1990).

It is now commonly accepted that firms depend on entrepreneurial activities to survive and thrive in today's competitive markets. In economies and sectors characterized by

consumers' ever-changing needs and desires, the most successful companies are those who learn continuously and react rapidly, speeding-up their capacity to generate new business ideas and innovation. In fact, Miller (1983) in his seminal article 'The correlates of entrepreneurship in three types of firms' shifted the emphasis from the individual entrepreneur to the entrepreneurial behaviour of the firm, describing entrepreneurship as "the process by which organizations renew themselves and their markets by pioneering, innovation, and risk taking" (Miller, 1983, p. 770). For this author the focus is not who is the critical actor of entrepreneurship but the process itself and the organizational factors that fosters, and impede, it. The authors in the 1980s and 1990s were concerned with the importance of firm-level entrepreneurship for the revitalization and performance of firms (Antoncic, 2001), but the field of research continued growing and several new research purposes emerged. Tables I.1a through I.1e, summarize the main studies in the field of corporate entrepreneurship.

The number of articles on the topic has grown substantially in the last 30 years. Currently, there are around 630 documents published in this field, and this refers only to the ones available through ISI Web of Knowledge alone (see Figure I.1).

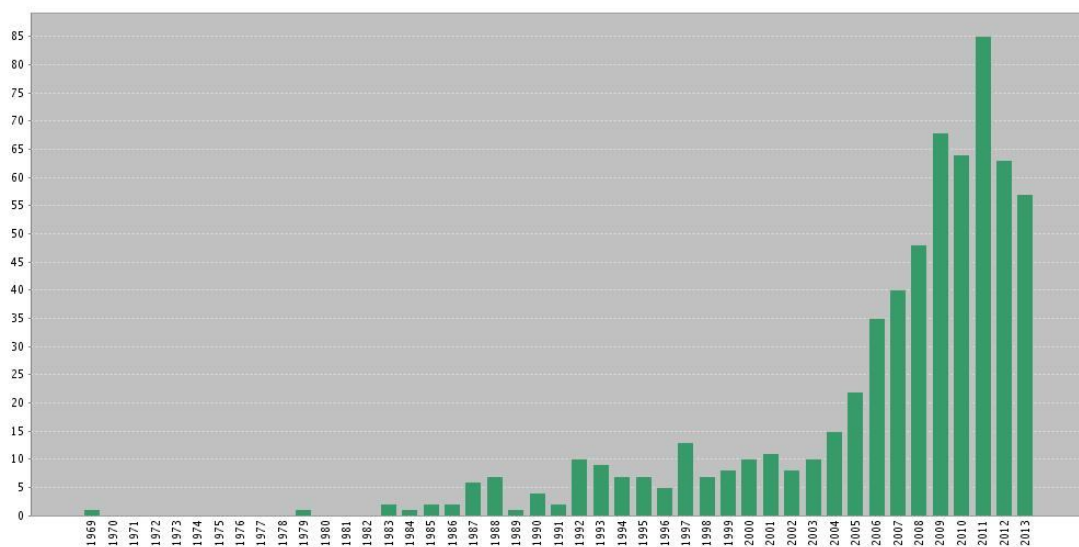


Figure I.1 - Nr. of documents published on corporate entrepreneurship, by year (ISI WoK)³

³ Until October 2013.

Study	Abstract/Findings
Burgelman (1983)	<p>The paper makes five key points. First, firms need both diversity and order in their strategic activities to maintain their viability. Diversity results primarily from autonomous strategic initiatives of participants at the operational level. Order results from imposing a concept of strategy on the organization. Second, managing diversity requires an experimentation-and-selection approach. Middle level managers play a crucial role in this through their support for autonomous strategic initiatives early on, by combining these with various capabilities dispersed in the firm's operating system, and by conceptualizing strategies for new areas of business. Third, top management's critical contribution consists in strategic recognition rather than planning. By allowing middle level managers to redefine the strategic context, and by being fast learners, top management can make sure that entrepreneurial activities will correspond to their strategic vision, retroactively. Fourth, strategic management at the top should be largely concerned with balancing the emphasis on diversity and order over time. Top management should control the level and the rate of change rather than the specific content of entrepreneurial activity. Finally, new managerial approaches and innovative administrative arrangements are required to facilitate the collaboration between entrepreneurial participants and the organizations in which they are active.</p>
Burgelman (1984)	<p>This article presents a new model of strategic behaviour in large, established firms, which identifies entrepreneurial activity as a natural and integral part of the strategic process. The model sheds more light on why the strategic management of entrepreneurial activities constitutes a challenge for corporate management. This article also proposes a conceptual framework which corporate management may find useful for improving its capacity to deal effectively with entrepreneurial initiatives. This, in turn, provides the basis for discussing conditions under which various organization designs for corporate entrepreneurship may be appropriate and raises some issues and problems associated with implementing such designs.</p>
Zahra (1991)	<p>This study proposes a model that identifies potential environmental, strategic, and organizational factors that may spur or stifle corporate entrepreneurship. The model also highlights the potential associations between corporate entrepreneurship and corporate financial performance. This exploratory study's results indicate that:</p> <ul style="list-style-type: none"> • environmental dynamism, hostility, and heterogeneity (multiplicity and complexity of environmental components) intensify CE, • growth-oriented strategies are associated with increased CE, whereas a strategy of stability is not conducive to CE, • the scanning, formal communication, and integration components of formal organizational structure are positively related to CE - increased differentiation and extensive controls stifle CE, • clearly defined organizational values, whether relating to competitors or employees, are positively associated with CE, and • CE activities are associated with company financial performance and reduced systematic risk.
Jones and Butler (1992)	<p>This article examines how agency problems affect the dynamics of internal corporate entrepreneurship and the level of entrepreneurial behaviour. The relationship between internal corporate and external entrepreneurship is explored, and the organizational factors that cause agency problems are examined. Solutions, to agency problems are suggest that also promote internal corporate entrepreneurship.</p>

Table I.1a - Synthesis of the main studies on corporate entrepreneurship (1983-1992)

Study	Abstract/Findings
Morris, Avila, and Allen (1993)	<p>The extent to which entrepreneurship in established firms is the result of a more individualistic culture is explored. Hypotheses are tested in which it is proposed that a curvilinear relationship exists between individualism-collectivism and corporate entrepreneurship. Findings are reported from a survey completed separately by three functional area managers in each of eighty-four industrial firms. The results support the hypotheses, such that entrepreneurship is highest under conditions of balanced individualism-collectivism, and declines in highly individualistic and more collectivistic environments.</p>
Zahra (1993)	<p>This study examined the association between a firm's external environment, CE, and financial performance. It emphasized three propositions:</p> <ul style="list-style-type: none"> • perceived rather than objective, characteristics of the environment significantly influenced entrepreneurship activities • a multidimensional definition of a firm's environment was essential to unravel the interplay between the environment, CE activities, and financial performance • a taxonomic approach had the advantage of accounting for the interrelationships among the dimensions of the environment in classifying firms <p>The results showed that: (1) each environmental cluster had a distinct combination of activities relating to corporate innovation and venturing, and renewal; (2) CE activities varied in their associations with measures of company growth and profitability; and (3) the associations between CE and company financial performance varied among the four environment clusters.</p>
Stopford and Badden-Fuller (1994)	<p>This paper demonstrates how the various types of CE –individual managers, business renewal and Schumpeterian, or industry, leadership–share five 'bundles' of attributes. Each type can exist in one firm, though at different times as the common attributes change their role and relative importance. External and internal triggers for change are examined for a sample of 10 firms in 4 European industries. The data suggest a provocative conclusion: troubled firms in hostile environments can shed past behaviours, adopt policies fostering entrepreneurship and accumulate innovative resource bundles that provide a platform on which industry leadership can be built.</p>
Zahra and Covin (1995)	<p>This article describes a study of CE and its impact on company financial performance. Data were collected from three different samples over a seven-year period to assess the longitudinal impact of corporate entrepreneurship on firm performance. The results suggest that corporate entrepreneurship has a positive impact on financial measures of company performance. This effect on performance, which tends to be modest over the first few years, increases over time, suggesting that corporate entrepreneurship may be, indeed, a generally effective means for improving long-term company financial performance. Moreover, the results indicate that corporate entrepreneurship is a particularly effective practice among companies operating in hostile environments (as opposed to benign environments).</p>
Zahra (1996)	<p>Data from 127 Fortune 500 companies show that executive stock ownership and long-term institutional ownership are positively associated with CE. Conversely, short-term institutional ownership is negatively associated with it, as is a high ratio of outside directors on a company's board. Outside directors' stock ownership somewhat mitigates the latter negative association. Outsiders, including stockowners, might lead companies away from internal product development, the traditional route to CE. An industry's technological opportunities moderate the associations observed between corporate governance and ownership variables and CE.</p>

Table I.1b – Synthesis of the main studies on corporate entrepreneurship (1993-1996)

Study	Abstract/Findings
Barringer and Bluedorn (1999)	This study examines the relationship between CE intensity and five specific strategic management practices in a sample of 169 U.S. manufacturing firms. The five strategic management practices include scanning intensity, planning flexibility, planning horizon, locus of planning, and control attributes. The results of the study indicated a positive relationship between CE intensity and scanning intensity, planning flexibility, locus of planning, and strategic controls. The fine-grained nature of these results may be of practical use to firms that are trying to become more entrepreneurial and may help researchers at better understanding the subtleties of the interface between strategic management and CE.
Covin and Miles (1999)	This paper presents a theoretical exploration of the construct of corporate entrepreneurship. Of the various dimensions of firm-level entrepreneurial orientation identified in the literature, it is argued that innovation, broadly defined, is the single common theme underlying all forms of corporate entrepreneurship. However, the presence of innovation per se is insufficient to label a firm entrepreneurial. Rather, it is suggested that this label be reserved for firms that use innovation as a mechanism to redefine or rejuvenate themselves, their positions within markets and industries, or the competitive arenas in which they compete. A typology is presented of the forms in which corporate entrepreneurship is often manifested, and the robustness of this typology is assessed using criteria that have been proposed for evaluating classificational schemata. Theoretical linkages are then drawn demonstrating how each of the generic forms of corporate entrepreneurship may be a path to competitive advantage.
Zahra and Garvis (2000)	This study uses data from 98 US companies to: (1) determine the impact of international corporate entrepreneurship (ICE) efforts on firm performance, and (2) explore the moderating effect of the perceived hostility of the environment has on the relationship between ICE and company performance. The results showed that ICE was positively associated with a firm's overall profitability and growth as well as its foreign profitability and growth. Those firms that aggressively pursued ICE in international environments with higher levels of hostility had higher return on assets (ROA) but did not achieve significantly higher levels of growth. However, as hostility in the international environment continued to intensify, ROA rose and then fell as companies increased their ICE.
Antoncic (2001)	The concept of intrapreneurship has four distinct dimensions. First, the new-business-venturing dimension refers to pursuing and entering new businesses related to the firm's current products or markets. Second, the innovativeness dimension refers to the creation of new products, services, and technologies. Third, the self-renewal dimension emphasizes the strategy reformulation, reorganization, and organizational change. Finally, the proactiveness dimension reflects top management orientation in pursuing enhanced competitiveness and includes initiative and risk-taking, and competitive aggressiveness, and boldness. In addition to the generalizability of the refined intrapreneurship construct measure, the results of this study support the notion that intrapreneurship is an important predictor of firm growth in terms of absolute growth (growth in number of employees and in total sales) and relative growth (growth in market share in comparison to competition).

Table I.1c – Synthesis of the main studies on corporate entrepreneurship (1999-2001)

Study	Abstract/Findings
Antonic and Hisrich (2001)	Intrapreneurship theory and measures have an American basis. In this study, a refined multidimensional measure of intrapreneurship was developed to be cross-culturally generalizable. The refined intrapreneurship construct measure showed reasonably good convergent and discriminant validity as well as good nomological validity in terms of expected positive relationships to its antecedents (organizational and environmental characteristics) and consequences (growth and profitability) across the two samples that included firms from a variety of different industries. The results of this study also support the notion that intrapreneurship is an important predictor of firm growth in terms of absolute growth (growth in number of employees and in total sales) and relative growth (growth in market share in comparison to competition).
Brown, Davidsson, and Wiklund (2001)	This article describes a new instrument that was developed specifically for operationalizing Stevenson's (1983) conceptualization of entrepreneurial management. After two pre-tests, the instrument was tested full scale on a very large (1200+ cases) stratified random sample of firms with different size, governance structure, and industry affiliation. The results show that both in the full sample and in various sub-samples it was possible to identify six sub-dimensions with high discriminant validity and moderate to high reliability, which represent dimensions of Stevenson's theoretical reasoning. The dimensions are labelled Strategic Orientation, Resource Orientation, Management Structure, Reward Philosophy, Growth Orientation and Entrepreneurial Culture.
Hornsby, Kuratko, and Zahra (2002)	This study describes an instrument used to identify empirically the internal conditions that influence middle manager's participation in corporate entrepreneurship activities. The literature on the internal factors was utilized to develop an assessment instrument called the Corporate Entrepreneurship Assessment Instrument (CEAI). The instrument contained 84 Likert-style questions that were believed to assess a firm's internal entrepreneurial environment. The measurement properties of the CEAI, including a factor analysis and reliability assessment, were determined. Results confirmed that five distinct internal organizational factors do exist. Based on how the items loaded on each factor, the factors were entitled management support, work discretion, organizational boundaries, rewards/reinforcement, and time availability. The reliability of each of these factors also met acceptable measurement standards.
Hayton (2003)	This article discusses the association between human capital management (HCM) and other HRM practices and the ability of SMEs to be entrepreneurial. In a study a 99 SMEs, HRM practices that promote employee discretionary behaviour, knowledge sharing, and organizational learning are found to be positively associated with entrepreneurial performance. Two contingencies are also identified for this relationship. First, the use of HCM practices enhances the observed positive association. Second, these relationships are strongest for SMEs operating in high-technologies industries.
Kuratko, Ireland, Covin, and Hornsby (2005)	This article integrates knowledge about CE and middle level managers' behaviours to develop and explore a conceptual model. The model depicts the organizational antecedents of middle-level managers' entrepreneurial behaviour, the entrepreneurial actions describing that behaviour, and outcomes of that behaviour as well as factors influencing its continuance.

Table 1.1d – Synthesis of the main studies on corporate entrepreneurship (2001-2005)

Study	Abstract/Findings
Zahra, Filatotchev and Wright (2009)	This paper highlights the importance of boards of directors and absorptive capacity for gaining access to varied and current knowledge that enriches CE. The authors suggest that boards and absorptive capacity complement each other in fuelling CE activities. Further, boards can sometimes substitute for poor absorptive capacity and vice versa, influencing the intensity of CE activities. Managing these complementarities (or substitutions) is crucial for sustaining CE initiatives and creating value from them.
Sebora and Theerapatvong (2010)	This study investigates influences on the idea creation, risk taking, and proactiveness perceptions of upper managers in a random sample of 105 Thai manufacturing firms. Results indicate that the type of product produced, the size of the company, and the extent of firm support for individual entrepreneurship influenced these managers' idea generation. Managerial risk taking is associated with firm size and extent of support for personal entrepreneurship. Managerial proactiveness is associated only with the scope of firms' competition, firm size, organizational entrepreneurial climate and support for personal entrepreneurship. Results suggest that firm context can influence the basis for corporate entrepreneurship.

Table I.1e – Synthesis of the main studies on corporate entrepreneurship (since 2006)

With the rise in academic interest for corporate entrepreneurship, have come multiple challenges. The first challenge refers to the different terminology used by both researchers, and practitioners when referring to similar constructs. Another challenge while reviewing the literature is to establish exactly what phenomena are related to corporate entrepreneurship. According to Covin and Miles (1999) there are different phenomena often viewed as examples of corporate entrepreneurship: an established organization enters a new business (corporate venturing); an individual or individuals champion new product ideas within a firm (intrapreneurship) or an entrepreneurial philosophy permeating the entire organization (entrepreneurial orientation). It is very possible then, that incongruences found in the literature can partially explain why frequently researchers arrive at ambiguous (Zahra & Covin, 1995) or even contradictory results (Zahra, 1996). In spite of these incongruences, some emerging topics in the literature seem rather commonly accepted as relevant for future research. These topics are:

(1) Environment, strategy, outcomes, and industry-oriented studies - Empirical studies looking at the entire process of corporate entrepreneurship including environment, strategies, and outcomes, may help to understand the phenomena. However, considering that the relation environment-strategy-outcome has relevant differences from one industry to another, it is necessary to understand the specificities of each industry concerning corporate entrepreneurship.

(2) Firm size - It is intuitive that small companies and large companies do not share the same constraints and potential. Researchers might investigate if the difference in size implies different corporate entrepreneurship practices or different outcomes for the same practices.

(3) Multi-level analysis - Literature suggests that managers at all levels play important roles. Kuratko, Ireland, Covin, & Hornsby (2005), at a conceptual level, and Ling, Simsek, Lubatkin, & Veiga (2008), at an empirical level, study the role of middle managers and of top-level managers, respectively, on corporate entrepreneurship. Studies should include other types of employees from different hierarchical levels in the organization.

(4) Individual preferences and characteristics - It is pertinent to investigate the moderating role of individual preferences and characteristics in employees' entrepreneurial behaviour. As Monsen, Patzelt, and Saxton (2010) argue, research has shown that entrepreneurial goals and motivations, personality, perceptions of risk and uncertainty, and rank within the organization can influence the behaviour of employees.

(5) Human resources practices. Different types of incentives and how they influence employees' motivation should be studied (Dess & Lumpkin, 2005), such as equity and stock ownership options, incentive intensity, non-financial incentives (Monsen *et al*, 2010). Work design can be highly motivating or de-motivating and the role of intrinsic motivation should not be overlooked in future research studies (Marvel, Griffin, Hebda, & Vojak, 2007). In general, human resource practices should be addressed in future studies, to bring light to how they may enhance or diminish corporate entrepreneurship.

(6) Strategic leadership - Future studies should explore to what extent a leader's behaviour enhances his firm's propensity to be proactive, innovative, and take risks (Dess & Lumpkin, 2005), what is his or her role in creating an organizational culture that fosters creativity and organizational learning (Ling *et al.*, 2008).

(7) Outcomes - As proposed by Dess and Lumpkin (2005), researchers should look beyond economic outcomes, and look for human and social capital results. Entrepreneurial failures may lead to new resource combinations, new skills, valued relationships that can be developed, and exploited at some point in the future.

Taking in consideration these emerging topics of research, it becomes evident an approximation towards other fields of research, mainly strategic management. Section 2.03 will

describe how the change in strategic management paradigms that occur also in the 1980s came to facilitate the convergence with corporate entrepreneurship.

Section 2.03 How internal assets became the focus of strategy

Some of the discussions of entrepreneurial activity in the strategy-making process literature argue that strategy making occurs from the entrepreneurial activities of organizational members. Researchers in this field argue that organizational members generate ideas that are passed on to higher levels of management (Hart, 1992), that strategy is initiated within the organization via individual entrepreneurship (Bourgeois & Brodwin, 1984) and that the impetus for new ventures often occurs at lower levels in an organization (Bower, 1970). However, this only came to be with a major paradigm shift that happened in the 1980s.

In this section, we present the main paradigms and schools of thought within the strategic management field and explain in more detail why resource-based theories are particularly relevant for the present study, justifying the strategic importance of employee entrepreneurial behaviour.

(a) Evolving paradigms in strategic management

While its roots have been on business policy, a more applied area, the field of strategic management has grown to become theory based but eclectic in nature. Therefore, there have been several shifts on the focus of researchers, as well as practitioners, regarding strategic management. Teece, Pisano, and Shuen (1997) suggest four paradigms for strategy, (1) attenuating competitive forces, mainly concerned with the competitive position of the firm and the structural conditions, (2) strategic conflict, concerned with strategic interactions between firms, (3) resource-based perspectives, with a focal concern in asset fungibility and (4) dynamic capabilities perspectives.

In 1999, Mintzberg and Lampel proposed the existence of ten major schools of thought on strategy since the concept emerged in management/business in the 1960s. The schools can be seen as focusing on different stages of the strategy formation process but it is also possible the interpretation that they represent fundamentally different processes. The schools identified by Mintzberg and Lampel (1999) are:

- Design school – sees strategy formation as achieving the essential fits between internal strengths and weaknesses, and external threats and opportunities. The role of senior manager is

to formulate – through a thoughtful process, clear and simple strategies so that anyone can implement them.

- Planning school - supports most of the ideas of design school, except that it considers strategy formation as a formal, rather than a cerebral, process decomposable into steps and using a series of tools. The role of senior manager is replaced by that of staff planners.

- Positioning school – strategy consists of generic positions selected through formally analysing industry situation. With this school, planners become analysts. Concepts such as strategic group and value chain emerged.

- Entrepreneurial school – like the design school, it centres the process on the top manager, but unlike it, on his or her intuition – the vision of the entrepreneur. In this school, manager closely controls strategy implementation.

- Cognitive schools – these schools research the cognitive bias in strategy making as well as cognition as information processing, knowledge structure mapping and concept attainment. A branch of this school adopted a more constructivist perspective of the strategic process: Cognition is used to construct strategies as creative interpretations, rather than an objective process.

- Learning school - considers that strategies are emergent, and can emerge throughout the organization. Strategy formulation and implementation are intertwined.

- Power school – This school has two branches. One sees the development of strategies as a political process of bargaining, persuading and confrontation among actors within the organization (micro power). The other, views the organization as an entity that uses its power over others organizations and among its partners to negotiate 'collective' strategies in its interest (macro power).

- Cultural school – focus on strategy formation as a social process rooted in culture.

- Environmental school – though not strictly concerned with strategic management, this school studies how the organization deals with its environment. For instance, responses are expected from organizations facing particular environmental conditions (contingency theory).

- Configuration school – one side of this school sees the organization as a configuration – coherent clusters of characteristics and behaviours – and integrates the claims of other schools. However, if an organization can be describe in that way, than change is a dramatic process. That

is why another side of this school, but complementary to the first, is concerned with transformation from one state to another. Mintzberg and Lampel (1999) consider this school a more comprehensive perspective than any of the other schools.

Mintzberg and Lampel (1999) also propose that since the 1990s clusters of schools have been forming blended approaches to strategy formation. Table I.2 presents these blended approaches.

Approach	Schools
Dynamic capabilities	Design, Learning
Resource-based theory	Cultural, Learning
Soft techniques (e.g. scenario analysis)	Planning, Learning or Power
Constructionism	Cognitive, Cultural
Chaos and evolutionary theory	Learning, Environmental
Institutional theory	Environmental, Power or Cognitive
Intrapreneurship (venturing)	Environmental, Entrepreneurial
Revolutionary change	Configuration, Entrepreneurial
Negotiated strategy	Power, Positioning
Strategic manoeuvring	Positioning, Power

Table I.2 Blend of strategy formation schools (Mintzberg & Lampel, 1999)

A more recent review on the evolution of the field of strategic management is offered by Herrmann (2005), organizing the evolution of the field into three eras. The first era is characterized by a focus on the environment. The second era defends that the main sources of sustainable competitive advantages reside in the development and use of valuable resources. The third, emergent, era, refers to a body of literature concerned with learning, knowledge management and innovation.

Some commonalities about the strategic management field can be identified across the proposals of Teece *et al.* (1997), Mintzberg and Lampel (1999), and Herrmann (2005). These commonalities have to do with the origins of the field, and then with the major paradigm shift that happened in the 1980s.

The early works in the field of strategic management took on a contingency perspective (fit between strategy and structure). The focus was more on planning than on implementation,

and content wise, on growth, acquisitions, and diversification. These developments in the field can be traced back to Chandler's (1962) 'Strategy and Structure'. According to Chandler, strategy is "the determination of the basic long-term goals and objectives of an enterprise, and the adoption of courses of action and the allocation of resources necessary for carrying out the goals" (1962, p. 13).

The work of Ansoff (1965), 'Corporate Strategy' was determinant for an analytic approach to strategy. This approach assumes that managers can and should understand all they possibly can about their organisation and its environment, so that they can make optimal decisions about the future. The emphasis was on trying to analyse the various influences on an organisation's life in such a way as to identify opportunities or threats to its development.

Eventually these ideas became the subject of much criticism. The volatile and unpredictability of the external environment in the 1970s exposed the limitations of planning, as it could not explain what was required to adapt quickly to new threats and opportunities in order to attain strategic goals. In fact, some authors (e.g. Mintzberg, 1978) had already argued that the search for optimal decisions was in vain because of the complexity and uncertainty of the world. This meant accepting that managers made decisions, which were as much to do with collective and individual experience, organisational politics and the history and culture of the organisation, as they were to do with strategy. It became relevant the notion of emergent strategies. Mintzberg (1978) suggested the concept of 'emergent strategy' in contrast to a 'deliberate strategy' that is the prerogative of top management. 'Realised' strategy, or actual performance achieved, according to Mintzberg (1978), is attributable to both deliberate and emergent strategies.

Meanwhile, what Herrmann (2005) calls the first era, which is primarily concerned with the external environmental factors, reached maturity with Porter's (1980, 1985) work. Porter's Five Forces framework provides an analytic tool to assess an industry's attractiveness and facilitates competitor analysis. The collective effects of the five forces determine the ability of firms in an industry to make profits. Porter (1980, 1985) also suggested generic strategies (low cost leadership, differentiation, and focus) that can be used in a particular industry, and thereby, build competitive advantage. However, some empirical studies find industry factors less relevant than what is suggested by Porter. For instance, Rumelt (1991) shows that regarding profits intra-industry differences are greater than inter-industry differences. This strongly suggests the importance of firm-specific factors and the relative unimportance of industry effects.

The 1980s marks a turning point and a shift towards a new era in strategic management literature. The new approach is based on core competencies and resources, especially difficult-to-imitate intangibles, such as culture, intellectual property and capital, creativity, adaptability, reputation and relationships with stakeholders (Herrmann, 2005). This resource-based view seems clearly in opposition to the competitive forces approach. Teece *et al.* (1997, p. 514), make a clear distinction between those two approaches:

With a competitive forces approach, "...an entry decision looks roughly as follows: (1) pick an industry (based on its 'structural attractiveness'); (2) choose an entry strategy based on conjectures about competitors' rational strategies; (3) if not already possessed, acquire or otherwise obtain the requisite assets to intermediate output to compete in the market"

With a resource-based view approach, the entry decision process is as follows (Teece *et al.*, 1997, p. 515):

"(1) identify your firm's unique resources; (2) decide in which markets those resources can earn the highest rents; and (3) decide whether the rents from those assets are most effectively utilized by (a) integrating into related market(s), (b) selling the relevant intermediate output to related firms, or (c) selling the assets themselves to a firm in related businesses" .

It is however, possible to acknowledge that the "resource perspective complements the industry analysis framework" (Amit & Schoemaker, 1993, p. 35).

Resource-based view theory is sometimes criticized for the lack of empirical grounding (Herrmann, 2005). Anyway, it becomes a dominant theory. By the 1990s, the focus was on the functioning and survival of the organisation and the behaviour of its people and the intra- and inter-organisational networks they adopt. Cooperative networks as distinct from competitive markets start to become a relevant concept to explain why some organizations have success and others fail. The focus of the resource-based view on the internal organisational arrangements evolved to integrate elements of knowledge management and organisational economics, especially agency theory and transaction cost economics (Bowman, Singh, & Thomas, 2002).

As technological cycles become shorter and innovation becomes critical for survival, a new era of strategic management literature emerges more recently building on resource-based view theory. These works focus learning, knowledge and innovation, and offer new insights into how firms obtain valuable information, create knowledge and accumulate intangible capabilities

in a continuous and mutually reinforcing process of individual and organizational learning (Herrmann, 2005).

The rise of the resource-based view, and other developments concerned with dynamic capabilities, has returned attention to the internal aspects of the firm. Internal firm characteristics represented the crucial research domain in the early development of the field. Early strategy researchers, such as Ansoff (1965), were predominantly concerned with identifying firms' 'best practices' that contribute to firm success.

The focus on firm resources and capabilities provides an important theoretical support for the strategic role of employees. Therefore, these theories are specifically addressed in subsection (b).

(b) The resources and capabilities paradigms

Subsection (a) described the fundamental paradigm shifts in the strategic management field. In particular, it described the shift from environmental models of competitive advantage to resource-based models. According to Barney (1991), two assumptions of previous models in analysing sources of competitive advantage are substituted by the resource-based view. Firms within an industry may be heterogeneous, and this heterogeneity can be long lasting, as resources are not perfectly mobile across firms.

The resource based view of the firm originated with the economic theory of growth by Penrose in 1959 (1995). She is the first researcher to conceptualize intangibles in a firm as resources and human skills, which cannot be transacted in the market. Penrose (1995) proposes that a firm is a collection of productive resources - things a firm buys, leases, or produces for its own use, and the people hired. The researchers also argued that it is the heterogeneity derived from its resources, not the homogeneity, that gives each firm its unique character. This is the fundamental assumption of the resource-based view.

However, Wernerfelt (1984) was the one to coin the term 'Resource Based View'. He pointed out that a firm's resources could explain its strengths and the weaknesses and suggested that evaluating firms in terms of their resources can lead to insights that differ from the traditional perspective. Firm's resources include all assets, capabilities, organizational processes, firm attributes, information, knowledge, and others, controlled by the firm (Barney, 1991). Therefore, resources can be either tangible or intangible assets, and are tied semi-permanently to the firm.

Not all resources in a firm have the potential of sustained competitive advantage, i.e. the potential for the firm to implement a value-creating strategy that is unique in the industry, considering both current and potential competitors. Barney (1991) presented a framework to identify the needed characteristics of firm resources in order to generate sustainable competitive advantages.

"A firm resource must have four attributes: (a) it must be valuable, in the sense that exploits opportunities and/or neutralizes threats, (b) it must be rare among a firm's current and potential competition, (c) it must be imperfectly imitable, and (d) there cannot be strategically equivalent substitutes for this resource that are valuable but neither rare nor imperfectly imitable" (Barney, 1991, p. 105-106).

Some researchers studied specific resources linked to sustainable competitive advantages, such as organizational culture (Barney, 1986), organizational learning (Teece *et al.*, 1997), and human resources (Amit & Schoemaker, 1993), among others.

Building on the resource-based view, Teece *et al.* (1997) refer to the ability to achieve new forms of competitive advantage as 'dynamic capabilities'. The term 'dynamic' refers to the capacity to renew competences to achieve congruence with the changing business environment. When time-to-market is critical, the rate of technological change is rapid, and the nature of future competition and markets difficult to determine, innovation is critical. The term 'capabilities' emphasizes the key role of strategic management in appropriately adapting, integrating, and reconfiguring internal and external organizational skills, resources, and functional competences to match the requirements of a changing environment.

*"Because this approach emphasizes the development of management capabilities, and difficult to-imitate combinations of organizational, functional and technological skills, it integrates and draws upon research in such areas as the management of R&D, product and process development technology transfer, intellectual property, manufacturing, human resources, and organizational learning" (Teece *et al.*, 1997, p. 510).*

In summary, from the strategic management literature, we should retain for our study the following ideas:

- Organizations should match the requirement of a changing environment – innovation is critical

- However, the firm is the source of competitive advantage with its competitive advantage residing in the resources it has available

- Firm's resources include all assets, capabilities, organizational processes, firm attributes, information, knowledge, and others. Therefore, it also includes the individuals' knowledge and behaviours

In face of how both resource-based view and the dynamic capabilities approaches to strategy rise the importance of individual knowledge and behaviour, organizational culture, human resources management and so on, an approximation to the organizational behaviour theories is most relevant and, perhaps, inevitable. In section 2.04, we will describe how organizational behaviour paradigms can enrich perspectives related to the strategic relevance of a firm's human resources, particularly in what relates to employee entrepreneurial behaviour.

Section 2.04 What explains employee behaviour

This section describes the main assumptions and streams of investigation in organizational behaviour literature, and explains why the present study should be placed under the umbrella of organizational development theories.

(a) Main assumptions and streams of research in organizational behaviour literature

Organizational behaviour is the study and application of knowledge about how people – as individuals and groups – act within organizations. It strives to identify ways in which people can act more effectively. As field of research, organizational behaviour borrows from sociology, psychology, economics, political science, and anthropology (Pfeffer, 1985). It is a fragmented field with applications in Labour Relations, Human Resources Management, Organizational Development, Management, and other fields.

In spite of the complexity of the field, there are some common key elements of the organizational behaviour research:

- The environment - which influences the attitudes of people, affects working conditions, and generating competition for resources and power.

- People – that make the internal social system (individuals and groups). The human organization changes every day.

- Structure – It defines the formal relationships of people in the organization. It facilitates coordination but it also creates complex problems of cooperation, negotiation and decision-making.

- Technology – that provides the resources with which people work. It allows people to do more and better work but it also restricts people in various ways.

Organizational behaviour is about organizations, a phenomenon that is not the sum of individual processes or the manifestation of a particular social process. Organizations are simultaneous individual and social phenomena. The common assumptions in organizational behaviour literature about the nature of people and organizations are (Beer, 1998):

- People are multifaceted and complex. They have different types of needs: to acquire, to bond, to learn and grow, to defend their self-esteem. People join organizations with a mix of these needs, and organizations are capable of reshaping itself through selection and socialization.

- Organizations are complex open systems. The organization is subject to influences by the external environment and successful adaptation requires exchange with it. The many aspects of an organization: its design, people, culture, policies and practices, and so on; as well as its many units/departments – are interdependent and in constant mutual adaptation.

- Over the time, organizations develop a specific pattern of behaviour or culture: a way of perceiving, thinking and acting to solve problems (Schein, 1990).

- Organizational behaviour is resistant to change due to human cognitive processes (people make sense of past behaviour) and defensive routines (people avoid embarrassment and threat). These human characteristics cause organizational policies and practices to persist even though reality has changed, unless a process of constant inquiry is present (Argyris & Schon, 1996).

Beer (1998) argues that there are two main streams of investigation within the field of organizational behaviour. One stream is dominated by contingency theory - the best way to organize and manage people depends on the situation (Lawrence & Lorsch, 1967); the other, has a more normative perspective and is dominated by Organizational Development theorists – this perspective is concerned with improving organizational performance and focusing on intervention theories and methods (Burke, 1992).

Concerning the normative stream, two opposing theoretical perspectives exist:

- Agency theory (derived from Economy) – it stresses the importance of linking top management incentives to the shareholders' interests. These researchers are concerned with economic outcomes and failure is overcome by Top Management substitution.

- Behavioural theory – focus on the importance of participative processes, which develop commitment to change. These researchers study the behaviour in the firm and its intermediate outcomes. The focus is on the diagnosis of behavioural problems based on data collection and feedback.

Both perspectives are concerned with improving performance. It is in the way to achieve it that they disagree. Economists emphasize extrinsic motivation and external control; Organizational Development researchers and practitioners focus on intrinsic motivation through the development of involvement processes.

For the purpose of our study, we must retain from the organizational behaviour literature, that:

- Organizational behaviour is about organizations, which means it has to do simultaneously with individual and social phenomena. Therefore, studying employees' entrepreneurial behaviour should not be confused with the 'who is the entrepreneur' types of questions. Though the characteristics of the individuals are a relevant issue, our focus will be on the organizational justification of that type of behaviour.

- Organizational design, people, culture, policies and practices, are only some of the relevant factors necessary to understand organizational behaviour;

- Therefore, organizational behaviour is a complex topic. When concerned with how to promote entrepreneurial behaviour we should not look for 'one fits all' type of answer.

- Both the contingent and normative streams of research are useful in the current turbulent environment (Beer, 1998). On the one hand, efficiency and effectiveness considerations demand congruence between the forces that shape organizational behaviour: environment/strategy, organizational design, and people – contingency stream. On the other hand, intense competition demands continuous change and adaptability requiring conflict, confrontation and commitment – normative stream.

Several specific streams of research within the organizational behaviour literature, mainly related to behavioural approaches, are relevant to understand better employees' entrepreneurial behaviour - those related to the study of work behaviours. Subsection (b) draws from the

organizational behaviour literature the similarities between employee entrepreneurial behaviour and other related work behaviours.

(b) Employees' entrepreneurial behaviour and other work behaviours

The origin of the term 'entrepreneur' strongly supports the idea that entrepreneurship is primarily behaviour-oriented. The underlying medieval French words 'entreprendre' and 'emprendre' refer to respectively 'doing something' or 'getting things done' and to 'commencing, taking initiative'. The traditional concept of entrepreneurship shares many key behavioural characteristics with employee entrepreneurial behaviour, such as taking initiative, opportunity pursuit without regard to presently available resources, and some element of 'newness' (de Jong & Wennekers, 2008). At the same time, intrapreneurship distinctly belongs to the domain of 'employee behaviour' and thus faces the same kind of limitations and opportunities for support from the organizational context.

Several individual behaviours with similarities to employee entrepreneurial behaviour have been studied in the organizational behaviour literature. Firstly, considering the relation between entrepreneurship and innovation, suggested by the entrepreneurship literature, the definitions of innovative behaviour from the organizational behaviour literature are a good starting point. Secondly, intrapreneurs are usually employees that go beyond their job descriptions, providing valuable help to innovate some aspect of their firms. Therefore, entrepreneurial behaviour may be considered extra-role behaviour. Extra-role behaviours are those not included in an employee's job description and that contribute to the well-being of the organization or its members. These constitute by itself a relevant stream in organizational behaviour literature. Thirdly, as employee entrepreneurial behaviour happens within the framework of an organization, other types of work behaviours are also relevant.

The recognition of the need for innovative behaviour from employees as a way for a firm to respond to sudden changes in the environment is not new in the organizational behaviour literature. In 1978, Katz and Kahn characterize spontaneous innovative behaviours as actions that are essential to the organization. "The resources of people for innovation, for spontaneous cooperation, for protective and creative behaviour are...vital to organizational survival and effectiveness" (Katz & Kahn, 1978, p. 403-404). In 1988, Kanter argues that innovation at the individual level begins with problem recognition and the generation of novel or adopted ideas or solutions, that are followed by seeking sponsorship for the idea and attempts to build a coalition

of supporters for it. Finally, these activities result in some prototype or model of the innovation that can be used by the organization. Innovative behaviour might emerge inside or outside the employee's work role.

Organizational behaviour researchers have studied several types of innovative behaviours (De Jong & Wennekers, 2008): opportunity exploration, idea generation, championing and application. Opportunity exploration includes behaviours such as looking for ways to improve current products, services or processes, or trying to think about current work processes, product or services in alternative ways (Farr & Ford, 1990). Idea generation includes behaviours directed at generating concepts for the purpose of improvement, related to new products, services or processes, the entry of new markets, improvements in current work processes or, in generic terms, solutions to identified problems (Van de Ven, 1986; Amabile, 1988). Championing includes behaviours related to finding support and building coalitions, such as persuading and influencing other employees and pushing and negotiating (Van de Ven, 1986; Howell & Higgins, 1990). Application implies doing what is needed to exploit opportunities. It includes behaviours such as developing new products or work processes, and testing and modifying them (e.g. Van de Ven, 1986; Kanter, 1988; West & Farr, 1990).

From the descriptions of innovative behaviour above, it becomes very clear that employee entrepreneurial behaviour is in every aspect much similar to it. Moreover, just like innovative behaviour, entrepreneurial behaviour might happen within the framework of work roles (e.g. R&D employees) as well as outside, as extra-role behaviour.

Extra-role behaviour is a "behaviour which benefits the organization and/or is intended to benefit the organization, which is discretionary and which goes beyond the existing role expectations" (Van Dyne, Cummings, & McLean Parks, 1995, p. 218). Extra-role behaviour differs from in-role performance, which is related to a worker's expected job duties.

Organizational citizenship behaviour (OCB) is considered the primary form of extra-role behaviour. To Organ (1988, p. 4), OCB is the "...individual behaviour that is discretionary, not directly or explicitly recognized by the formal reward system, and that in the aggregate promotes the effective functioning of the organization". Researchers have been proposing a variety of specific dimensions of OCB. These dimensions include altruism, conscientiousness, sportsmanship, courtesy, civic virtue (Organ 1988), obedience, loyalty, advocacy participation, social participation, functional participation (Van Dyne, Graham, & Dienesch, 1994), helping and

voice (Van Dyne & LePine, 1998), as well as organization-focused and interpersonal-focused organizational citizenship behaviour (Williams & Anderson, 1991).

In the organizational behaviour literature, we can also find other employee behaviours that might be similar to employee entrepreneurial behaviour, such as personal initiative, taking charge, issue selling and voice, most of them extra-role behaviours:

- Personal initiative is a work behaviour defined as self-starting and proactive that overcomes barriers to achieve a goal (Frese & Fay, 2001).

- Taking charge captures the idea that organizations need employees who are willing to challenge the status quo to bring about constructive change (Morrison & Phelps, 1999), and it implies voluntary and constructive efforts by individual employees to effect organizationally functional change with respect to how work is executed within the context of their jobs, work units or organizations.

- Issue selling was introduced as a construct that indicates if managers strive to influence the strategy formulation process in their organization (Dutton & Ashford, 1993). Issue selling is “a voluntary, discretionary set of behaviours by which organizational members attempt to influence the organizational agenda by getting those above them to pay attention to issues” (Ashford, Rothbard, Piderit, & Dutton, 1998, p. 24).

- Voice is defined as making innovative suggestions for change and recommending modifications to standard procedures even when others disagree (Van Dyne & LePine, 1998). Voice is a behaviour that emphasizes expression of constructive challenge intended to realize improvements rather than just to criticize how things are done. Voice is particularly important when an organization’s environment is dynamic and new ideas facilitate continuous improvement. It has been argued that these constructs overlap (Crant, 2000; Morrison & Phelps, 1999; Parker, Williams, & Turner, 2006). Voice behaviour is believed to play a critical role in organizations (Edmondson, 1999; Morrison & Phelps, 1999).

From the above we can conclude that employees’ entrepreneurial behaviour may be classified as extra-role behaviour. Being extra-role behaviour with the intent to innovate and improve the organization, it implies speaking out and challenging the status quo, therefore shares several similarities with innovative behaviour, voice behaviour and other related work behaviours. On the other hand, it is also true that voice and other work behaviours, such as personal

initiative, may have a much wider application than opportunity pursuit and innovation. Therefore, they are not the same constructs.

Anyway, the construct of employee entrepreneurial behaviour overlaps in a significant way with these widely researched concepts from organizational behaviour literature, therefore stressing the importance of a multidisciplinary approach to the topic.

Section 2.05 Chapter conclusion

In this chapter, we reviewed how the main lines of research on entrepreneurship, strategic management, and organizational behaviour literatures enlighten the study of employee entrepreneurial behaviour.

Section 2.02 explains that entrepreneurship literature, traditionally concerned with answering the questions 'what' entrepreneurs do and 'why' do entrepreneurs do what they do, eventually produced a new branch of research focused on the 'how' of entrepreneurship, that led to the concept of corporate entrepreneurship. Corporate entrepreneurship may assume different forms. It can assume the form of a formal top-down processes (for instance, focus on corporate venturing) or it can assume the form of bottom-up informal processes that might originate anywhere in the organization resulting from the autonomous behaviour of individuals. However, as we discussed in subsection 2.02(b) any study within the corporate entrepreneurship field must first deal with the incongruences of a relative recent body of literature. Anyway, it is evident the convergence between this branch of entrepreneurship literature and strategic management literature. Incidentally, or not, the emergence of corporate entrepreneurship chronologically coincides with a paradigm shift in strategic management literature (1980s).

Section 2.03 described that paradigm shift in strategic management literature, from environmental models of competitive advantage to resource-based and dynamic capabilities models. Resource-based models views firm-specific resources, such as assets and capabilities, as the drivers of strategy. In face of how both resource-based view and the dynamic capabilities approaches to strategy rise the importance of individual knowledge and behaviour, organizational culture, human resources management and so on, an approximation to the organizational behaviour research is most relevant.

Section 2.04 described organizational behaviour literature's main streams of research. We conclude that both contingency and normative streams of research can be of relevance for our objectives. On the one hand, the contingency approach to organizational behaviour is, in

many aspects, similar to the usual approaches from the corporate entrepreneurship literature. On the other hand, the normative view, focused on continuous change can bring relevant input to the study of employees' entrepreneurial behaviour as a way to face competition and improve performance through the exploration of opportunities. Within the normative stream, we place our research under the behavioural theoretic perspective because, as mentioned before, firms depend on their employees' behaviours and willingness to initiate or participate in activities that extend the firm in new directions and the process of innovation is not exclusive of top managers. Subsection 2.04(b) described work behaviours studied by organizational behaviour researchers that are similar to employees' entrepreneurial behaviour. We conclude, that the distinction organizational behaviour researchers make around the constructs of in-role and extra-role work behaviours suggests a need to make a similar distinction around the construct of employees' entrepreneurial behaviour. In fact, entrepreneurial behaviour can happen either from formal processes (in-role) as well as from informal processes (extra-role). Top management does not always desire extra-role behaviours, and even if it does, the organizational factors necessary to promote them are not exactly the same as the ones necessary to make people perform their usual roles, even if these roles are to develop new products or processes. For the purpose of the empirical stage of our study, we will focus on the extra-role entrepreneurial behaviour of employees, which we will address to onwards, as intrapreneurial behaviour. Figure 1.1 schematically summarizes the background theoretical model that supports this study.

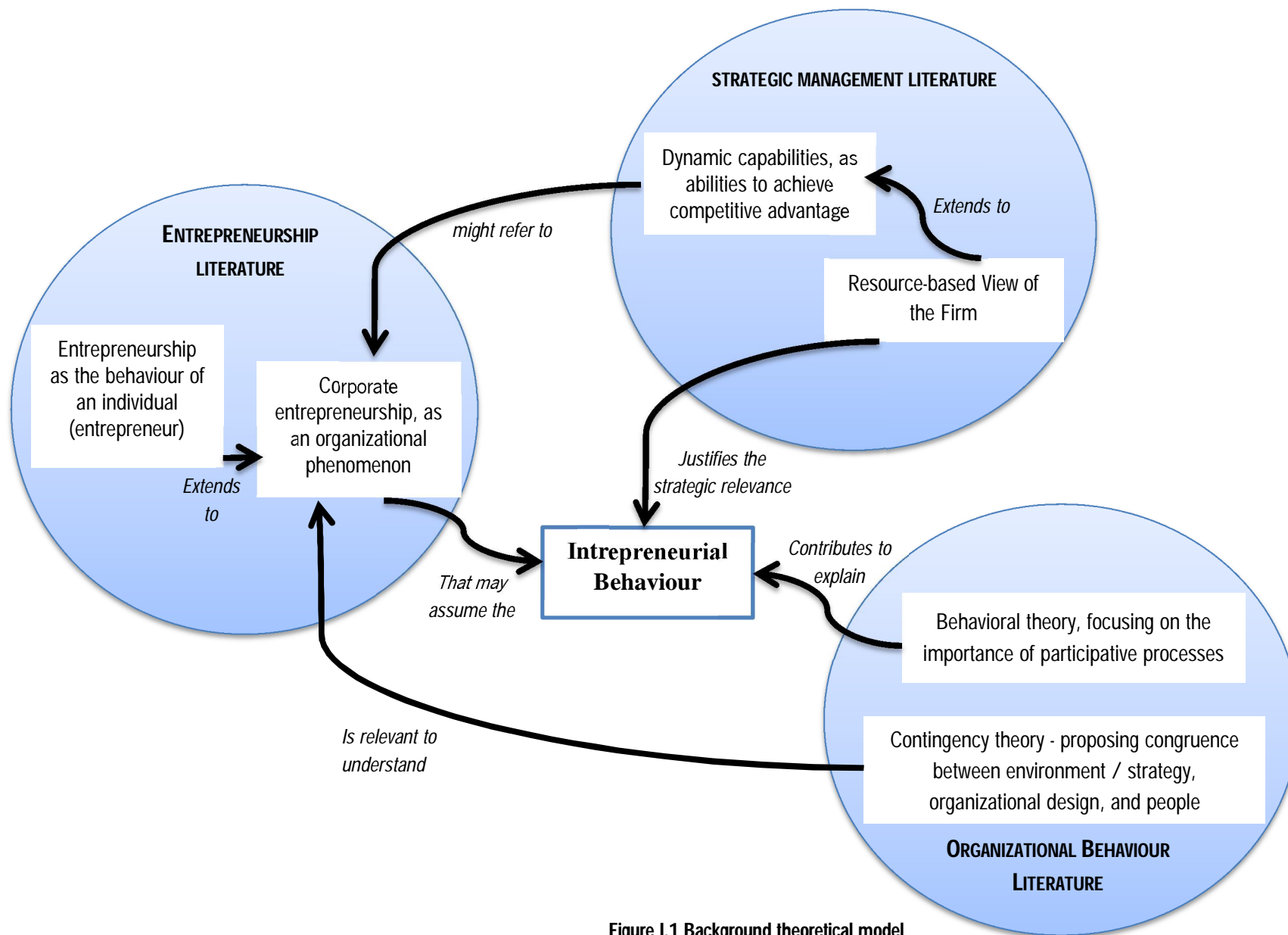


Figure I.1 Background theoretical model

PART II – ARTICLES

Article 1. Standing on the shoulders of giants – an ontology of corporate entrepreneurship

Abstract

The rapid growth of corporate entrepreneurship literature has brought with it incongruences in the way researchers use related concepts, and consequently on models used to study an organization's entrepreneurial efforts. This has frequently resulted in partitioned views as well as contradictory results. This paper contributes to the development of the field in two ways. Firstly, it provides a preliminary structure and classification of the domain of corporate entrepreneurship. For the first time in the literature, an ontology of corporate entrepreneurship is proposed, contributing to a common understanding of the process and related concepts. Secondly, and deriving from the proposed ontology, this paper also provides a model of corporate entrepreneurship that integrates several approaches to the field from previous researchers. We also point out to further areas of research in this very promising field.

Keywords: corporate entrepreneurship; entrepreneurial behaviour; entrepreneurship; strategic management; ontology

Chapter 1. Introduction

The interest in firm-level entrepreneurship has been growing both within academia as well as in the business community. However, one faces some challenges regarding construct issues while reviewing the literature on corporate entrepreneurship, which have implications on the models used to study organizations and their entrepreneurial efforts. Consequently, this has frequently resulted in fractured or partitioned views with contradictory results.

In this study, we propose a preliminary ontology of corporate entrepreneurship, which future scholars could use to clarify the concepts in the domain, thereby supporting the development of the field. Our ontology also describes the ways previous researchers have studied how corporate entrepreneurship works inside the firm, from which we derived an integrative multilevel model of corporate entrepreneurship.

The term “Ontology” has its origin in philosophy and refers to the philosophical discipline that deals with the nature and the organization of reality. In this article, we use the term “ontology” (with the lowercase “o”) referring to “a formal and explicit description of concepts in a domain of discourse” (Noy & McGuiness, 2001, p. 3). An ontology is a kind of taxonomy-plus-definitions and a kind of knowledge representation language (Van Rees, 2003). First emerging in the artificial intelligence community, ontologies are increasingly used in other areas nowadays, including in the entrepreneurship research field (e.g. Jones, Coviello, & Tang, 2011).

Our ontology can be understood as semi-informal in the sense of Ushold and Gruninger’s (1996, p. 98), as it is “expressed in a restricted and structured form of natural language greatly increasing clarity”. The purpose of our ontology corresponds to one of the main purposes ontologies are built for, which is “communication between people with different needs and viewpoints arising from their particular contexts” (Ushold & Gruninger, 1996, p. 100). In our case, the classification system will serve to bring coherence to a relatively recent body of studies as well as to elucidate the meaning of the varied terms used in the literature. Moreover, our domain will not be restricted to the use of the specific construct by the researchers, but it will also encompass the options made by them in what concerns modelling the way corporate entrepreneurship works inside a firm. Despite the scope of our work, our fundamental aim is not prescriptive, but rather both descriptive and analytic of the researchers’ efforts over the past 30 years.

The following questions specify the scope of the ontology we propose: What is corporate entrepreneurship? What variables influence corporate entrepreneurship? What are the main features of the process? What are the immediate and mediate results of corporate entrepreneurship?

In the following sections, we discuss the emergence of corporate entrepreneurship as a field of research, and the construct issues in the domain resulting from a growing body of literature. Then we proceed to describe the theoretical assumptions and the methodology used for our work, followed by the presentation and discussion of our ontology and subsequent model. Finally, in the last section, we present the main conclusions and directions for future research.

Chapter 2. Corporate entrepreneurship

Section 2.01 The emergence of the field

Earlier researchers were concerned with studying ‘what’ entrepreneurs do (e.g. Schumpeter, 1934, 1942), others with ‘why’ entrepreneurs act as they do (e.g. McClelland, 1961). Particularly this branch

of entrepreneurship research has been subject to criticism. Some authors (e.g. Carland, Hoy, Boulton, & Carland, 1984) argued that the excessive focus on the individual had collated entrepreneurship to small business ownership. Schumpeter (1934), in fact, had already clearly separated the concept of entrepreneur from that of businessperson.

In the 1980s, a more recent branch of research emerged with the concern of 'how' entrepreneurs act, focusing on understanding and improving managerial practice (Stevenson & Jarillo, 1990). This branch eventually led the interest in entrepreneurship to encompass entrepreneurship within the organizational setting as a way for achieving firm growth and strategic renewal (Guth & Ginsberg, 1990) as well as legitimizing the concept of corporate entrepreneurship (Stevenson & Jarillo, 1990). Corporate entrepreneurship (CE) is "(...) the process whereby an individual or group of individuals, in association with an existing organization, create a new organization or instigate renewal or innovation within that organization" (Sharma & Chrisman, 1999, p. 18).

By the turn of the century, CE had not only become an established stream of research within the entrepreneurship field, but had also become a focus for strategic management scholars. Early strategy literature equated entrepreneurship with going into business. As the field of strategic management developed however, the emphasis shifted to entrepreneurial processes, that is, the methods, practices, and decision-making styles managers use to act entrepreneurially (Lumpkin & Dess, 1996).

In summary, CE is at a theoretical crossroads. On the one hand, as a field concerned with opportunities identification and with innovation, it is related to entrepreneurship literature, and can benefit from it. On the other hand, as it is mostly concerned with how organizations do that, motivated by the need to grow or strategically renew itself, it also relates to strategic management literature. Despite that or rather because of that, since the 1980s the number of articles on the topic has grown substantially⁴. However, there are multiple challenges researchers face, especially regarding construct and model issues. In the next section, we will describe these issues.

Section 2.02 Construct and model issues

Corporate entrepreneurship permits the understanding of growth not just at the individual start-up level, but also for established firms. Indeed a better understanding of the antecedents and consequences of

⁴ By the end of 2012, there were more than 580 articles published in this field, and this refers only to articles available through ISI Web of Knowledge alone.

CE has the potential to unlock reservoirs of endogenous growth capacity, hitherto sporadically used. However, with the rise in academic interest, have come multiple challenges.

The first challenge refers to the different terminology used both by researchers, and by practitioners. For instance, some authors use the term 'intrapreneurship' (the term coined by Pinchot in 1985) as referring to the same phenomena as CE (e.g. Antoncic & Hisrich, 2001), yet others do not (e.g. Covin & Miles, 1999). Moreover, other concepts are used similarly, such as 'internal corporate entrepreneurship' (Jones & Butler, 1992) or 'entrepreneurship in established companies' (Morris, Avila, & Allen, 1993).

Another challenge while reviewing the literature is to establish exactly what phenomena are related to CE. It is possible to identify ten different models in CE literature that reveal different notions regarding the entrepreneurial phenomena, as well as different locus of entrepreneurship, or main antecedents and outcomes (Ireland, Covin, & Kuratko, 2009).

It is very possible then that the incongruences found in the literature can partially explain why frequently researchers arrive at ambiguous (Zahra & Covin, 1995) or even contradictory results (Zahra, 1996). Our understanding is that these incongruences derive from the fact that each scholar deals with a particular part of wider system. It is not that the different models used by researchers (Ireland *et al.*, 2009) are fundamentally contradictory. They just use different lenses. An advance in the field would come with a systemic understanding of CE.

These issues were behind our motivation for developing an ontology of CE, and subsequent integrative model.

Chapter 3. An ontological approach to corporate entrepreneurship

Section 3.01 Theoretical considerations

When constructing the ontology of a domain of knowledge, each researcher (or group of researchers) inevitably uses specific lenses to look at reality. This means, that other researchers might interpret reality differently and arrive at alternative ontological designs. Our ontological design of CE results from three fundamental theoretical assumptions.

The proposed ontology has a fundamental open systems approach to understanding the organization and the CE process, around the notions of inputs, throughputs, outputs and feedback. Regarding the field of entrepreneurship, it is interested in the 'how' of entrepreneurship and it makes an

effort to integrate the previous models of CE. Inputs from strategic management are mainly related to a configurational approach (Mintzberg, 1979; Miller & Friesen, 1984) to organizations.

Section 3.02 Methodological considerations

To develop the ontology of CE research we applied a two-stage methodology. The first stage consisted in delimiting the basis of relevant articles, and the second stage involved the capture of the ontology from that basis of knowledge.

(a) First stage: delimitation

The first stage in the construction of the ontology implied defining and applying the procedures for search, selection and exclusion of articles. This involved the search of articles in academic journals indexed in the ISI/Web of Knowledge, via the topic⁵ of the article. The query words corresponded to those researchers in the domain mostly use to refer to entrepreneurship within the firm⁶.

We then refined our search, only considering articles under the research domain of social sciences. However, to assure a comprehensive approach, several research areas within that domain were considered⁷. In our search, we included only articles, as books, conference papers and other documents are subject to variable peer review processes.

We then proceeded to reading all these papers to decide on further inclusion, based on applying exclusion criteria and verifying their scope. The exclusion criteria were: (1) the primary focus of an article not being CE, (2) the empirical research not being exclusively on firms, (3) research on family firms, and (4) the article being referenced less than 17 times⁸ unless it was from one of the most relevant authors in the domain.

These exclusion criteria do not diminish the importance of those specific objects of analysis. In fact, it is rather the opposite. Since we recognize the specificities of non-profits or family firms, we took the deliberate decision to focus on articles that address the issues of CE that are common to most firms. The criteria also led to the non-inclusion in our work of several articles that are concerned with specific branches of research within CE literature. This is the case of articles specifically concerned with the constructs of entrepreneurial orientation or corporate venturing. Again, it is not our intention to

⁵ Topic = Title + abstract + keywords

⁶ Query words = 'corporate entrepreneurship'; 'intrapreneurship'; 'firm-level entrepreneurship'; 'in-firm entrepreneurship'; 'entrepreneurship within...+firm', or 'entrepreneurship within...+organization'.

⁷ Research areas = 'business economics'; 'behavioural sciences'; 'psychology'; and 'sociology'.

⁸ The average citation per article in the field (without self-citations) is seventeen.

underestimate these topics, but our aim is to understand CE as whole, without overdetailing specific aspects of it.

We also conducted a focused search on selected journals and authors - the journals and authors most relevant in the domain. Our intention was not to overlook other relevant articles that might have been missed in the first stage.

The search, selection and exclusion criteria led us from 367 articles that complied with search criteria, to 103 that complied with the selection criteria, to a final group of 58 articles, which survived the exclusion criteria. These articles, that constitute the basis for our ontology, were mostly published in the last 5 years, in 25 academic journals. These include some published in journals with impact factors lower than that of main journals in the fields of entrepreneurship and strategic management such as 'Journal of Business Venturing', 'Entrepreneurship Theory and Practice', and 'Strategic Management Journal'. However, the fact that those articles have citations above average or belong to one of the most relevant author in the field, made us acknowledge their probable relevance. Table II.1.1 lists some of the most relevant articles considered in the ontology, identifying publications and authors.

(b) Second stage: capture

To develop the ontology we used informal techniques as suggested by Ushold and Gruninger (1996) where the output is a semi-informal ontology, as intended. 'Ontology capture' includes for instance, the identification of the key concepts and relationships in the domain of interest; and the production of text definitions for such concepts and relationships. There are four phases in this stage: scoping, producing definitions, review, and development of a meta-ontology.

In the scoping phase, the methodological procedures for classification included a data organization process and a process for the construction of the classification system⁹. Papers were arranged according to the number of citations (highest to lowest) and a database structure was prepared with an analysis grid. Then, we read and analysed each paper according to that grid, and identified potentially relevant terms within the domain of CE.

⁹ We used the software Protégé OWL v. 4.2, from Stanford University to modulate the ontology.

Journal/Author(s)	Article title
Academy of Management Journal	
Zahra (1996)	"Governance, ownership, and corporate entrepreneurship: the moderating impact of industry technological opportunities"
Entrepreneurship Theory and Practice	
Covin, Green, and Slevin (2006)	"Strategic process effects on the entrepreneurial orientation – Sales growth rate relationship"
Journal of Business Venturing	
Zahra (1991)	"Predictors and financial outcomes of corporate entrepreneurship - An exploratory study"
Zahra (1993)	"Environment, corporate entrepreneurship and financial performance – A taxonomic approach"
Zahra and Covin (1995)	"Contextual influences on the corporate entrepreneurship-performance relationship – A longitudinal analysis"
Zahra and Garvis (2000)	"International corporate entrepreneurship and firm performance: the moderating effect of international environmental hostility"
Antoncic and Hisrich (2001)	"Intrapreneurship: construct refinement and cross-cultural validation".
Hornsby, Kuratko, and Zahra (2002)	"Middle managers' perception of the internal environment for corporate entrepreneurship: assessing a measurement scale".
Wiklund and Shepherd (2005)	"Entrepreneurial orientation and small business performance: a configurational approach"
Journal of Marketing	
Matsuno, Mentzer, and Ozsomer (2002)	"The effects of entrepreneurial proclivity and market orientation on business performance"
Management Science	
Burgelman (1983)	"Corporate entrepreneurship and strategic management: insights from a process study"
Strategic Management Journal	
Dougherty (1992)	"A practice-centered model of organizational renewal through product innovation"
Naman and Slevin (1993)	"Entrepreneurship and the concept of fit: a model and empirical tests"
Stopford and Baden-Fuller (1994)	"Creating corporate entrepreneurship"
Dess, Lumpkin, and Covin (1997)	"Entrepreneurial strategy making and firm performance: tests of contingency and configurational models"
Barringer and Bluedorn (1999)	"The relationship between corporate entrepreneurship and strategic management"
Ahuja and Lampert (2001)	"Entrepreneurship in the large corporation: a longitudinal study of how established firms create breakthrough inventions"
Brown, Davidsson, and Wiklund (2001)	"An operationalization of Stevenson's conceptualization of entrepreneurship as opportunity-based firm behaviour"

Table II.1.1 Main articles¹¹ in the domain, by journal

¹¹ Articles most referenced, from those considered in the ontology.

Following an ontological process, constructs were organized according to similarity resulting in a preliminary taxonomic hierarchy. After this, we analysed each article completely and after each reading, the ontology was revised to include the extracted information. In the phase 'producing definitions', a clarification of each class was developed, by returning to the papers. One of the most important roles an ontology plays in communication is that it provides definitions for terms used. However, when researchers in a certain domain have different backgrounds and act in different contexts, there may be the problem that each user's previous ontology (even if not explicit) is different from the proposed ontology¹². In this case, one better serves a communication purpose by providing the different meanings for terms used in the field, what Ushold and Gruninger (1996) refer to as 'meaning mapper'. Because we find this to be the case in what regards the domain of CE, we decided not to provide precise and definitive definitions of the relevant concepts but rather providing the most common understanding of the terms by researchers in the field¹³. This clarification of classes is provided in tables II.1.2 through II.1.7.

In the review phase, the final structure of the domain was mapped and categories were reviewed for redundancy or duplication, and the structure compared for consistency with the papers' analysis notes.

Finally, we devise a meta-ontology, i.e. we decided that our ontology was comprised of classes (of constructs used by researchers in the domain), relations (between those classes), and authors (the researchers who studied a particular construct). Specifically the relations between the classes would allow us to structure an integrative model of previous studies on how CE works in a firm.

Figure II.1.1 depicts the resulting classification, which comprises of 38 classes, in three levels, organized into three main branches. Each level in the ontology shows the concepts with similar level of aggregation that facilitate the understanding of the previous level. Then each of the main classes is broken down into its subclasses and then each subclass further into subclasses of lower level.

In the following sections, we provide a detailed analysis of the main branches in the ontology and its classes, and subclasses.

¹² It is not just that people use different terms for the same meaning, even if with similar significations. They sometimes also use different terms when referring to constructs that are similar or partially overlap.

¹³ In addition, one must consider that our ontology is descriptive of 30 years of research rather than prescriptive.

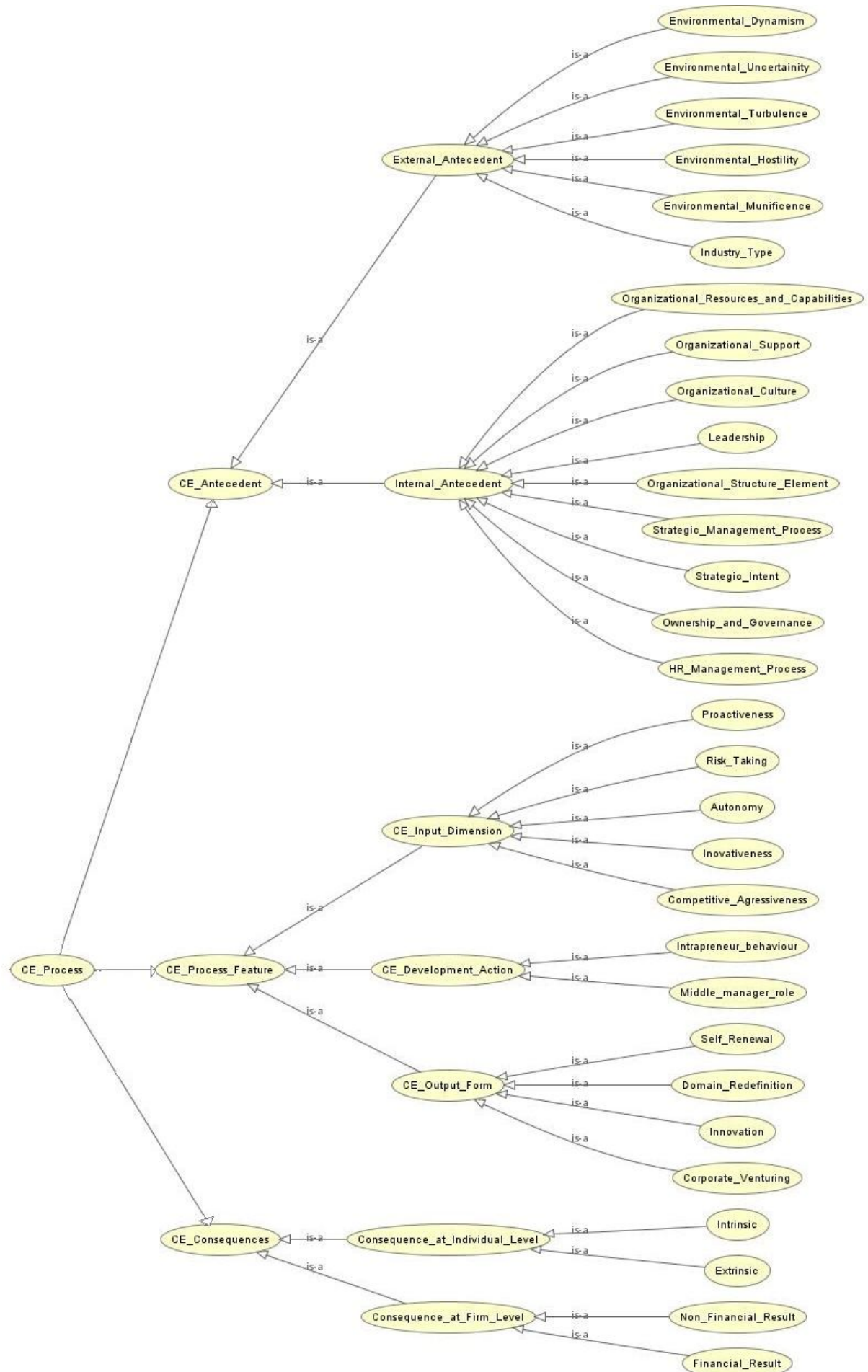


Figure II.1.1 Ontology of corporate entrepreneurship.

Section 3.03 An ontology of corporate entrepreneurship: results and discussion

The root of our ontology is CE, the fundamental construct in this ontology. At the first level of the ontology, we chose to group the main topics of research, considering CE as a process. At this first level, the classes are 'CE_Antecedent', 'CE_Process_Feature' and 'CE_Consequence'. This approach to CE as a process with inputs and outputs is consistent with Burgelman (1983) and with a pattern in the literature around the ideas of external and internal antecedents (Zahra & Covin, 1995).

(a) External antecedents of the corporate entrepreneurship process

Antecedents are factors that are used to explain the process of CE and its results, and can be broadly divided into external and internal.

The class 'External_Antecedent' refers to contextual variables that may either improve or suppress the impact of CE on firm performance (Zahra & Covin, 1995). The concepts related with this class are described in Table II.1.2. One can observe that the different concepts that researchers use, in some cases overlap and cannot be considered as completely different phenomena.

Researchers have studied the external environment using many different lenses and there appears to be no consensus in the field concerning which is the most relevant external determinant. Some authors argue that entrepreneurship is particularly effective in hostile environments (e.g. Zahra & Covin, 1995), including in the case of international ventures (Zahra & Garvis, 2000). However, Kuratko, Covin, & Garrett (2009) find hostility and dynamism to be negatively correlated with venture performance.

The differences between industry types, especially the differences between services and other types of firms, is still unclear as research has been focusing on high-tech or manufacturing firms.

(b) Internal antecedents of the corporate entrepreneurship process

This class refers to the antecedents of the CE process that pertain to the organization. The subclasses in this class are organizational components such as leadership, organizational support, organizational structure, resources and capabilities, organizational culture, human resource management, strategic management process, and others. The related concepts are presented in Tables II.1.3a through II.1.3c.

The constructs that emerged from the literature as internal antecedents suggest an approach to internal factors around the notion of a configuration where organizational components (e.g. people, structure, culture, processes) embody the purpose of entrepreneurial action. "Configurations seem to

act as vortex like force fields that progressively specialize and align values and behaviour” (Miller, 1996, p. 130).

3rd level classes	Clarification of concepts
Environmental uncertainty	Russell and Russell (1992) consider environmental uncertainty to have elements of complexity and dynamism, but do not provide an objective definition of the concept. Dess <i>et al.</i> (1997) also do not provide an objective definition of the concept, but refer that environmental uncertainty has elements of unpredictability, dynamism and heterogeneity.
Environmental hostility	According to Zahra (1991), environmental hostility creates threats to a firm’s mission, through increasing rivalry in the industry or depressing demand for a firm’s products (or services), thereby threatening the very survival of the firm. Hostility shows the unfavourability of environmental forces for a company’s business. Zahra (1993) refers that this unfavourability results from radical changes in the industry or the intensity of rivalry. Zahra and Covin (1995) refer Dess and Beard (1984): hostile environments are characterized by high levels of competitive intensity, a paucity of readily exploitable market opportunities, tremendous competitive-, market-, and/or product-related uncertainties, and a general vulnerability to influence, from forces and elements external to the firm’s immediate environment. Zahra and Garvis (2000) consider that environmental hostility indicates unfavourable external forces for a firm’s business.
Environmental turbulence	Naman and Slevin (1993) consider environmental turbulence as resulting from environmental hostility and environmental dynamism.
Environmental munificence	Zahra (1993) uses Aldrich’s (1979) definition - richness of opportunities for venturing and renewal in an industry. Simsek, Veiga, and Lubatkin (2007) use Miller and Friesen’s (1983) definition - degree of resource abundance and richness of investment opportunities in the environment, and therefore, its capacity to support growth and profitability.
Industry type	Kuratko <i>et al.</i> (2009) define industry as a group of firms that offer identical or highly similar products. However, in general, authors in the domain conduct their empirical studies selecting firms according to activity, types of goods or technologic intensity.
Environmental dynamism	Zahra (1991) uses Keats and Hitt’s (1988) definition - perceived instability and continuing changes in the market. Thornhill (2006) uses Sharfman and Dean’s (1991) definition: degree of uncertainty and turbulence in market and industry conditions. To Heavey, Simsek, Roche, and Kelly (2009), it refers to both the rate of change and unpredictability of change in an organization’s environment. Kuratko <i>et al.</i> (2009) define it as the degree to which the environment is changing, unstable, or unpredictable. Simsek, Heavey, and Veiga (2010, p. 112) refer Eisenhardt and Bourgeois (1988): “In a dynamic environment there is rapid and discontinuous change (...) so that information is often inaccurate, unavailable, or obsolete”. Previous researchers, use dynamism either as a dimension of uncertainty – e.g. Dess <i>et al.</i> (1997), or as an independent construct - e.g. Thornhill (2006).

Table II.1.2 Concepts related to ‘External_Antecedent’ class (2nd level)

(i) Leadership

Given the suggestion of many researchers for the need to study leadership behaviour (e.g. Dess & Lumpkin, 2005; Pearce II, Kramer, & Robbins, 1997) and the importance of transformational leadership skills (Hayton & Kelley, 2006) to promote CE, the scarcity of research on this topic is rather surprising. Other than the development of the concept of entrepreneurial leadership and the related empirical measure by Gupta, MacMillan, and Surie (2004), there seems to be no relevant studies on the behaviours of leaders in the entrepreneurial process.

(ii) Organizational support

This class refers to two factors that might lead individuals to perceive they have support from the organization to pursue entrepreneurship: management support and time availability. Prior research has frequently addressed both these topics.

Some authors have found that support from management for entrepreneurial activities is positively related to the generation of innovative ideas (Hornsby, Kuratko, Shepherd, & Bott, 2009), to corporate venturing (Kuratko *et al.*, 2009) and to innovation performance especially when risk control is low (Goodale, Kuratko, Hornsby, & Covin, 2011).

Regarding time availability, researchers find no support for the hypothesis that it moderates the relation between managers' level and the number of ideas implemented (Hornsby *et al.*, 2009), or that it directly affects innovation performance (Goodale *et al.*, 2011). However when risk control or process control formality is low, Goodale *et al.* (2011) argue that results are different and time availability affects innovation performance.

(iii) Organizational resources and capabilities

This is probably one of the most recent research trends in the domain. This class includes constructs that correspond to the focus of researchers concerning organizational resources and capabilities as antecedents of CE.

Some researchers find slack resources a determinant of entrepreneurial behaviour (e.g. Kuratko, Montagno, & Hornsby, 1990; Hornsby, Kuratko, & Montagno, 1999; Hornsby *et al.*, 2002; Simsek *et al.*, 2009), although discretionary slack is significantly influenced by managerial perceptions of environmental munificence and dynamism (Simsek *et al.*, 2007). However, Kuratko *et al.* (2009) found no evidence that financial resources were associated with venturing.

3rd level classes	Clarification of concepts
Leadership	Gupta <i>et al.</i> (2004, p. 242) develop the concept of entrepreneurial leadership: "leadership that creates visionary scenarios that are used to assemble and mobilize a 'supporting cast' of participants who become committed by the vision to the discovery and exploitation of strategic value creation."
Organizational support	This class refers to top management support and time availability for CE. Hornsby <i>et al.</i> (2002) define top management support as a willingness of top managers to facilitate and promote entrepreneurial actions. Others use similar definitions (e.g. Kuratko, Ireland, Covin, & Hornsby, 2005; Hornsby <i>et al.</i> , 2009; Sebora & Theerapatvong, 2010). Kuratko <i>et al.</i> (2005, p. 703) refer to time availability as "time needed to pursue innovations". Kuratko (2009) and Goodale <i>et al.</i> (2011) use similar definitions.
Organizational resources and capabilities	<p>When studying the relevance of organizational resources for corporate entrepreneurship, 'slack resources' is a concept that has earned the attention of several researchers (e.g. Zahra, 1991; Wiklund & Shepherd, 2005; Simsek, Lubatkin, Veiga, & Dino, 2009). Burgelman (1983) defines slack as the existence of resource levels above those needed for sustaining induced strategy.</p> <p>Organizational capabilities, encompasses different variables related to knowledge/knowledge management that researchers have studied, such as intellectual capital, absorptive capacity, or dynamic capabilities. Regarding intellectual capital, Hayton (2005, p. 140) refers to "a bundle of organizational resources comprised of human capital, intellectual property, and reputational capital that are tangible and intangible in nature and can be leveraged to create value". Others addressed particular dimensions of intellectual capital (e.g. Thornhill, 2006; Yiu, Lau, & Bruton, 2007; Simsek & Heavey, 2011). Concerning absorptive capacity, Zahra and Hayton (2008), and Zahra, Filatotchev, and Wright (2009) define it as a firm's ability to import, comprehend and assimilate the knowledge obtained from external sources. As to dynamic capabilities, Covin and Lumpkin (2011) define it as the ability to reconfigure a firm's resources in the manner envisioned and deemed appropriate by its principal decision-makers.</p>
Organizational culture	Chung and Gibbons (1997) define organizational culture as a routinized, enduring pattern of assumptions, norms, values, and beliefs that a collectively develops over time. According to the authors, organizational culture possesses two facets that are determinant to entrepreneurship. Superstructure refers to the widely shared believes, values, and ideological tenets in the organization, and social capital or sociostructure refers to the administrative structure of the organization and the social relations between individuals, and includes norms and sanctions, trust levels and extent of information sharing. Kemelgor (2002) defines organizational culture as shared philosophies, ideologies, values, assumptions, beliefs, expectations, attitudes and norms that knit a group of people together. Morris <i>et al.</i> (1993) study individualism-collectivism as a dimension of organizational culture.

Table II.1.3a Concepts related to 'Internal_Antecedent' class (2nd level).

3rd level classes	Clarification of concepts
Organizational structure elements	<p>This class includes concepts such as structure, communication, scanning intensity, and organizational boundaries.</p> <p>Naman and Slevin (1993) refer to structure as organic vs. mechanistic without providing definitions. The organizational structure dimensions studied by the different authors interested in this construct are centralization (Jennings & Lumpkin, 1989; Caruana, Morris, & Vella, 1998; Matsuno, Mentzer, & Ozsomer, 2002), specialization (Jennings & Lumpkin, 1989), departmentalization (<i>Matsuno et al.</i>, 2002), formalization (Caruana <i>et al.</i>, 1998; Matsuno <i>et al.</i>, 2002), controls (Zahra, 1991), integration (Jennings & Lumpkin, 1989; Zahra, 1991), and differentiation (Zahra, 1991).</p> <p>Zahra (1991) focuses on the quality and amount of formal communication, without providing a specific definition.</p> <p>Zahra (1991) defines scanning intensity as the formal efforts to collect, analyse, and interpret data about the firm's external environment and the competition¹⁴. Other authors use similar constructs, such as 'market sensing capacity' (Simsek <i>et al.</i>, 2007), 'decision comprehensiveness' (Heavey <i>et al.</i>, 2009), and entrepreneurial alertness (Simsek <i>et al.</i>, 2009).</p> <p>Organizational boundaries refer to "precise explanation of outcomes expected from organizational work and development of mechanisms for evaluating, selecting, and using innovations" (Kuratko <i>et al.</i>, 2005, p. 704).</p>
Human resources management process	<p>The human resources management related concepts that researchers address are competence, rewards and incentives, empowerment, and work discretion.</p> <p>Hayton and Kelley (2006) refer McEvoy's (2005) definition of competence: "...what a person is, knows, and does that is causally related to superior performance" and propose a framework that outlines the key competencies relevant to corporate entrepreneurship.</p> <p>Goodale <i>et al.</i> (2011) use Kuratko <i>et al.</i>'s (2002) notion of rewards/reinforcement as the extent to which one perceives that the organization uses systems that reward based on entrepreneurial activity and success. Hornsby <i>et al.</i> (2002) consider that a reward system must consider goals, feedback, emphasis on individual responsibility and results-based incentives. The types of incentives studied by researchers are diverse. Zahra (1996) studies a particular case of incentives: stock ownership for directors and executives. Simsek <i>et al.</i> (2007) distinguish between outcome- or behaviour-based incentives.</p> <p>Sundbo (1996) defines empowerment as the involvement of employees in the innovation process.</p> <p>Kuratko <i>et al.</i> (2005) and Goodale <i>et al.</i> (2011) refer to work discretion/autonomy as the extent to which one perceives that the organization tolerates failure, provides decision-making latitude and freedom from excessive oversight, and delegate authority and responsibility to lower level managers and workers.</p>

Table II.1.3b Concepts related to 'Internal_Antecedent' class (2nd level).

¹⁴ Scanning intensity is considered a dimension of strategic management by other authors (e.g. Barringer & Bluedorn, 1999).

3rd level classes	Clarification of concepts
Strategic management process	<p>Barringer and Bluedorn (1999) study five dimensions of the strategic management process: scanning intensity, locus of planning, planning flexibility, planning horizon, and control attributes. Kemelgor (2002) studies three similar dimensions of the strategic management process: opportunity recognition; planning flexibility, and locus of planning.¹⁵ Covin <i>et al.</i> (2006) consider the following dimensions of the strategic process - strategic decision-making participativeness, strategy formation mode, and strategic learning from failure.</p>
Strategic intent	<p>A business orientation describes what drives the creation of the strategy. The most researched business orientations are market and learning orientations, and of course, entrepreneurial orientation¹⁶.</p> <p>Baker and Sinkula (2009), and Matsuno <i>et al.</i> (2002) define market orientation as the extent to which firms establish the satisfaction of customers' needs and wants as an organizing principle of the firm, i.e. know the market, share the market information, and act on it. This orientation is sometimes termed as customer orientation (Luo, Zhou, & Liu, 2005).</p> <p>Liu, Luo, and Shi (2002) define learning orientation as a set of organizational values that defines the ability to create, disseminate and utilize knowledge. Anderson, Covin, and Slevin (2009) refer to 'strategic learning capability': a firm's proficiency at deriving knowledge from past strategic actions and leveraging that knowledge to adjust firm strategy.</p> <p>Regarding firms' strategies, Naman and Slevin (1993) study mission strategy as <i>ex ante</i> management intent operationalized as the aggregation of product-market strategies for the portfolio of products offered. Zahra (1991) use the term grand corporate strategies to refer to internal or external growth, stability, and retrenchment. Dess <i>et al.</i> (1997) use Porter's (1980) generic strategies: cost leadership and differentiation. Sundbo (1996) distinguishes between offensive market strategy, price leadership strategy, and steady strategy.</p>
Ownership and Governance	<p>Zahra (1996) approaches ownership considering the impact of outside directors' ownership vs. company managers' ownership on CE, and that of long-term vs. short-term institutional ownership. Luo <i>et al.</i> (2005) study ownership as the difference between national and international owned firms.</p> <p>Zahra (1996, p. 1716) defines corporate governance system as "the mechanisms that regulate the relationship between executives and shareholders" and Zahra <i>et al.</i> (2009, p. 249) as "the organizational arrangements used to monitor managers and protect shareholders' interests".</p>

Table II.1.3c Concepts related to 'Internal_Antecedent' class (2ndlevel).

Regarding intellectual capital, some authors study knowledge resources in general while others focus on human capital. Dougherty (1992) stresses the importance of market-technology knowledge for product innovation. Hayton (2005) argues that intellectual property has an insignificant effect in a firm's entrepreneurial performance. In what concerns human capital, some researchers focus on the

¹⁵ Other authors consider scanning intensity a dimension of organizational structure.

¹⁶ Because of the particular relevance to the CE process, entrepreneurial orientation will be addressed in table 5.

importance of top management human capital (e.g. Hayton, 2005; Simsek, *et al.*, 2010). It seems there is some consensus that the competencies of individual employees are fundamental to CE (Jennings & Lumpkin, 1989; Hayton & Kelley, 2006).

For some authors it is the pursuit of CE that extends the firm's knowledge-based, not the other way around (e.g. Simsek & Heavey, 2011), while for others the possession of the needed knowledge, technology and competencies is a strong predictor of venture success (e.g. Kuratko *et al.*, 2009).

Zahra and Hayton (2008) argue that the interaction between absorptive capacity and international venturing is significant and is positively related to firm performance when these venture initiatives are related to firm's primary business activities. Concurrently, Zahra *et al.* (2009) propose the importance of absorptive capacity for the firm to gain access to the knowledge that enriches CE.

(iv) Organizational structure

Regarding structure, Caruana *et al.* (1998) propose that centralization inhibits entrepreneurial behaviour while some degree of formalization promotes it. Formalization ensures that individuals do not pursue opportunities that are inconsistent with the company's mission and strategic direction. Scholars Matsuno *et al.* (2002), on the other hand, point out that entrepreneurial firms generally avoid high levels of organizational formalization, centralization and departmentalization. Russell and Russell (1992) argue that decentralization might facilitate entrepreneurship but that effect is highly moderated by innovation-related norms. However, Sundbo (1996) finds that in most of the cases studied, firms that encouraged empowerment did not control it. Zahra (1991) argues that integration is positively related to CE, whereas differentiation and extensive controls have the opposite effect. In contrary, Jennings and Lumpkin (1989) find no statistical significant support for the hypothesis that entrepreneurial firms are different from conservative firms, with respect to integration.

Formal communication and scanning intensity are other relevant organizational elements that researchers find to be significantly and positively associated with CE (e.g. Zahra, 1991). Similarly, Simsek *et al.* (2009) argue that a firms' alert information system has a positive influence on CE.

Jennings and Lumpkin (1989) conclude that organizational members tend to be more innovative when performance objectives are developed in a participative manner, and Goodale *et al.* (2011) find that organizational boundaries are positively associated with innovation performance, mainly when risk control is high.

(iv) Organizational culture

Scholars that find organizational culture to be relevant for CE, argue that entrepreneurial strategies require a context where innovation is valued by employees, where innovation-supporting behaviours are encouraged through norms and where resistance to innovation is discouraged (e.g. Russell & Russell, 1992). Zahra (1991) finds a positive relationship between CE and organizational values, while Antoncic and Hisrich (2001) find similar results for competition-focused values, but not for personal-related values. Morris *et al.* (1993) support that balanced individualism-collectivism contexts favour entrepreneurship. In contrast, Sundbo's (1996) research of Danish case studies finds that an entrepreneurial-oriented organizational culture is not the primary explanation for innovation activities of those companies, and that even when such a culture exists it is subordinated to strategy.

(vi) Human resources management process

We found only a few articles in our sample concerned with human resources management issues. Hayton and Kelley (2006) propose a competency-based framework to identify the human capital necessary to support CE. Thornhill (2006) confirms the interaction between training investment and innovation, but only in low-tech sectors.

Concerning rewards and incentives, it seems that there is little or no consensus among scholars. Some argue that the direct effect of incentives on CE is positive and significant (e.g. Hornsby *et al.*, 1999; Hornsby *et al.*, 2002; Simsek *et al.*, 2007) and that vehicles for the assignment of rewards are vital if entrepreneurship is to be maintained (Jones & Butler, 1992). Contrarily, Goodale *et al.* (2011) find no such support for the hypothesis that rewards/reinforcement affect innovation performance and Burgelman (1983, p. 1361) argues that "(...)' encouraging' entrepreneurship may create games and lead to misguided opportunism".

It appears that contradictory results are also found with respect to work discretion. Goodale *et al.* (2011) find no support for the hypothesis that work-discretion / autonomy by itself affects innovation performance except when risk control is high. Hornsby *et al.* (2009), on the other hand, argue that work-discretion is related to entrepreneurial actions.

(vii) Ownership and corporate governance

Despite the work of Zahra (1996) and Zahra *et al.* (2009), research on CE has generally neglected the role of corporate governance and the composition of boards.

Zahra (1996) argues that corporate governance and ownership systems can affect CE efforts significantly. The author found an inverse but significant association between the proportion of outside directors on a board and CE, and positive association of stock ownership by executives and entrepreneurial activity. This impact varies considerably between industries with low and high technological opportunities (Zahra, 1996).

(viii) Strategic management process

According to Barringer and Bluedorn (1999), the nature of strategic management practices influences a firm's entrepreneurial intensity. Covin *et al.* (2006) focus on the effects of the strategic process on the relation between a firm's entrepreneurial orientation and its performance. They find that a more autocratic/less participative style of top management in the strategic process is preferable for firms with growth-seeking strategies. These results seem to be in contradiction to Burgelman's (1983) proposition that top management's critical role is strategic recognition rather than planning. However, Covin *et al.* (2006) assess participativeness as it pertains to the making of major operating and strategic decisions, and not as a generalized decision-making approach employed across organizational levels.

Heavey *et al.* (2009) find decision comprehensiveness positively associated with the extent to which the firm pursues CE. Barringer and Bluedorn (1999) argue that scanning intensity, planning flexibility, and locus of planning are important correlates of a firm's entrepreneurial behaviour. Dougherty (1992) proposes that firms should revise strategy as on-going process with clear goals. On the other hand Barringer and Bluedorn (1999) find planning horizon to be not associated with CE. However, measurement issues might influence this result.

(ix) Strategic intent

Several types of business orientations are referred in strategy literature but market orientation, learning orientation and naturally entrepreneurial orientation, are the most researched in the CE domain.

Matsuno *et al.* (2002) concluded that entrepreneurial proclivity¹⁷ has a positive and direct relationship on market orientation, and that its influence on the firm's performance is positive when mediated by market orientation but negative, or non-significant, when not. Similarly, Baker and Sinkula (2009) find that at least among small firms, both an entrepreneurial orientation and market orientation contribute to firm's profitability, while Luo *et al.* (2005) find that market orientation has an impact on

¹⁷ Matsuno *et al.* (2002) do not use the term 'entrepreneurial orientation' but the term 'entrepreneurial proclivity'.

CE that in turn contributes to performance. Concurrently, Liu *et al.* (2001) arrived at the conclusion that a learning orientation mediates the impact of customer orientation and CE on outcome.

The few articles that address this issue seem to point to an interaction between an entrepreneurial and a learning orientation. On the one hand, there is a direct effect and a mediated effect –via structural organicity, market responsiveness, and a strategy formation mode– of entrepreneurial orientation on strategic learning capability (Anderson *et al.*, 2009). On the other hand, if the firm is able to learn from both mistakes and successes, and is able to change the innovativeness and empowerment system, the firm might develop a better innovation capability (Sundbo, 1996).

Concerning firm strategy, Sundbo's (1996) Danish case studies revealed that it has an impact on the type of innovations a firm follows. Zahra (1991) found that growth oriented strategies are positively associated with CE while stability strategies are not. Dess *et al.* (1997) argue that differentiation strategies are positively associated with high performance. However, contrary to the hypothesized, the same authors find similar results for cost leadership strategies. In this case, entrepreneurial processes might serve as mean of process innovation that lowers costs.

Scholars Luo *et al.* (2005) find support for the hypothesis that firms that are more internationalized tend to have a higher level of CE. Contrarily, Sebora and Theerapatvong (2010) find that firms that compete in domestic as well as international markets find it more difficult to engage their managers in entrepreneurial behaviours.

(c) Corporate entrepreneurship process features

In our ontology, we established the difference between concepts that are used by authors as a frame of mind and general behaviour reflected in a firm's on-going processes, from those that refer to the manifestations/outcomes of that behaviour. We decided to call the first class 'CE_Input_Dimension' to draw attention to its difference from the other class, 'CE_Output_Form', thereby contributing to the clarification of one of the most common problems concerning the CE construct.

All too frequently, researchers have used a mixed approach whereby outputs and inputs are interchangeably used to describe the CE process, which in our view it is not the best way to clarify different perspectives on the construct. The input perspective concerns the organizational ingredients for CE to emerge, which is usually referred to in the literature as entrepreneurial orientation. The output perspective concerns the immediate outcomes of the process. This distinction is consistent with Covin and Miles' (1999) proposal, and is similar to the distinction used in the innovation literature. Between the entrepreneurial orientation of a firm and the outcomes of CE, are the individual behaviours

and actions through which the CE process develops. Therefore, the class 'CE_Process_Feature' includes three subclasses, 'CE_Input_Dimension', 'CE_Development_Action', and 'CE_Output_Form'.

(d) Corporate entrepreneurship input dimensions

Entrepreneurial orientation is one of the most studied constructs in the field. Miller (1983) proposed the dimensions of 'innovativeness', 'risk taking', and 'proactiveness' to characterize and test entrepreneurship within a firm, and numerous researchers have adopted an approach based on Miller's (1983) original conceptualization (e.g. Covin & Slevin, 1989; Naman & Slevin, 1993). More recently, developments in the area of entrepreneurial orientation propose that the enhancement of a firm's entrepreneurial performance depends on five dimensions that work together and permeate the decision-making styles and practices of a firm's members (Lumpkin & Dess, 1996; Dess & Lumpkin, 2005). The concepts that pertain to this class¹⁸ refer to the dimensions of entrepreneurial orientation, which are presented in table II.1.4.

Numerous studies have empirically explored the independent effect of entrepreneurial orientation on performance and its contingent relationship with the external environment (Lumpkin & Dess, 1996), and strategic process variables (Kemelgor, 2002; Covin *et al.*, 2006). The results, although not always consistent, tend to show a positive association between entrepreneurial orientation and firm performance.

In spite of the importance of organizational-level attributes, such as organizational structure or strategy, these do not *per se* make a firm entrepreneurial. The behaviour of intrapreneurs is arguably the central element in the entrepreneurial process¹⁹, although singular and sporadic entrepreneurial behaviours *per se* do not make a firm entrepreneurial. The concepts that pertain to this class of the ontology are presented in table II.1.5.

¹⁸ The reason why we termed the class 'CE_Input_Dimension', rather than entrepreneurial orientation, is to draw attention to the fact that even though all dimensions might be important to understand the entrepreneurial process, they may occur in different combinations (Lumpkin & Dess, 1996), and that each might have a specific effect on the outcomes of the CE process.

¹⁹ Pearce II *et al.* (1997) propose a scale to measure individuals' entrepreneurial behaviours. The largest number of items measures the change orientation and innovative aspect of entrepreneurial behaviour.

3rd level classes	Clarification of concept
	When these dimensions are present, the firm is considered to have an entrepreneurial orientation , “a frame of mind and a perspective about entrepreneurship that are reflected in a firm’s on-going processes and corporate culture” (Dess & Lumpkin, 2005, p. 147). Other authors use different terms to refer to similar concepts, such as ‘entrepreneurial style’ (Naman & Slevin, 1993) or ‘entrepreneurial proclivity’ (Matsuno <i>et al.</i> , 2002).
Autonomy	Lumpkin and Dess (1996, p. 140), as well as Dess and Lumpkin (2005, p. 148) refer to autonomy as “independent action by an individual or team aimed at bringing forth a business concept or vision and carrying it through to completion.”
Innovativeness	According to Dess and Lumpkin (2005, p. 148), innovativeness refers to “a willingness to introduce newness and novelty through experimentation and creative processes aimed at developing new products and services, as well as new processes”. Baker and Sinkula (2009), and Anderson <i>et al.</i> (2010) refer Lumpkin and Dess’s (1996) definition - a tendency to engage in and support new ideas, novelty, experimentation, and creative processes that may result in new products, services, or technological processes.
Risk-taking	Wiklund and Shepherd (2005) and Sebra and Theerapatvong (2010) use Miller and Friesen’s (1978, p. 1982) definition of risk-taking. Zahra and Covin (1995) and Zahra and Garvis (2000) define this dimension in a similar way - a willingness to engage in business ventures or strategies where the outcome maybe uncertain. Dess and Lumpkin (2005, p. 148) define it as “making decisions and taking action without certain knowledge of probable outcomes; some undertakings may also involve making substantial resource commitments in the process of venturing forward”. Baker and Sinkula (2009) refer Lumpkin and Dess (1996) – willingness of owners or managers to commit a large percentage of a firm’s resources to new projects and to incur heavy debt in the pursuit of opportunity.
Proactiveness	Zahra and Covin (1995) refer to proactiveness as a company’s capacity to beat competitors in introducing new products, services, or technologies to the market. Zahra and Garvis (2000) define it as a firm’s aggressive pursuit of market opportunities and a strong emphasis on being among the very first to undertake innovations in its industry. Dess and Lumpkin (2005, p. 148) define it as “a forward-looking perspective characteristic of a marketplace leader that has the foresight to seize opportunities in anticipation of future demand”. Matsuno <i>et al.</i> (2002), Wiklund and Shepherd (2005), and Sebra and Theerapatvong (2010) use a similar definition to Lumpkin and Dess’s (1996). Baker and Sinkula (2009) define proactiveness as the ability of firms to seize the initiative in the pursuit of marketplace opportunities. Anderson <i>et al.</i> (2010) use Miller’s (1983) definition. Unlike Miller (1983), Stopford and Baden-Fuller (1994, p. 523) “do not regard proactiveness as necessarily meaning being the first in an industry to do something. Firms can be proactive in renewal, when they borrow others’ ideas as a means of breaking from past behaviours”.
Competitive aggressiveness	Dess and Lumpkin (2005, p. 148) define it as “an intense effort to outperform industry rivals. It is characterized by a combative posture or an aggressive response aimed at improving position or overcoming a threat in a competitive marketplace.”

Table II.1.4 Concepts related to ‘CE_Input_Dimension’ class (2nd level)

3rd level classes	Clarification of concepts
	This class refers to the actions and behaviours individuals develop in the corporate entrepreneurship process, and the different roles they assume.
Intrapreneurs' behaviours and roles	<p>Kuratko <i>et al.</i> (2005) define entrepreneurial behaviour, after Smith and Di Gregorio's (2002), as actions taken by a firm's members that relate to the discovery, evaluation, and exploitation of entrepreneurial opportunities.</p> <p>Burgelman (1983) suggests two distinct behavioural processes: induced strategic behaviour, which is an outcome of strategy and is considered the official path for innovation; and, autonomous strategic behaviour that occurs when operational-level participants see opportunities that exceed those proffered by top management. Similarly, Zahra (1991) argues that intrapreneurs' behaviours may be associated with formal as well as informal activities. Sundbo (1996) uses 'free entrepreneurship' to refer to situation where employees struggle to realize their own ideas without being stimulated by management.</p> <p>Day (1994) describes three types of intrapreneurs: bottom-up champions; top-management champions; and, dual-role champions, each having different roles. Intrapreneurs from the lower levels of the organization have the appropriate knowledge and expertise, and are close to relevant sources of information. Top-management intrapreneurs arise when innovative ideas need substantial resources and legitimacy to face challenges. Dual-role intrapreneur is "someone who possesses both the relevant expertise and information and the appropriate hierarchical power and control over resources so that he or she can make and implement better decisions in the face of significant uncertainties" (Day, 1994, p. 150).</p>
Middle-managers roles	<p>Burgelman (1983) points selecting and supporting <i>bona fide</i> entrepreneurial actors and their projects, as the role of middle managers. They act as enablers of individual entrepreneurial actions within an organization. According to Kuratko <i>et al.</i> (2005), middle-level managers endorse, refine, and shepherd entrepreneurial opportunities and identify, acquire, and deploy resources needed to pursue those opportunities. Concurrently, Wakke, Elfring, & Monaghan (2010) argue that managers have the important role of coaching employees, providing access to resources and expertise, using their network and status to act as brokers. Fulop (1991) highlights that middle managers can stimulate their employees to reflect on how he or she can balance the emerging behaviour as an intrapreneur with potentially conflicting roles related to improving efficiency of existing business operations.</p>

Table II.1.5 Concepts related to 'CE_Development_Action' class (2nd level)

(e) Corporate entrepreneurship development actions

Jones and Butler (1992), as well as Sundbo (1996), argue that intrapreneurs may arise from lower levels, as well as middle and upper levels of the firm. Intrapreneurial activities can result from individual creativity or pursuit of self-interest, and some might eventually receive formal approval and become an integral part of the business concept, even when originating at the lower levels of the firm.

Innovative behaviour can also happen in organizations within the employee's job description (e.g. R&D department). Sundbo (1996) defends that firms can establish two systems for the

organization of the innovation activities: the expert system (most common in high-tech firms) and the empowerment system (most relevant for service and low-tech firms). Although the most common intrapreneurial processes are emergent and bottom-up, Day (1994) describes other types of intrapreneurs.

The fact that entrepreneurial behaviour can happen in any part of the organization does not mean that managers do not play a major role in the process. Kuratko (2009) proposes that without strong and sustained commitment from all levels of the organization, entrepreneurial behaviour will never be a defining characteristic of the firm.

Section 3.04 Corporate entrepreneurship output forms

Corporate entrepreneurship can assume several output forms that can concurrently co-exist in an entrepreneurial organization. According to Zahra (1993), the distinction between the diverse forms of CE is relevant because different environments emphasize the need for different CE activities and these activities are associated differently with firm performance. The constructs that pertain to this class are presented in table II.1.6.

Most of the empirical work in our sample of articles use Zahra's (1996) proposal of the main CE immediate outcomes: firm innovation, corporate venturing and strategic renewal. Stopford and Baden-Fuller (1994) also consider changing the 'rules of competition' for an industry as a type of CE, and Covin and Miles (1999) value also domain redefinition as a form of CE. According to Stopford and Baden-Fuller (1994), these different types of CE might correspond to different stages of change, from individual entrepreneurship to industry frame breaking.

3rd level classes	Clarification of concepts
'CE_Output_Form' class refers to the immediate outcomes of entrepreneurial behaviour.	
Innovation	Dougherty (1992) refers that innovation comprises the creative linkage of market and technological possibilities, into a comprehensive package of attributes. Several authors define it as a firm's commitment to introducing new products, production processes, and organizational systems (e.g. Covin & Slevin, 1991; Zahra, 1996; Simsek & Heavey, 2011). Covin and Miles (1999) use the term 'sustained regeneration' to refer to product innovation and 'organizational rejuvenation' to refer to processes/systems innovation. "Firms that engage in sustained regeneration are those that regularly and continuously introduce new products and services or enter new markets" (Covin & Miles, 1999, p. 51). Organizational rejuvenation refers "to the corporate entrepreneurship phenomenon whereby the organization seeks to sustain or improve its competitive standing by altering its internal processes, structures, and/or capabilities" (Covin & Miles, 1999, p. 52).
Strategic renewal	According to Zahra (1991), strategic renewal reflects the transformation of organizations through the renewal of key ideas on which they are built. It involves changing a firm's scope of business, competitive approach, or both (Stopford & Baden-Fuller, 1994), and building or acquiring new capabilities and creatively leveraging them to add value (Zahra, 1996). Yiu <i>et al.</i> (2007) use Guth and Ginsberg's (1990) definition where strategic renewal refers to the creation of new wealth through new combinations of resources. Simsek and Heavey (2011) use Covin and Miles's (1999) definition - activities aimed at redefining the firm's relationship with its markets or competitors by fundamentally altering how it competes.
Domain redefinition	Covin and Miles (1999) use the term domain redefinition to refer to the situations whereby a firm proactively creates a new product-market, taking the competition to a new arena, and gaining the status of first or early mover. "Under such a scenario, the entrepreneurial firm may be able to create the industry standard or define the benchmark against which later entrants are judged" (Covin & Miles, 1999, p. 54).
Corporate venturing	According to Zahra (1991), venturing can be either internal or external. External venturing centres on exploring and exploiting business opportunities outside the firm's existing boundaries (Zahra & Hayton, 2008). Internal venturing occurs within the boundaries of a firm's existing businesses. "...internal corporate venture was defined as an entrepreneurial initiative that originated within the corporate structure (or within an existing business of the corporation) and was intended from its inception as a new business for the corporation" (Kuratko <i>et al.</i> , 2009 p. 460). Simsek <i>et al.</i> (2007) use corporate venturing to refer to expanding operations in existing or new markets. Antoncic and Hisrich (2001) use the term 'new business venturing' to refer to the creation of new businesses. Kuratko <i>et al.</i> (2009) refer to Govindarajan and Trimble's (2005) definition, where corporate venturing involves creating an entirely new business. New businesses created through corporate venturing may be heterogeneous in terms of their markets, products and innovativeness, as well as in terms of the nature of their 'parent' incubator organizations (Phan, Wright, Ucbasaran, & Tan, 2009).

Table II.1.6 Concepts related to 'CE_Output_Form' class (2nd level)

Section 3.05 The consequences of the corporate entrepreneurship process

This class refers to the mediate outcomes of CE, either at the firm level or at the individual level. The concepts that pertain to this class are presented in table II.1.7.

2nd level classes	3rd level classes	Clarification of concepts
Consequences at firm-level		
	Financial/economic results	<p>The main financial/economic performance outputs researchers are concerned with, are:</p> <ul style="list-style-type: none"> (1) Growth - of revenue (Zahra & Hayton, 2008; Simsek & Heavey, 2011) or market share (Luo <i>et al.</i>, 2005; Simsek & Heavey, 2011) (2) Profit (Baker & Sinkula, 2009; Heavey <i>et al.</i>, 2009) (3) Return - on assets (Heavey <i>et al.</i>, 2009; Simsek & Heavey, 2011); on equity (Heavey <i>et al.</i>, 2009; Simsek & Heavey, 2011); on sales (Zahra, 1993); and, on investment (Dess <i>et al.</i>, 1997; Matsuno <i>et al.</i>, 2002)
	Non-financial results	<p>Dess and Lumpkin (2005) suggest that indicators of the creation of human and social capital might also be a valuable outcome of CE efforts, but do not provide indication of which.</p> <p>Pearce II <i>et al.</i> (1997) study the consequence of managers' entrepreneurial behaviour on subordinates' satisfaction.</p> <p>Pearce II <i>et al.</i> (1997) propose other measures to evaluate the effects of entrepreneurial behaviour, such as employee turnover, absenteeism, or goal accomplishment indices.</p>
Consequences at individual level		
		<p>Kuratko <i>et al.</i> (2005) study promotion; career derailment; reassignment within the firm; development of political skills; establishment of a new social network; enhanced self-image, and financial rewards as outcomes of entrepreneurial behaviour for the individual. Sundbo (1996) identifies financial rewards, as well as prestige and promotion as outcomes.</p> <p>Some of these outcomes are intrinsic (i.e., psychological), other extrinsic (i.e., tangible) in nature. Some outcomes are of mixed nature (e.g. promotion). Kuratko <i>et al.</i> (2005) refer to extrinsic reward as financial or other tangible rewards that are made possible by the firm's financial performance. "Intrinsic rewards center on the satisfaction individuals receive as a result of developing their own ideas, from being more in control of their destiny and from having ultimate responsibility for the success of projects with which they are involved" Kuratko <i>et al.</i> (2005, p. 708).</p>

Table II.1.7 Concepts related to 'CE_Consequences' class (1st level)

The analysis of the articles considered for our ontology reveals a high concern of previous researchers with the financial/economic consequences of CE, and several authors find it to be

positively related to firm performance. Zahra and Covin (1995) argue that the effect of CE on firm performance increases over time drawing attention to the long-term effects. However, there are cases where the association between entrepreneurship and firm performance, without potential moderators, was not observed (e.g. Zahra & Hayton, 2008).

Few studies however have focused on the consequences of CE on individuals. In the cases studied, Sundbo (1996) finds that intrapreneurs were given economic rewards only in exceptional cases, and similarly Kuratko *et al.* (2005) suggest other potential individual outcomes of entrepreneurial behaviour rather than economic ones.

In this section, we discussed our ontology, which permitted to learn about the classes and related concepts, and the relation between constructs as previous researchers addressed them. Based on this, the ontology of CE may now be used to describe how CE works inside the firm. In the next section, we will propose an integrative model of CE.

Section 3.06 An integrative multi-level model of corporate entrepreneurship

Our analysis arrives at a global model of CE that conciliates most of the views of previous researchers (Figure II.1.2). CE requires an organization-wide entrepreneurial orientation (Covin & Slevin, 1991; Lumpkin & Dess, 1996) that instigates entrepreneurial actions, namely at individual-level (Hornsby *et al.*, 2002; Kuratko *et al.*, 2005). These actions may eventually result in outcomes, such as sustained regeneration (Dess, Ireland, Zahra, Floyd, Janney, & Lane, 2003), organizational rejuvenation (Dess *et al.*, 2003), strategic renewal (Floyd & Lane, 2000; Guth & Ginsberg, 1990), Dess *et al.* (2003), and/or domain redefinition (Dess *et al.*, 2003), that might imply internally developed new ventures (Burgelman, 1983; Guth & Ginsberg, 1990).

The model also integrates the usual levels of analysis in the CE, which we call macro and meso. Sometimes researchers are interested in the macro level (for instance, studying the impact of CE on financial performance), others in the meso level (for instance studying the behaviours of intrapreneurs). At the macro level, the integrative multi-level model of CE that we have constructed considers that the CE process has its external and internal antecedents, and produces consequences, both at the firm and individual levels. This level of analysis is derived from first level classes in the ontology.

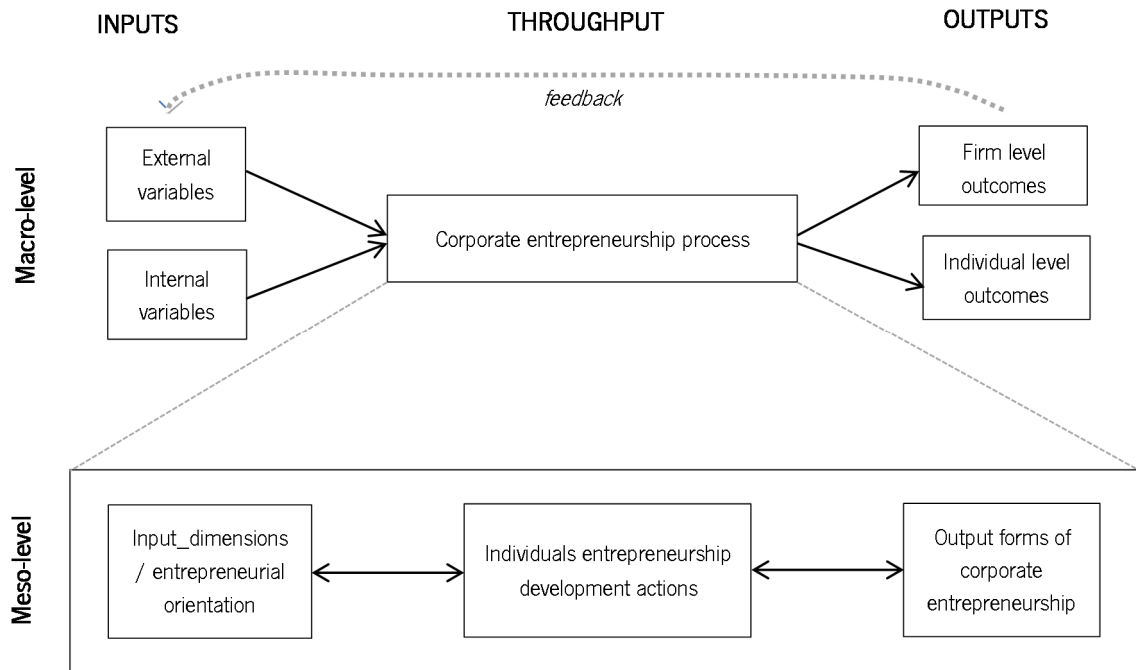


Figure II.1.2 Integrative multilevel model of corporate entrepreneurship

From the definitions of constructs and the discussion of the ontology in the previous section, we derive the following propositions associated with our model:

Proposition 1: Environmental conditions are associated with CE.

Proposition 2: Industry type has a moderating effect on the association between the environmental conditions and CE.

Proposition 3: A firm's internal conditions are associated with CE.

Proposition 4: Depending on the aspects of the environmental or internal conditions considered, the association with CE might be either positive or negative.

Third-level classes of the 'CE_Antecedent' branch in our ontology suggest types of internal and external variables, to operationalize propositions 1 and 4.

Proposition 5: CE is associated with firm performance, measured by financial and non-financial indicators, even if only in the long run.

Proposition 6: CE is associated with consequences to the individual.

At the meso level, the CE process unfolds to reveal how the dimensions of entrepreneurial orientation are an antecedent of individuals' actions towards entrepreneurship and produces some type of entrepreneurial outcome. This level of analysis is derived from the 'Corporate_Process_Feature' class and respective subclasses in our ontology.

Proposition 7: The entrepreneurial orientation dimensions are positively associated with individuals' entrepreneurial actions.

Proposition 8: Individuals' entrepreneurial actions are associated with immediate outcomes of CE.

The subclasses related to 'CE_Output_Form' class suggest types of immediate outcomes, to operationalize proposition 8.

The model also considers a possible connection between the macro and the meso levels.

Proposition 9: Some external, as well as internal inputs, might moderate the relation between the individuals' entrepreneurial actions and outcomes.

The idea of a 'virtuous cycle for corporate entrepreneurship'²¹ proposed by Ahuja and Lampert (2001), and the observations made by several researchers²², suggest that causal relationships might be hard to identify. The feedback mechanism in our multi-level integrative model, derived from our systems approach to the domain, encompasses the possibility of consequences becoming antecedents.

Proposition 10: Consequences from previous entrepreneurial actions influence future entrepreneurial efforts.

Proposition 11: Consequences from previous entrepreneurial actions are associated with the development of internal conditions to promote future CE.

Proposition 12: The pursuit of CE might lead managers to perceive their environment in a specific way.

Chapter 4. Conclusions

In the area of entrepreneurship studies, the last three decades have witnessed an increased focus away from the individual entrepreneur, as one who creates a new organization, towards the understanding of the entrepreneurial behaviour of and within the firm. The rapid growth of this area of research and the incongruence in the way researchers use the concepts related to CE, call for the need to consolidate the current knowledge and to provide directions for future research. Despite important contributions to the clarification of the construct from Covin and Miles (1999) and from Sharma and Chrisman (1999), this research topic is probably far from being closed.

²¹ Ahuja and Lampert (2001) propose that the pursuit of new technologies leads to breakthrough inventions that create wealth and surplus resources that then fund the next cycle of entrepreneurial experimentation.

²² Other researchers arrive at results that suggest similar virtuous cycles regarding knowledge and corporate entrepreneurship, entrepreneurial and market orientation, and entrepreneurial and learning orientation.

In this study, we reviewed 58 articles and followed an ontological process to propose a structure of the corporate entrepreneurship domain that includes 38 classes organized into three main branches: the antecedents, features and consequences of the corporate entrepreneurship process. Our ontology is preliminary, and not intended to be definitive. We are aware that other researchers might interpret prior research differently and arrive at alternative ontological designs. Our objective was to propose an initial ontology to support current and future researchers in corporate entrepreneurship and we believe that our proposed ontology of the domain makes a useful contribution.

Our ontology also describes the ways previous researchers have studied how corporate entrepreneurship works inside the firm, from which we derived an integrative multilevel model of corporate entrepreneurship that can serve as a starting point for future empirical studies. We propose this model because the inconsistencies in results arrived at by different scholars is only partially explained by researchers' options on how to describe and operationalize constructs, although this is a relevant issue. It might be also explained because partial analysis hardly captures the complexity of the phenomena.

Our work has some limitations. The results presented are applicable only to the sample of 58 articles resulting from our search, selection and exclusion criteria, albeit a sample representative of a broader literature base and one that includes several articles from lead researchers in the field as well as the most referenced articles in the domain. In any case, future work should include the analysis of a broader research base to study the robustness of our proposed ontology.

Our ontology represents how previous researchers studied the phenomena. It does not intend for the model to become a reality in itself, in which case a significant number of classes would be missing from our ontology. By addressing the main constructs studied by earlier researchers, it reveals by default the under-researched areas. We therefore propose six streams for future research.

First, the relationship between corporate entrepreneurship and firm performance has been one of the areas to which researchers have paid attention, as well as to the clarification of the main antecedents, external and internal, even though not always with similar results. Less attention has been given to the process, especially in what refers employees' entrepreneurial behaviour. Second, one must not forget that results associated with corporate entrepreneurship are mostly contingent to a particular environmental context, and dependent on internal factors. However, aspects from the internal environment such as informal communication, organizational culture in all its relevant dimensions, human resources management issues related to staffing, development and performance appraisal, just

to mention a few, should be addressed in future research. Third, if corporate entrepreneurship can be initiated at any level of the organization, and if it can be developed either within a formal or within an informal process, then it is plausible to hypothesize that diverse configurations of organizational attributes would promote different types of entrepreneurial actions, thus arriving at different results. It is necessary therefore to explore how the processes develop in each case and a configurational design research is probably the most helpful to do that (Naman & Slevin, 1993; Wiklund & Shepherd, 2005). Fourth, most researchers concerned with entrepreneurial behaviour of the individuals study the top and middle level intrapreneurs. What about operational employees? Fifth, there may be firms where corporate entrepreneurship is not beneficial to improving performance. What characterize these cases? Researchers have yet to answer this question. Sixth, with respect to the differences between industries in the corporate entrepreneurship process and its consequences, there is still need for further research addressing the specificities of services and low-tech firms.

Thus, there is a lot of promising research that can be done on corporate entrepreneurship, with our ontology serving as both a clarifying as well as a useful springboard.

Article 2. Unravelling the importance of intrapreneurial behaviour

Abstract

Intrapreneurs are employees that go beyond their job descriptions, providing valuable help to innovate some aspect of their firms. Until now, the construct of intrapreneurial behaviour has been concealed in the strategic entrepreneurship literature under the constructs of entrepreneurial orientation and corporate entrepreneurship, which have been the major focus of research. Establishing the differences between these constructs, allows us to study specific influences on intrapreneurial behaviour and to unravel its importance for firm performance. Data from 127 firms confirm that some external and internal input variables are associated to intrapreneurial behaviour, and that this behaviour is positively related to innovation and firm performance. This study, also makes suggestions for future research, and draws implications for managerial practice.

Keywords: corporate entrepreneurship, entrepreneurial proclivity, innovation, intrapreneurial behaviour

Chapter 1. Introduction

Most research on corporate entrepreneurship has so far been dedicated to study the importance of being an entrepreneurial organization, by establishing the relationship with firm performance, and the clarification of the contingencial effects of external or internal factors, even though not always with similar results. Anyway, an integrative approach to previous research in the domain, reveals that corporate entrepreneurship requires an organization-wide entrepreneurial orientation (Covin & Slevin, 1991; Lumpkin & Dess, 1996) that instigates entrepreneurial actions, namely at individual-level (Hornsby, Kuratko, & Zahra, 2002; Kuratko, Ireland, Covin, & Hornsby, 2005). These actions may eventually result in outcomes, such as sustained regeneration (Dess, Ireland, Zahra, Floyd, Janney, & Lane, 2003), organizational rejuvenation (Dess *et al.*, 2003), strategic renewal (Floyd & Lane, 2000; Guth & Ginsberg, 1990; Dess *et al.*, 2003), and/or domain redefinition (Dess *et al.*, 2003), that might imply internally developed new ventures (Burgelman, 1983; Guth & Ginsberg, 1990). Therefore, the focus of previous researchers has been mostly on studying corporate entrepreneurship at the macro level, i.e. demonstrating that external and internal conditions are associated with corporate entrepreneurship, which in turn is associated with firm performance.

Assuming that corporate entrepreneurship is relevant for the performance of firms, under certain environmental circumstances, now the opportunity lies in studying corporate entrepreneurship

at a meso-level, i.e. the process itself. In the entrepreneurship literature, there are two possible approaches to the corporate entrepreneurship process – the input and the output perspectives. All too frequently, researchers have used a mixed approach whereby outputs and inputs are interchangeably used to describe the CE process, which in our view it is not the best way to clarify different perspectives on the construct. The input perspective concerns the organizational ingredients for corporate entrepreneurship to emerge, which is usually referred to in the literature as entrepreneurial orientation (Lumpkin & Dess, 1996). The output perspective concerns the immediate outcomes of the process. We argue that both perspectives are necessary, and that between the entrepreneurial orientation of a firm and the outcomes of corporate entrepreneurship, are the individual behaviours and actions through which the process develops. Although fewer researchers have been concerned with this meso-level of analysis, the recognition of the importance of individual behaviour for the corporate entrepreneurship process emerges from seminal works in the field (e.g. Burgelman, 1983; Pinchot, 1985). Burgelman (1983) suggests that innovation in organizations is the result of two distinct behavioural processes. The first of these is what the author calls induced strategic behaviour, which is an outcome of strategy, while the second process is called autonomous strategic behaviour. While induced strategic behaviour is seen as the official path for innovation, Burgelman (1983) proposes that as long as operational-level participants see opportunities that exceed those proffered by top management, autonomous strategic behaviour will occur. Pinchot (1985) focuses on the individual characteristics of the entrepreneurial employee or intrapreneur. An intrapreneur is someone who possesses entrepreneurial skills and uses them within a company instead of using them to launch a new business (Pinchot, 1985). Later, Pinchot describes intrapreneurs as ‘dreamers who do’ (1987).

Our objectives are to study external and internal factors associated with intrapreneurial behaviour, as well as the association between this behaviour and innovation and firm performance. In chapter 2, we describe the theoretical background of our study and develop the hypotheses to be tested. In chapter 3, we describe the method through which we conducted our empirical study, and its results are presented in chapter 4. In the last chapter, we discuss the results, explain the main limitations of the study, point out some future research possibilities, and draw some managerial implications.

Chapter 2. Theory and hypotheses

We place our study under the resource-based view of the firm. This not only justifies the study of the strategic relevance of employees’ behaviour, as it stresses the relevance of studying other firm

resources and capabilities that might also serve as inputs for the entrepreneurial process. In fact, the resource-based view of the firm, developed by Penrose in 1959 (1995), has been later applied to the field of innovation (Teece & Pisano, 1994).

Section 2.01 Inputs for intrapreneurial behaviour

Previous research has demonstrated that inputs for corporate entrepreneurship (CE) originate both inside and outside of the firm. Firms in different environments emphasize different corporate entrepreneurship activities, and these activities are associated differently with indicators of financial performance (Zahra, 1993). Hostility is one of the most studied external variable and it has been positively associated with corporate entrepreneurship (Zahra, 1991), although not in every case. According to Zahra (1991), environmental hostility creates threats to a firm's mission, through increasing rivalry in the industry or depressing demand for a firm's products (or services), thereby threatening the very survival of the firm. Hostility shows the unfavourability of environmental forces for a firm's business. Research showed that CE is also contingent on internal variables, such as organizational resources. In this case, researchers in the field are usually concerned with slack resources (e.g. Simsek, Veiga, & Lubatkin, 2007) and with some aspects of intellectual capital (e.g. Thornhill, 2006), particularly human capital (e.g. Hayton, 2005). From a resource-based perspective, firm's resources include all assets, capabilities, organizational processes, firm attributes, information, knowledge, and others, controlled by the firm (Barney, 1991). Therefore, resources can be either tangible or intangible assets, and are tied semi-permanently to the firm.

Considering that a generalized IB across the organization is a form of CE, the above is useful to arrive at the following hypotheses:

H1: IB is contingent on external and internal input variables, such as:

H1a: environmental hostility

H1b: firm resources

H1b1: financial resources

H1b2: number of employees

H1b3: technology

H1b4: profile of employees

H1b5: organizational climate

H1b6: marketplace image

H1b7: market information

H1b8: material resources

The inputs for CE, which are therefore relevant to study IB, do not refer only to organizational resources. Previous researchers have addressed various internal factors related to the entrepreneurial process, although the strength and the signal of the association between each of these factors and CE are not always consistent across studies. Some of the most relevant internal conditions, according to the most recent researches, are:

- entrepreneurial leadership (Gupta, MacMillan, & Surie, 2004)
- organizational support (Hornsby, Kuratko, Shepherd, & Bott, 2009; Kuratko, Covin, & Garrett, 2009; Goodale, Kuratko, Hornsby, & Covin, 2011)
- organizational culture (Chung & Gibbons, 1997; Antoncic & Hisrich, 2001; Kemelgor, 2002)
- structure (Naman & Slevin, 1993; Caruana, Morris, & Vella, 1998; Matsuno, Mentzer, & Ozsomer, 2002)
- human resources management practices (Hayton & Kelley, 2006; Simsek *et al.*, 2007; Goodale *et al.*, 2011)
- strategic management process (Kemelgor, 2002; Covin & Slevin, 2006; Heavey, Simsek, Roche, & Kelley, 2009)
- business orientation and strategy (Luo, Zhou, & Liu, 2005; Anderson, Covin, & Slevin, 2009; Baker & Sinkula, 2009)

Therefore, a large number of variables have been studied by previous researchers, and these probably do not cover all relevant organizational factors. Moreover, contradictory results between studies on some of these variables are common. For these reasons, we will use a proxy for the configuration of internal factors that instigate IB. A construct such as entrepreneurial orientation might serve as that proxy. In fact, one would expect to find elements that pertain to the organization, for example organizational culture, associated with the exhibition of an entrepreneurial orientation (Covin & Lumpkin, 2011). However, the enlarged construct of entrepreneurial orientation proposed by Lumpkin and Dess (1996) and Dess and Lumpkin (2005) is not very adequate as proxy to measure the fitness of organizational factors towards IB, as it is already measuring behaviours. Therefore, in our study, we use Matsuno *et al.*'s (2002) 'entrepreneurial proclivity', which is more a dispositional construct, to clearly mark a distinction from Dess and Lumpkin's (2005) entrepreneurial orientation construct, which is more behavioural. Entrepreneurial proclivity (EP) is a better construct for our purpose, as it refers to an organization's predisposition to accept entrepreneurial processes, practices, and decision-making,

characterized by its preference for innovativeness, risk taking, and proactiveness (Matsuno *et al.*, 2002). From the above, we derive the following hypothesis:

H2: EP is positively associated with IB

Another aspect of our model refers to the output perspective of the entrepreneurial process, namely the immediate outcomes of intrapreneurial behaviour.

Section 2.02 Intrapreneurial behaviour and performance

Most previous studies have focused on the effects of the entrepreneurial process on a firm's financial performance (e.g. Zahra & Covin, 1995; Antoncic & Hisrich, 2001). Most studies, but not all, found a positive association between entrepreneurship and firm performance. However, the studied relation is usually between CE outcomes (e.g. innovation) and performance. It is relevant to study the more distant relation between IB and firm performance:

H3: IB is positively associated with the financial performance of the firm.

Several authors (e.g. Monsen, Patzelt, & Saxton, 2010; Pearce II, Kramer, & Robbins, 1997) have pointed out the need to consider non-financial results as well. In fact, literature from the organizational behaviour field suggests that measures such as employee turnover, absenteeism, and employee commitment are usually more immediate results of behaviours and attitudes than the firm's financial performance is.

Arthur (1992) found evidence for two distinct approaches to shaping employee behaviour and attitudes at work: control systems and commitment systems. The goal of control systems is to reduce direct labour costs, or improve efficiency, by enforcing employee compliance with specified rules. For commitment systems, the focus is on developing committed employees who can be trusted to use their discretion to carry out job tasks in ways that are consistent with organizational goals (Arthur, 1994).

IB is more likely to emerge in a commitment system, which is the system to expect in a firm with high entrepreneurial proclivity, than in a control system. Firms with commitment systems have lower employee turnover than firms with control systems have (Arthur, 1994) and absenteeism can foreshadow employee turnover (Griffeth, Hom, & Gaertner, 2000). Therefore:

H4: IB is negatively associated with employee turnover and absenteeism

H4a: The association is not significant when EP is high

H4b: The association is significant when EP is low

In general, commitment systems are characterized by higher levels of employee involvement in managerial decisions, formal participation programs, training in group problem solving, and socializing activities and by higher percentages of skilled employees and average wage rates (Arthur, 1992). Employees under these conditions are thought to be more likely to engage in organizational citizenship behaviours (Organ, 1988), extra role, unrewarded behaviours that are believed to be critical to organizational success.

H5: IB is positively associated with commitment

H5a: The association is significant when EP is high

H5b: The association is not significant when EP is low

The basic conceptual model of our study is depicted in Figure II.2.1.

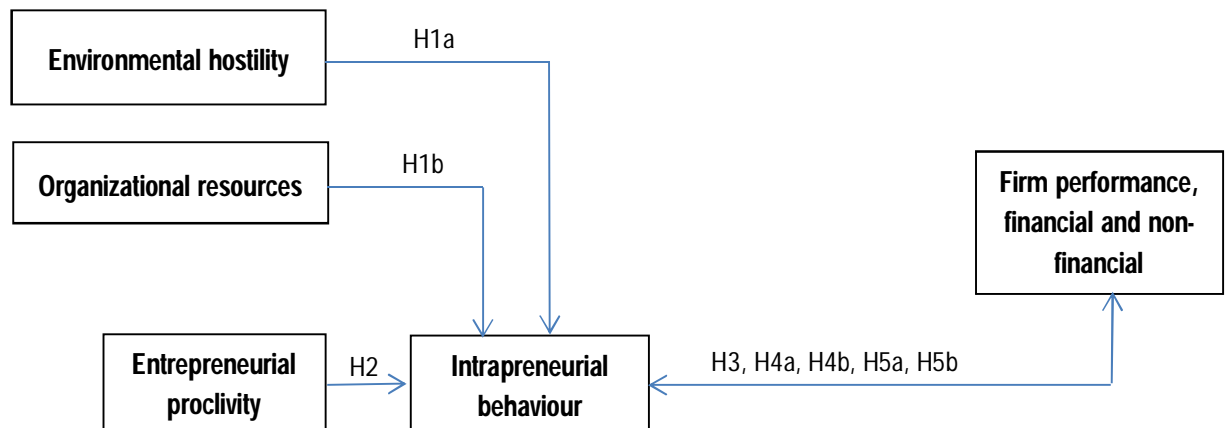


Figure II.2.1 Model of the corporate entrepreneurship process

Chapter 3. Method

Section 3.01 Data

Data was collected through an online survey that was directed to the CEOs or other high-level executives of firms on the 'PME Líder', '1000 Melhores PME' and '1000 Maiores Empresas'²³ ranks. A two-wave survey was used to enhance the response rate. The introductory e-mail explained the study's objective and assured executives of the confidentiality of their responses. Responses from 127 firms represented a response rate of 18%. Responding firms averaged 55 (s. d. = 87) full-time equivalent employees, ranging from 10 to 668, and the revenue mode is in the range between 500.000 and 2.000.000 Euros,

²³ "PME Líder" is a label issued by IAPMEI (Portuguese Agency for SMEs and Innovation) that distinguishes the best SMEs based in Portugal; '1000 Melhores PME' is the rank of the 1000 largest SME's based in Portugal (organized by Exame, a leading Portuguese business magazine); '1000 Maiores' is the rank of the 1000 largest firms based in Portugal (organized by Diário Económico, a leading Portuguese financial newspaper).

with 50% of the firms with revenues from 150.001 to 5.000.000 Euros. This means the sample is heterogeneous regarding factors such as the number of employees and revenues, as it is regarding sector (11 NACE²⁴ sections are represented). Variation in the sample has the potential to increase generalizability of the findings.

The survey targeted the firms' CEOs or other senior executives because of their likely familiarity with company-wide strategic actions, especially corporate entrepreneurship efforts and overall performance. Analysis of the titles of respondents showed that 47 % were the top executive of the firm or the owner, 9% were CFO, 9% were CMO, 6% were HRM, and the remaining were other executives.

Section 3.02 Measures

(a) Environmental hostility

To characterize firms' external environment we included a variable to measure environmental hostility, because we expect hostility to be positively associated with IB. We used Zahra's (1993) environmental hostility index, which considers two dimensions: 'unfavourability of change' and 'competitive rivalry'. Executives rated the industry's hostility using a 5-Point Likert-type scale where "1" corresponds to low hostility and "5" represents high hostility. However, we only considered the "unfavourability of change" subscale results because the 'competitive rivalry' subscale revealed not to be internally consistent in our sample. Results for unidimensionality and reliability are presented in Table II.2.1.

Other input variables included in this study are concerned with firm resources. Based on Wiklund and Shepherd (1995) we considered firm's financial resources, but also other variables, thus extending to human resources - quantity and skills, organizational climate, and marketplace image. Therefore, both tangible and intangible resources were included. These variables were measured on a 6-point scale, where "1" represents that the resource is not adequate at all, considering the firm's needs, and "6" represents that the resource is very adequate.

(b) Entrepreneurial proclivity

We used Matsuno *et al.* (2002) entrepreneurial proclivity scale, which measures the following dimensions: innovativeness, risk-taking and proactiveness. Executives rated their firms' entrepreneurial proclivity using a 5-Point Likert-type scale where "1" corresponds to low EP and "5" represents high EP. The Cronbach's alpha for the EP scale is .830.

²⁴ NACE = Nomenclature Generale des Activites Economiques dans l' Union Europeenne (General Name for Economic Activities in the European Union).

Construct	Measurement items	Factor loadings	Variance explained (%)	Cronbach's alphas
Unfavourability of change			44.6%	.748
	The technology relevant to our industry has changed significantly	.748		
	The demographic characteristics of our industry's consumers has changed significantly	.728		
	The Government regulations that affect our industry have changed significantly	.582		
	The number of domestic competitors in our industry increased significantly	.698		
	The number of foreign competitors in our industry increased significantly	.644		
	Industry-wide spending on marketing communication has increased significantly	.590		
Competitive rivalry				.430
	Our firm has been facing significant competition from domestic producers			
	Our firm has been facing significant competition from foreign producers			

Table II.2.1 Measurement scale for environmental hostility and factor loadings

(c) Intrapreneurial behaviour

We used an adapted version of Pearce II *et al.*'s (1997) entrepreneurial behaviour scale. The scale proposed by these authors is used to assess a particular individual's entrepreneurial behaviour and is focused on behaviours that illustrate how intrapreneurs interact with others within the organization. We adapted this scale to reflect the degree in which each of the behaviours applies to the totality of the workforce over the preceding 3-year period as perceived by the executive. Respondents are asked to make a choice on a Likert-type 5-point scale. A firm's score was calculated as the average between the sum of the items for managers and the sum of the items for non-managers. However, Pearce *et al.*'s scale (1997) was not constructed with operational level employees in mind. Therefore, to confirm the validity of the scale for non-managerial level employees we subjected the scale to factor analysis considering only one subset of employees, with managerial and with non-managerial positions, at a time. Results showed the unidimensionality of the scale (with all factor loadings ranging from .653 to .933), as well as its high reliability, in both cases. The Cronbach's alphas for the IB scale were .969 in the managers' subset and .973 in the non-managers' subset.

(d) Firm performance

Improved organizational results, usually in terms of growth and profitability, are thought to be a result of entrepreneurship in established organizations (Covin & Slevin, 1991). To assess firms' performance we will use subjective measures, because these types of measures can be consistent with objective measures, thus enhancing reliability and validity (Venkatraman & Ramanujam, 1987), and executives are more willing to provide firm data this way. In our study, we consider financial, as well as non-financial, measures of performance. The financial measures include sales, sales growth, profit (measured by EBIDTA) and profitability (measured by ROA, ROI and ROE). Regarding non-financial measures, we used employees' absenteeism, turnover and commitment. The executives are asked to assess his or her firm performance over the past three years relative to competitors in a 5-Point Likert-type scale where "1" represents performance way under the industry's average and "5" represents results way above the industry's average. In the case of absenteeism and employee turnover, the items will be reversed scored so that a "5" represents in fact a better result (lower employee turnover and absenteeism than that of the competitors).

(e) Control variables

In this study, we also included four control variables that are believed to have effects on IB:

- Firm sector is controlled because we expect IB to be more relevant in certain industries, such as those where employee-client interactions are more significant. We used NACE codes aggregated at section level, converted to a dummy variable.
- Firm size is controlled because larger firms are usually more likely to have slack resources that can be used in entrepreneurial activities. Size was measured through the number of full-time employees' equivalent, and the natural logarithm transformation was taken.
- Firm age is controlled because older firms usually have a more risk-averse culture. Firm age is calculated by subtracting the year of foundation from 2013, and then natural logarithm transformation was taken.
- The level of internationalization was considered, as internationalized firms are more likely to be involved in innovation activities because of their exposure to more competitive markets. We therefore created a dummy variable to control for different levels of internationalization (firms that only act in the domestic market, are coded "0", firms where international markets account for 50% or less of the total revenue, are coded "1", the rest of the firms, are coded "2").

Chapter 4. Results

In a first phase, data analysis was conducted using multiple hierarchical regression analysis, to explore how internal and external variables explain IB, and four models were estimated. The control variables, firm size, NACE sector, firm age, and the degree of internationalization, were entered into the regression equation first, then the external environment variable (unfavourability of change), then firm resources. Entrepreneurial proclivity was entered last in the regression equation. In all the cases, the different variables were pre-standardized. The results are presented in table II.2.2.

The first model, where control variables were entered, gives an R^2 value of .197 ($F=7.495$; $p<.001$), in which the influence of sector ($\beta = .252$; $p < .01$) and firm age ($\beta = -.258$; $p < .01$) are significant. Thus, employees from firms with higher NACE sector codes (i.e. retail and services) and employees from younger firms show higher intrapreneurial behaviour.

Variables	Standard β			
	Model 1	Model 2	Model 3	Model 4
Constant	-1.006E-013	-1.002E-013	-1.004E-013	-1.001E-013
Controls				
Firm size (ln of nr. of employees)	.022	.057	.009	-.062
NACE sector (dummy)	.252**	.150	.065	.059
Firm age (ln of years)	-.258**	-.265**	-.226**	-.162*
Degree of internationalization (dummy)	-.165	-.229**	-.196*	-.181*
External input variable				
Unfavourability of change		.269**	.146	.168*
Internal input factors (resource adequacy)				
Employees' profile			.173	.207*
Organizational climate			.372***	.246**
Market information			-.023	-.035
Material resources			.155	.156
Technology			-.108	-.086
Financial resources			.092	.075
Firm's marketplace image			.040	.022
Nr. of employees			-.068	-.054
Entrepreneurial proclivity				.272**
R^2	.197	.258	.503	.553
ΔR^2	.197	.061	.245	.050
R^2 adjusted	.171	.228	.446	.497
F	7.495***	8.427***	8.811***	9.905***

Table II.2.2 Results of multiple regression analysis ($N=127$. * $p < .05$; ** $p < .01$; and *** $p < .001$)

The second model incorporates the environmental variable, unfavourability of change, according to H1a. This second model gives a R^2 value of .258 ($F=8.427$; $p<.001$) and $\Delta R^2 = .061$. In

this model, unfavourability of environmental change is significant ($\beta = .269$; $p < .01$). Therefore, H1a is supported in what concerns the unfavourability of change component of environmental hostility. Employees from firms that operate in environments where change is more unfavourable reveal higher levels of intrapreneurial behaviour.

The third model incorporates firm resources, according to H1b. The third model has a R^2 value of .503 ($F=8.811$; $p<.001$) and $\Delta R^2 = .245$. Models 3 give partial support for H1b. IB is dependent on an adequate organizational climate ($\beta = .372$ $p < .001$), so H1b5 is supported. However, the rest of the variables do not demonstrate a significant influence on IB. Therefore, H1b1, H1b2, H1b3, H1b4, H1b6, H1b7 and H1b8 are not supported.

Finally, the fourth model includes entrepreneurial proclivity. This model has a R^2 value of .553 ($F=9.905$; $p<.001$) and $\Delta R^2 = .050$. The significance of entrepreneurial proclivity ($\beta = .272$; $p < .01$) gives support for H2. Employees from firms with higher entrepreneurial proclivity will show higher intrapreneurial behaviour. The R^2 value of 55% is very significant considering our sample size and number of independent variables (Cohen & Cohen, 1983). In other words, context matters and top managers should be concerned with providing adequate conditions if they wish to instigate IB. The rest of variance in IB is probably explained by personal characteristics and the natural randomness associated with human behaviour.

In a second phase, after establishing which variables contribute to explaining intrapreneurial behaviour, we studied the relation between intrapreneurial behaviour and several firm performance measures, both financial and non-financial, according to H3, H4 and H5. The results are presented in Table II.2.3.

H3 is supported, as IB is positively associated to firm financial performance, measured by ROA (.179; $p < .05$), ROE (.256; $p < .01$) and ROI (.207; $p < .05$), although the correlations are weak. However, if we consider IB from employees in managerial position separately of IB from employees in non-managerial positions, we find that IB from non-managers is also correlated with revenue (.244; $p < .01$) and revenue growth (.248; $p < .01$), and correlations with ROA (0.229; $p < 0.05$), ROE (0.320; $p < 0.001$) and ROI (0.242; $p < 0.01$) are stronger. Firms with higher IB have higher profitability. Firms with higher intrapreneurial behaviour from operational employees have higher profitability but also higher revenue, than firms with lower IB from non-managers have. These results might be explained by a critical mass effect. The number of non-managers employees is larger than the number of managers,

so when IB from operational employees is widespread across the organization, that effect on firm's performance is higher.

	Intrapreneurial behaviour	IB from Managers	IB from non- managers
Non-financial performance			
Absenteeism (recoded)	.159	.100	.179*
Employee turnover (recoded)	.081	-.009	.153
Commitment	.426***	.317***	.458***
Financial performance			
Revenue	.161	.055	.244**
Revenue growth	.174	.073	.248**
EBIDTA	.084	.031	.119
Return on Assets (ROA)	.179*	.097	.229*
Return on Equity (ROE)	.256**	.155	.320***
Return on Investment (ROI)	.207*	.134	.242**

Table II.2.3. Correlations between IB and output variables (*N* = 127. **p* < .05; *p* < .01; and ****p* < .001)**

Regarding the association of IB and non-financial performance, H4 is not confirmed. However, if we consider only IB from non-managerial employees then the correlation with absenteeism becomes significant. In firms where employees in non-managerial positions are more intrapreneurial, results with absenteeism are better, i.e. absenteeism is lower. As the correlations between IB and employee turnover and between IB and absenteeism are not significant, H4a and H4b were not tested.

Firms with high levels of IB show high levels of employee commitment, thus supporting H5. To test for the possibility that the correlation between IB and commitment is different under low EP (a control system) vs. high EP (commitment system), according to H5a and H5b, we recalculated the correlation selecting first the 1/3 of firms with lower EP, and then the 1/3 of firms with higher EP. Results are presented in Table II.2.4. Hypotheses 5a and 5b were confirmed. In firms with higher levels of EP, the association between IB and commitment is significant (.311; *p* < 0.05). In firms with lower levels of EP, more IB is not significantly associated to higher employee commitment (.253; *p* >= .05).

	IB in firms with lower levels of EP (n = 41)	IB in firms with higher levels of EP (n = 41)
Commitment	.253	.311*

Table II.2.4 Correlations between IB and commitment, for different EP levels (p* < .05; ***p* < .01; and ****p* < .001).**

Again results confirm the relevance of internal organizational conditions, this time showing how higher levels of IB is significantly associated with commitment only when the internal environment is receptive to the intrapreneurs' efforts.

Chapter 5. Discussion and conclusions

In this study, we predicted that intrapreneurial behaviour is dependent on external and internal inputs factors, and that it has consequences on firm performance - financial and non-financial. Results provide strong support for those predictions. As suggested by other authors (e.g. Zahra, 1991; Zahra, 1993; Zahra & Covin, 1995; Zahra & Garvis, 2000) the level entrepreneurship within a firm is dependent on external variables. In this study, we demonstrated how intrapreneurial behaviour is similarly dependent on how unfavourable change in the environment is. This has important implications as it stresses the relevance of information and internal communication, so that employees have an understanding of how the firm's environment poses threats and opportunities. This is consistent with Zahra (1991) that indicates the importance of environmental scanning and the quality and amount of formal communication to corporate entrepreneurship.

We also demonstrated that the relevance of organizational climate in explaining IB. Other researchers in the entrepreneurship field have addressed the relevance of organizational culture (e.g. Morris, Avila, & Allen, 1993; Chung & Gibbons, 1997; Kemelgor, 2002). Organizational climate is a manifestation of culture. Organizational climate is a perception of the organizational environment through the eyes of the individuals working there (Denison, 1996). Therefore, our results suggest the importance of social norms and firm's policies and procedures as they influence the shared perception of how to behave in a particular environment (Zohar & Luria, 2005). Other organizational inputs, such as the adequacy of financial resources and of the number of employees, are not significantly relevant to explain intrapreneurial behaviour. Slack resources are not relevant for intrapreneurial behaviour, as it may be for other forms of corporate entrepreneurship. In the case of financial resources, this is consistent with Kuratko *et al.* (2009).

We also confirmed that intrapreneurial behaviour is associated with firm's financial performance, especially profitability. The hypothesized relations to employee turnover and absenteeism were not confirmed. However, results show that intrapreneurial behaviour is correlated with employee commitment. This correlation is only significant in firms with higher levels of entrepreneurial proclivity. These firms probably operate under human resources commitment systems, while firms with lower entrepreneurial proclivity might be operating in a control system, or drifting between the two. Control

system firms do not expect employees to show discretionary behaviour, such as intrapreneurial behaviour. Therefore, if employees do reveal that type of behaviour, it will not be welcomed, and employees might become frustrated and less committed to the firm. This is consistent with Burgelman's (1983) paradox.

The use of self-reported measures from only one individual in each firm might be considered a limitation of this study. We assumed that asking for objective financial performance data in our questionnaire would limit the response rate with the resulting statistical limitations this would bring. Nevertheless, the use of self-reported and perceived measures is a usual method in this field of research (Miller, 1983; Zahra, 1991). Sample size might also be considered a limitation of this study. This limitation is also an opportunity for future research with the objective of replicating results in a larger sample. The cross-sectional approach adopted in this research does not allow to fully understand the effects intrapreneurial behaviour and innovation on firm performance over time, which would only be possible through the adoption of a longitudinal design. Anyway, because we used subjective measures of performance, where top executives were asked to consider the firms last three-year period, the effects over time were incorporated in their opinions, which would not have happened if we have used objective measures of performance.

Our results suggest some managerial implications. Managers that wish to stimulate intrapreneurial behaviour should be concerned with the following aspects:

- (1) Environmental scanning and communication (how well are employees informed about environmental opportunities and threats?),
- (2) Organizational norms, systems and procedures (in what degree do these instigate a common perception - or climate, that extra-role behaviour and discretionary opportunity exploration from employees is welcome or not?),
- (3) Strategic orientation towards entrepreneurship (does it transpire from top managers' posture?).

The results indicate the relevance of internal factors, such as organizational climate and entrepreneurial proclivity. Further research should be developed to study how different configurations of intern factors are associated with intrapreneurial behaviour, innovation and firm performance.

Article 3. Entrepreneurial proclivity, intrapreneurial behaviour, and innovation: how different for services' firms?

Abstract

Research in the strategic entrepreneurship field has established the importance of corporate entrepreneurship as a firm's strategic choice. Corporate entrepreneurship may assume the form of a generalized intrapreneurial behaviour across the organization, which happens when employees go beyond their job descriptions, providing valuable help to innovate some aspect of their firms. However, previous research has failed to establish the association between the firm's strategic orientation towards entrepreneurship (entrepreneurial proclivity) and intrapreneurial behaviour from operational levels, as well as the association between intrapreneurial behaviour and innovation. Moreover, intrapreneurial behaviour might be particularly relevant for services' firms because of the employee-client interactions. Research so far has focused on high-tech manufacturing firms. In this study, our main goal is to fill-in these gaps in strategic entrepreneurship literature. Data from 127 firms confirm that entrepreneurial proclivity is associated to intrapreneurial behaviour, that this is positively associated with innovation, and that this association is stronger in services firms. This study also makes suggestions for future research and draws some possible implications for managerial practice.

Keywords: corporate entrepreneurship, entrepreneurial proclivity; innovation, intrapreneurial behaviour, services

Chapter 1. Introduction

Previous research has been mostly concerned with studying corporate entrepreneurship at the macro level, i.e. studying the importance of being an entrepreneurial organization, by establishing the relation with firm performance, and the clarification of the contingencial effects of external or internal factors, even though not always with similar results.

Assuming that corporate entrepreneurship is relevant for the firm performance, under certain environmental circumstances, now the opportunity lies in studying corporate entrepreneurship at a meso-level, i.e. the process itself. In the literature, there are two possible approaches to the corporate entrepreneurship process – the input and the output perspectives. All too frequently, researchers have

used a mixed approach whereby outputs and inputs are interchangeably used to describe the corporate entrepreneurship process, which in our view it is not the best way to clarify different perspectives on the construct. The input perspective concerns the organizational ingredients for corporate entrepreneurship to emerge, which is usually referred to in the literature as entrepreneurial orientation (Lumpkin & Dess, 1996). The output perspective concerns the immediate outcomes of the process, namely innovation. We argue that both perspectives are necessary, and that between the entrepreneurial orientation of a firm and the outcomes of CE, are the individual behaviours and actions through which the CE process develops. Although fewer researchers have been concerned with this meso-level of analysis, the recognition of the importance of individual behaviour for the corporate entrepreneurship process emerges from seminal works in the field (e.g. Burgelman, 1983; Pinchot, 1985).

Burgelman (1983) suggests that innovation in organizations is the result of two distinct behavioural processes. The first of these is what the author calls induced strategic behaviour, which is an outcome of strategy, while the second process is called autonomous strategic behaviour. While induced strategic behaviour is seen as the official path for innovation, Burgelman (1983) proposes that as long as operational-level participants see opportunities that exceed those proffered by top management, autonomous strategic behaviour will occur. Pinchot (1985) focuses on the individual characteristics of the entrepreneurial employee or intrapreneur. An intrapreneur is someone who possesses entrepreneurial skills and uses them within a company instead of using them to launch a new business (Pinchot, 1985). Later, Pinchot describes intrapreneurs as 'dreamers who do' (1987).

Employees in a firm are very often a large source of innovation, which could strategically be utilized by firms. This behaviour may be particularly relevant for services' firms because of the strategic importance of employee-client interactions. When considering innovation, managers may see the advantage to involve employees because they know the organization, the operational processes, and they know the customers. Most services firms therefore depend on their employees' behaviours and willingness to initiate or participate in activities that extend the firm in new directions. However, most research developed so far is mostly concerned with high-tech manufacturing firms and with more structured ways of corporate entrepreneurship, such as corporate venturing, rather than on employees' entrepreneurial behaviour.

Our objectives are to study how the entrepreneurial orientation or proclivity of the firm is associated with intrapreneurial behaviour, how intrapreneurial behaviour is associated with a firm's innovation outcomes, and how these are different in services' firms versus non-services' firms.

In chapter 2, we describe the theoretical background of our study and develop the hypotheses to be tested. In chapter 3, we describe the method through which we conducted our empirical study, and its results are presented in chapter 4. In the last chapter, we discuss the results, explain the main limitations of the study, point out some future research possibilities, and draw some managerial implications.

Chapter 2. Theory and hypotheses

Our approach to this study is based upon specific theoretical pillars. We apply a systems approach to understanding the entrepreneurial process within an organizational context, around the notions of inputs, throughputs, and outputs. This implies understanding how internal conditions are inputs for intrapreneurial behaviour (IB), and how IB produces outcomes, particularly concerning innovation. On the other hand, we place our study under the resource-based approach to strategic management. This justifies the study of the strategic relevance of employees' behaviour. In fact, the resource-based view of the firm, developed by Penrose in 1959 (1995), has been later applied to the field of innovation (Teece & Pisano, 1994).

Section 2.01 Entrepreneurial proclivity as an input for intrapreneurial behaviour

In his seminal work, Miller (1983) examined the entrepreneurial style of top management teams and suggested that an entrepreneurial firm "...engages in product market innovation, undertakes somewhat risky ventures, and is first to come up with 'proactive' innovations, beating competitors to the punch" (Miller, 1983, p. 771). Several researchers have adopted an approach based on Miller's (1983) original conceptualization. It seems there is a consensus around the three underlying dimensions of the organizational predisposition to entrepreneurial management processes: innovativeness, proactiveness and risk-taking (Barringer & Bluedorn, 1999; Caruana, Morris, & Vella, 1998; Covin & Slevin, 1989; Morris, Avila, & Allen, 1993). Therefore, in its original conceptualization, entrepreneurial orientation is demonstrated by the "extent to which top managers are inclined to take business-related risks, to favour change and innovation in order to obtain a competitive advantage for their firm, and to compete aggressively with other firms" (Covin & Slevin, 1989, p. 77). Later developments in the area of entrepreneurial orientation (Lumpkin & Dess, 1996; Dess & Lumpkin, 2005) propose that the enhancement of a firm's entrepreneurial performance depends on five dimensions that work together and permeate the decision-making styles and practices of a firm's members. These scholars add two more dimensions (autonomy and competitive aggressiveness) to Miller's (1983) conceptualization. This

development seems to correspond to the enlargement of the scale to all the organization and not just to management. For instance, according to Lumpkin and Dess (1996, p. 140), autonomy

“...refers to the independent action of an individual or a team in bringing forth an idea or a vision and carrying it through to completion. In general, it means the ability and will to be self-directed in the pursuit of opportunities. In an organizational context, it refers to action taken free of stifling organizational constraints”.

This definition of autonomy illustrates that this dimension does not refer to organizational dispositions but rather to individual behaviour. Therefore, the enlarged construct of entrepreneurial orientation (Lumpkin & Dess, 1996; Dess & Lumpkin, 2005) is not very adequate to use as an input measure for intrapreneurial behaviour (IB), as it is already measuring behaviours. In fact, a recurring question in literature is whether entrepreneurial orientation represents a disposition or a behavioural construct (Covin & Lumpkin, 2011). In our study, we use Matsuno, Mentzer, and Ozsomer's (2002) “entrepreneurial proclivity”, which is more a dispositional construct, to clearly mark a distinction from Dess and Lumpkin's (2005) entrepreneurial orientation construct, which is more behavioural. Entrepreneurial proclivity (EP) is a better construct for our purpose, as it refers to an organization's predisposition to accept entrepreneurial processes, practices, and decision-making, characterized by its preference for innovativeness, risk taking, and proactiveness (Matsuno *et al.*, 2002). From the above, we derive the following hypothesis:

H1: EP is positively associated with IB

Another aspect of our model refers to the output perspective of the entrepreneurial process, namely the immediate outcomes of intrapreneurial behaviour in terms of innovation.

Section 2.02 Innovation as the immediate output of intrapreneurial behaviour

Stopford and Baden-Fuller (1994) propose that the diverse output forms of CE, from regeneration to strategic renewal and industry frame breaking are in fact different stages of the entrepreneurial process that can coexist in a firm. However, individual entrepreneurship within an established firm is more relevant at the first-stage. Therefore, the types of outcomes that are more immediately affected by IB are sustained regeneration and organizational rejuvenation, which corresponds to product innovation and processes/systems innovation, respectively (Covin & Miles, 1999):

H2: IB is positively associated to innovation

We argue that the importance of the firm's entrepreneurial proclivity is twofold, as it is not only necessary to instigate IB but also to determine the success of intrapreneurial projects. Therefore:

H3: The association between IB and innovation is stronger when moderated by EP.

Section 2.03 Services' firms versus non-services' firms

As we proposed earlier, intrapreneurial behaviour might be a particularly relevant concept in services, because these are inherently different from other types of activities. Zeithaml, Parasuraman, and Berry (1985) summarize the characteristics of services as belonging to four categories: intangibility, inseparability of production and consumption, heterogeneity, and perishability. Intangibility means that ownership cannot be transferred and that services cannot be tested in advance. Inseparability means that customers are involved in the process of production, many times in direct interaction with the production employee. Heterogeneity concerns the potential for high variability in the performance of service (every service is different). This means that standardization and quality control are difficult to achieve. Perishability means that services cannot be stored. Some of these characteristics of services imply that employee-customer interactions in services are critical.

Because of those characteristics, mainly inseparability, front line employees are often in a unique position to observe changing customer needs and suggest new approaches for improving the service delivery process (Raub, 2008). These employees are also subject to pressure from customers to improve products and processes. In services, process/organizational innovation, which can increase both quality and productivity, are at least as important as product innovation. Incremental innovations in services' firms might occur without stimulus from top management. Therefore:

H4: The association between EP and innovation is weaker in services' firms than in non-services' firms.

H5: The association between IB and innovation is stronger in services' firms than in non-services' firms.

The basic conceptual model of our study is depicted in Figure II.3.1.

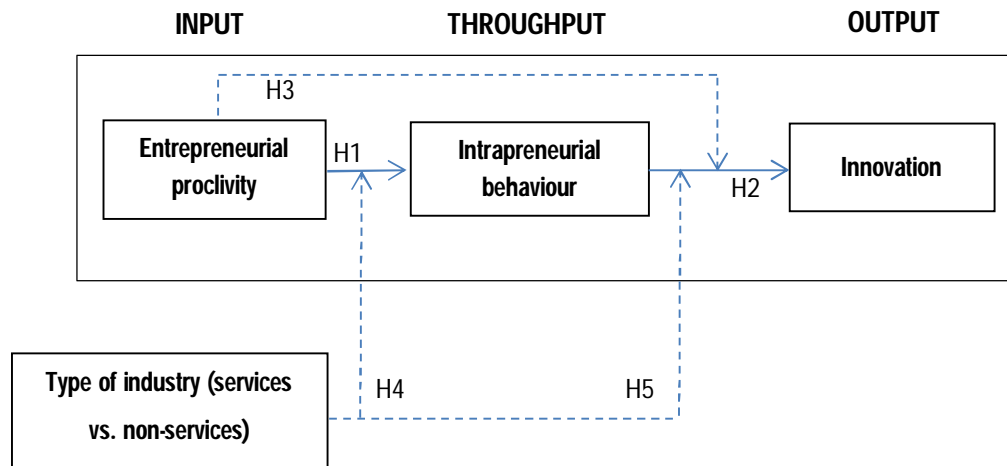


Figure II.3.1 Model of the corporate entrepreneurship process (meso-level)

Chapter 3. Method

Section 3.01 Data

Data was collected through an online survey that was directed to the CEOs or other high-level executives of firms on the 'PME Líder', '1000 Melhores PME' and '1000 Maiores Empresas'²⁵ ranks. A two-wave survey was used to enhance the response rate. The introductory e-mail explained the study's objective and assured executives of the confidentiality of their responses. Responses from 127 firms represented a response rate of 18%. Responding firms averaged 55 (s. d. = 87) full-time equivalent employees, ranging from 10 to 668, and the revenue mode is in the range of 500.000 to 2.000.000 Euros, with 50% of the firms with revenues from 150.001 to 5.000.000 Euros. This means the sample is heterogeneous regarding factors such as the number of employees and revenues, as it is regarding the sector (11 NACE²⁶ sections are represented). Variation in the sample has the potential to increase generalizability of the findings.

The survey targeted the firms' CEOs or other senior executives because of their likely familiarity with company-wide strategic actions, especially corporate entrepreneurship efforts and overall performance. Analysis of the titles of respondents showed that 47 % were the top executive of the firm or the owner, 9% were CFO, 9% were CMO, 6% were HRM, and the remaining were other executives.

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²⁶ NACE = Nomenclature Generale des Activites Economiques dans l' Union Europeenne (General Name for Economic Activities in the European Union).

Section 3.02 Measures

(a) Entrepreneurial proclivity

We used Matsuno *et al.* (2002) entrepreneurial proclivity scale, which measures the following dimensions: innovativeness, risk-taking and proactiveness. Executives rated their firm's entrepreneurial proclivity using a 5-Point Likert-type scale where "1" corresponds to low EP and "5" represents high EP. We subjected the scale to factor analysis, using varimax rotation, and it revealed that in the case of our sample, innovativeness and proactiveness are not distinct factors. Because of that, we considered only two factors, innovativeness+proactiveness and risk-taking. The measurement items at the lower level were aggregated by summing the scale to have two indicators. Each of the two dimensions is distinct, but they collectively constitute the higher-order EP construct. Table II.3.1 lists the measurement items and summarizes the factor analysis results and internal consistency of the EP scale.

(b) Intrapreneurial behaviour

Scales to measure intrapreneurial behaviour are not frequent in the literature. Most measures related to CE, measure organizational attributes and/or outcomes. De Jong, Parker, Wennekers, & Wu (2011) propose a scale to measure employee entrepreneurial behaviour but this scale puts more emphasis on entrepreneurial actions than on behaviour itself. Our interest is not on the activities intrapreneurs develop, but rather on behaviours, as these indicate in which manner the various activities are carried out. This distinction is relevant if we assume that within an organizational context the contribution of an employee to innovation might be significant even if he or she does not perform all the necessary entrepreneurial actions.

We propose to use an adapted version of Pearce II, Kramer, and Robbins (1997) entrepreneurial behaviour scale. The scale proposed by these authors is used to assess a particular individual's entrepreneurial behaviour and is focused on behaviours that illustrate how intrapreneurs interact with others within the organization. We adapted this scale to reflect the degree in which each of the behaviours applies to the totality of the workforce over the preceding 3-year period as perceived by the executive. Respondents are asked to make a choice on a Likert-type 5-point scale. A firm's score was calculated as the average between the sum of the items for employees in managerial positions and the sum of the items for employees in non-managerial positions.

Constructs	Measurement items	Factor1 loadings	Factor 2 loadings	Cronbach's alphas
Entrepreneurial proclivity (EP)				.830
	Innovativeness + Proactiveness			.740
	When it comes to problem solving, we value creative new solutions more than the solutions of conventional wisdom.	.817		
	Top managers here encourage the development of innovative marketing strategies, knowing well that some will fail.	.715	.240	
	We firmly believe that a change in market creates a positive opportunity for us.	.719		
	Members of this firm tend to talk more about opportunities rather than problems.	.747		
	Risk-taking			.724
	We value the orderly and risk-reducing management process much more highly than leadership initiatives for change (reverse-coded).		.703	
	Top managers in this firm like to "play it safe" (reverse-coded).		.861	
	Top managers around here like to implement plans only if they are very certain that they will work (reverse coded).		.834	
Variance explained		33.3%	28.1%	

Table II.3.1 Measurement scale for entrepreneurial proclivity and factor loadings

However, Pearce *et al.*'s scale (1997) was not constructed with operational level employees in mind. Therefore, to confirm the validity of the scale for non-managerial level employees we subjected the scale to factor analysis considering only one subset of employees, managerial and non-managerial positions, at a time (see Table II.3.2). The Cronbach's alphas are .969 for the managerial position subset, and .973 for the non-managerial position subset.

(c) Innovation

To measure innovation, we used an adapted version of Zahra, Neubaum, and Huse's (2000) corporate entrepreneurship scale. Using a 5-point scale, respondents rated their companies' emphasis over the previous three years, on 10 items. The scale was factor-analysed using varimax rotation. In Zahra *et al.*'s (2000) scale, process and organizational innovation are separate factors. In our sample, however, these dimensions are aggregated in only two factors that we called product and process/organizational innovation.

Construct	Measurement items	Factor loadings	
		Managers subset	Non managers subset
Intrapreneurial behaviour (IB)			
	Our employees are able to describe vividly how things could be in the future and what is needed to get the firm there.	.878	.845
	Our employees encourage their colleagues to take the initiative for their own ideas.	.917	.910
	Our employees inspire their colleagues to think about their work in new and stimulating ways.	.864	.933
	Our employees create an environment where people get excited about making improvements.	.861	.915
	Our employees get people to rally together to meet a challenge.	.886	.907
	Our employees boldly move ahead with a promising new approach when others might be more cautious.	.913	.912
	Our employees display an enthusiasm for acquiring skills.	.897	.871
	Our employees “go to bat” for the good ideas of their colleagues.	.781	.891
	Our employees devote time to helping other colleagues find ways to improve our products and services.	.735	.837
	Our employees quickly change course of action when results are not being achieved.	.653	.877
	Our employees efficiently get proposed actions through “bureaucratic red tape” and into practice.	.712	.865
Variance explained		76.39%	78.86%

Table II.3.2 Measurement scale for intrapreneurial behaviour and factor loadings

We also observed that the item “Investing heavily in cutting edge R&D”, that in Zahra et al.’s (2000) scale is a dimension of product innovation, in our sample belongs to the same factor as the items of process/organizational innovation. Table II.3.3 shows the unidimensionality and reliability of the innovation scales.

(d) Control variables

Four control variables were included that are believed to have effects on a firm’s EP as well as on IB:

- Firm sector is controlled because we expect IB to be more relevant in certain industries, such as those where employee-client interactions are more significant. We used NACE codes aggregated at section level and converted to a dummy variable. When testing for differences between services’ and non-services’ firms, we considered services’ firms those from the NACE sections H or up. In our sample, this corresponds to the following industries: I - Accommodation and food service activities; J - Information and communication; M - Professional, scientific and technical activities; N - Administrative and support service activities; P – Education; R - Arts, entertainment and recreation.

Constructs	Measurement items	Factor 1 loadings	Factor 2 loadings	Cronbach's alphas
Innovation				0.796
	Process/organizational innovation			0.889
	Being the first in the industry to develop innovative management systems	0.795	0.257	
	Introducing innovative human resource programs to spur creativity and innovation	0.794		
	Being the first in the industry to introduce new business concepts and practices	0.768	0.282	
	Changing the organizational structure in significant ways to promote innovation	0.732	0.265	
	Investing heavily in cutting edge R&D	0.709	0.386	
	Being the first company in the industry to develop and introduce radically new technologies	0.653	0.490	
	Product innovation			0.854
	Creating radically new products for sale in the company's existing markets	0.262	0.853	
	Creating radically new products for sale in new markets	0.281	0.821	
	Commercializing new products		0.753	
	Being the first company in your industry in introduce new products to the market	0.497	0.657	
Variance explained		56.43%	11.25%	

Table II.3.3 Measurement scale for innovation and factor loadings

- Firm size is controlled because larger firms are usually more likely to have slack resources that can be used in CE activities. Size was measured through the number of full-time employees' equivalent, and the natural logarithm transformation was taken.
- Firm age is controlled because older firms usually have a more risk-averse culture. Firm age is calculated by subtracting the year of foundation from 2013, and then natural logarithm transformation was taken.
- The level of internationalization was considered, as internationalized firms are more likely to be involved in innovation activities because of their exposure to more competitive markets. We therefore created a dummy variable to control for different levels of internationalization. Firms that only act in the domestic market are coded "0", firms were international markets account for 50% or less of the total revenue, are coded "1", the rest of the firms, are coded "2".

Chapter 4. Results

Pearson correlation was used to study the association between EP and IB. A positive moderate correlation was found (.458; $p < .001$), giving support for H1. Hierarchical multiple regression was used to study how entrepreneurial proclivity and intrapreneurial behaviour explain innovation. Four models were estimated. The control variables, firm size, sector, firm age, and the degree of internationalization, were entered into the regression equation first, then entrepreneurial proclivity and intrapreneurial behaviour. The interaction between entrepreneurial proclivity and intrapreneurial behaviour was entered last in the regression equation. In all the cases, the different variables were pre-standardized. The results are presented in table II.3.4.

Variables	Standard β			
	Model 1	Model 2	Model 3	Model 4
Constant	1.011E-013	-1.008E-013	-1.010E-013	-.017
Controls				
NACE sector (dummy)	.285**	.149	.165*	.154*
Firm size (ln of nr. of employees)	.195*	.183*	.114	.115
Firm age (ln of years)	-.183*	-.044	-.007	-.004
Degree of internationalization (dummy)	.155	.244**	.234**	.234**
Intrapreneurial behaviour		.541***	.429***	.439***
Entrepreneurial proclivity			.241**	.243**
Intrapreneurial behaviour x Entrepreneurial proclivity				.039
R^2	.162	.397	.439	.440
ΔR^2	.162	.235	.042	.001
R^2 adjusted	.135	.372	.411	.407
F	5.911***	15.939***	15.628***	13.358***

Table II.3.4 Results of multiple regression analysis ($N=127$. * $p < 0.05$; ** $p < 0.01$; and *** $p < 0.001$)

The first model has a R^2 value of .162 ($F=5.911$; $p<.001$), in which the influence of firm sector ($\beta = .285$; $p < .01$), firm size ($\beta = .195$; $p < .05$), and firm age ($\beta = -.183$; $p < .05$) are significant. Firms with higher NACE codes (retail and services) reveal higher entrepreneurial outcomes (in terms of process/organization and product innovation), as do larger and younger firms.

In the second model, we entered intrapreneurial behaviour. The model has a R^2 value of .397 ($F=15.939$; $p<.001$) and $\Delta R^2 = .235$, and gives support for H2. Intrapreneurial behaviour has a significant positive effect on innovation ($\beta = .541$; $p < .001$). Firms, where employees show higher levels of intrapreneurial behaviour, have higher levels of innovation.

In model 3, entrepreneurial proclivity was entered. Model 3 has a R^2 value of .439 ($F=15.628$; $p<.001$) and $\Delta R^2 = .042$, and reveals the significant positive effect of a firm's entrepreneurial proclivity on innovation ($\beta = .241$; $p < .01$). However, model 4 (R^2 value of .440; $F=13.358$; $p<.001$) showed no significant moderating effect of entrepreneurial proclivity in the association between intrapreneurial behaviour and innovation, thus not supporting H3.

Finally, we studied how the effects of entrepreneurial proclivity and intrapreneurial behaviour on innovation, are different between services firms and non-services firms, according to H4 and H5. In Table II.3.5, we can observe the correlations between the variables in each case.

	Innovation		Process/Organizational innovation		Product innovation	
	Services	Non-services	Services	Non-services	Services	Non-services
Entrepreneurial proclivity	.349	.505***	.411*	.442***	.220	.483***
Intrapreneurial behaviour	.559**	.464**	.594**	.432***	.431*	.409***

Table II.3.5. Pearson correlations – services' vs. non-services' firms ($N= 126$. * $p < .05$; ** $p < .01$; and * $p < .001$)**

Hypothesis 4 and 5 are confirmed. In fact, in services' firms, the correlations between EP and innovation variables are only significant for process/organizational innovation (.411; $p < .05$) and in this case, it is weaker than in non-services' firms. On the other hand, that correlation is significant for both types of innovation in non-services' firms. Results also show differences between these types of sectors, when considering the relation between IB and innovation. As expected, the correlation between IB and all types of innovation is higher in services' firms' than in non-services' firms'.

Chapter 5. Discussion and conclusions

The results of our study confirmed that entrepreneurial proclivity and intrapreneurial behaviour are associated. This suggests that when employees' perceive that there is a predisposition of top management towards innovativeness, risk taking, and proactiveness, they will behave more intrapreneurially. The importance of entrepreneurial proclivity has been discussed in several previous studies in the field (Miller, 1983; Covin & Slevin, 1991; Lumpkin & Dess, 1996; Matsuno *et al.*, 2002). However, our results indicate that the importance of entrepreneurial proclivity is more relevant in non-services' firms than in services. In services' firms, entrepreneurial proclivity is only associated with process/organizational innovation. This may be justified by the pressure services' employees suffer from customers, i.e. they might be impelled to innovate even if, or because, they perceive top management as not being very entrepreneurial. We also did not find support for a moderating effect of

entrepreneurial proclivity in the relation between intrapreneurial behaviour and innovation. It might be the case that entrepreneurial proclivity being important to instigate intrapreneurial behaviour is not a sufficient when it comes to implementing intrapreneurs innovative ideas. Other organizational variables may be more important in that stage (e.g. middle-managers role). This has managerial implications, as firms should be concerned with identifying which organizational factors are promoting, and which are creating obstacles to innovation.

In this study, we also demonstrated how innovation seems to depend on intrapreneurial behaviour. This is consistent with Kuratko *et al.* (2005). Our results show differences between services' and non-services firms', concerning the relation between intrapreneurial behaviour and innovation, as expected. Services' firms show stronger association between those variables. Our results also reveal that the relation between intrapreneurial behaviour and innovation is stronger in services' firms, than in other types of firms, which is consistent with Sundbo (1996). This has implications for services firms' managers, because firms that create the necessary environment towards intrapreneurial behaviour and that have employees intrinsically motivated to innovate, should expect higher levels of innovation. Innovation in non-services' firms might be more dependent on formal innovation activities, due to technologic reasons or the amount of investment needed. Most services' firms are operating under low technological levels, and low-tech firms are not so dependent on radically new products based on scientific results in the same way as high- tech firms (Sundbo, 1996).

The use of self-reported measures from only one individual in each firm might be considered a limitation of this study. Nevertheless, the use of self-reported and perceived measures is a usual method in this field of research (Miller, 1983; Zahra, 1991). Sample size might also be considered a limitation of this study, in spite of the variability of the sample. However, this limitation is also an opportunity for future research. Further research should also study how different configurations of internal factors influence the relation between intrapreneurial behaviour and innovation.

Article 4. A metaphor of firms as biomes of intrapreneurial behaviour

Abstract

In this article, we argue that intrapreneurial behaviour is explained by both contextual factors and personal dimensions. Results also confirmed the existence of four types of firm that we, borrowing from Biology, characterized as different biomes of “intrapreneurial life”. High levels of entrepreneurial proclivity and moderate to high levels of intrapreneurial behaviour characterize tropical rainforest firms. Low levels of entrepreneurial proclivity and moderate levels of intrapreneurial behaviour characterize chaparral firms. Tundra firms are characterized by low levels of entrepreneurial proclivity and low levels of intrapreneurial behaviour. A fourth type of firm was identified as an ecotone, a transition state for small, younger firms. The levels of innovation outcomes vary across biomes.

Keywords: corporate entrepreneurship, intrapreneurial behaviour, strategic management, organizational behaviour

Chapter 1. Introduction

Intrapreneurial behaviour is one of the ways through which a firm can develop a corporate entrepreneurship strategy. Like any behaviour within an organizational context, intrapreneurial behaviour is dependent on both organizational factors and personal dimensions. Several researchers in the entrepreneurship field have addressed issues related to organizational factors such as structure or organizational culture, and other aspects that influence intrapreneurial behaviour (e.g. Hornsby, Kuratko, & Zahra, 2002; Hornsby & Kuratko, 2003; Kuratko, Ireland, Covin, & Hornsby, 2005; Hornsby, Kuratko, Shepherd, & Bott, 2009).

The major activities of intrapreneurs include identifying opportunities, generating ideas, designing new products or new combination of resources, building internal coalitions, persuading the management, acquiring resources, planning and organizing (De Jong & Wennekers, 2008). These are activities similar to those of an independent entrepreneur. However, an entrepreneurial individual within an established firm might not necessarily perform all those activities and still make a useful contribution

to firm innovation. For instance, if a team of employees together perform those activities, and none of them perform all, would that mean none of them is an intrapreneur? We argue that individual contribution to corporate entrepreneurship is essentially a behavioural phenomenon. Behaviours indicate in which manner the various activities are carried out. De Jong and Wennekers (2008) propose that the key behavioural aspects of intrapreneurship are taking initiative, active information searching, out of the box thinking, voicing, championing, taking charge, finding a way, and some degree of risk taking. These behaviours are usually the concern of researchers from the organizational behaviour (O. B.) field. Therefore, an approach to intrapreneurial behaviour from that perspective should be useful.

For scholars in the field of O.B., behaviour is function of person and environment. In fact, the fundamental orientation of organizational behaviour theory is $B = f(P, E)$ – i.e. Behaviour is a function of both Person and Environment. Similarly, for intrapreneurial behaviour $(IB) = f(\text{Personal dimensions; Organizational factors})$. Therefore, if one wants to understand IB, one must study the immediate environment where people act and behave, as well as their individual characteristics. In a seminal work, Burgelman (1983, p. 1355) already suggested the interaction between individual and organizational factors, towards corporate entrepreneurship: "Corporate entrepreneurship would seem to depend both on the capabilities of operational level participants to exploit entrepreneurial opportunities and on the perception of corporate management that there is a need for entrepreneurship at the particular moment in its development." A behavioural model has two main advantages, measurability and manageability - behaviour is verifiably, and IB is affected by and can be managed through the creation of particular organizational configurations (strategies, structures, systems, and cultures).

The recognition of the need for innovative behaviour from employees as a way for an organization to respond to sudden changes in the environment is not new in the organizational behaviour literature. In 1978, Katz and Kahn characterized spontaneous innovative behaviours as actions that are essential to the organization. "The resources of people for innovation, for spontaneous cooperation, for protective and creative behaviour are (...) vital to organizational survival and effectiveness" (Katz & Kahn, 1978, p. 403-404). Other similar work behaviours, such as initiative and proactiveness are essential to competitive advantage and organizational success (Crant, 2000).

Moreover, there has been a growing interest during the last decades on organizational citizenship behaviour (Organ, 1988) and related constructs such as extra-role behaviour (Van Dyne, Cummings, & McLean Parks, 1995). To Organ (1988, p. 4), organizational citizenship behaviour (OCB) is the "...individual behaviour that is discretionary, not directly or explicitly recognized by the formal reward system, and that in the aggregate promotes the effective functioning of the organization". Extra-

role behaviour is a “behaviour which benefits the organization and/or is intended to benefit the organization, which is discretionary and which goes beyond the existing role expectations” (Van Dyne *et al.*, 1995, p. 218). Extra-role behaviour differs from in-role performance, which is related to a worker’s expected job duties.

Although innovative behaviour, as well as the other referred work behaviours, happens frequently in organizations within the employee’s job description (e.g. R&D departments) this is not our focus. Pinchot (1985) described intrapreneurs as those who may get in trouble because they go beyond formal job descriptions. Our focus is on employees that reveal extra-role behaviours related to innovation, that occur either inside or outside the current strategy. In this last case, it coincides with Burgelman’s (1983) autonomous strategic behaviour. We will onwards refer to intrapreneurs as employees that go beyond their job descriptions, providing valuable help to innovate some aspect of their firms. This is consistent to what Zahra (1991) calls the ‘informal activities’ through which entrepreneurial behaviour might occur.

Previous researchers in the entrepreneurship field have addressed issues such as structure or organizational culture, and other aspects that influence organizational behaviour (e.g. Hornsby *et al.*, 2002; Kuratko *et al.*, 2005; Hornsby *et al.*, 2009). However, most of these studies focus on the effects of these factors on the outcomes of CE, not necessarily on the process itself nor on the behaviour of individuals. Other studies focus on what causes individuals to ‘act intrapreneurially’ but do not relate that to an identifiable strategic orientation towards entrepreneurship. Therefore, there is room for further investigation to provide insight on the complex social processes associated with entrepreneurial activity.

This study seeks to understand how internal conditions instigate different levels of IB, as well as how similarly (un)favourable environments generate somewhat different results depending on the characteristics of the individuals. Using a metaphor derived from Biology, we suggest that it is possible to classify firms according to the type of biome it constitutes regarding intrapreneurial behaviour. In fact, our study uses a deductive approach to reveal different configurations for intrapreneurial behaviour. Whereas an inductive approach focuses on configurations empirical derived from a given context, the deductive approach generates configurations from theory (Ketchen, Thomas, & Snow, 1993). Contrarily to the inductive approach, the deductive approach applies to a variety of industries. For theory advancement, our proposed typology is tested in a sample of firms with diverse characteristics.

In chapter 2, we describe the theoretical background of our study and develop the hypotheses to be tested. In chapter 3, we describe the method through which we conducted our empirical study, and its results are presented in chapter 4. In the last chapter, we discuss the results, explain the main limitations of the study, and point out some future research possibilities.

Chapter 2. Theory and hypotheses

The behavioural approach to corporate entrepreneurship that motivates our study does not intend to be a detour from the strategic entrepreneurship path. Rather, we intend to explore a point of convergence from several streams of research relevant for strategic management, and in particular for human resource strategic management. Our approach to the study of corporate entrepreneurship is based upon specific theoretical pillars. We apply a configurational approach (Mintzberg, 1979; Miller & Friesen, 1984) to organizations – i.e. organizations as coherent clusters of characteristics and behaviours. We study intrapreneurial behaviour with an organizational development perspective (intense competition demands continuous change and adaptability requiring conflict, confrontation and commitment), specifically using a behavioural theory approach thereby focusing on the importance of participative processes, which develop commitment to change.

Some of the most relevant internal conditions for entrepreneurial behaviour, according to the most recent researches in the strategic entrepreneurship field, are:

- entrepreneurial leadership (Gupta, MacMillan, & Surie, 2004)
- organizational support (Hornsby *et al.*, 2009; Kuratko, Covin, & Garrett, 2009; Goodale, Kuratko, Hornsby, & Covin, 2011)
- organizational resources and capabilities (Simsek, Heavey, & Veiga, 2010; Covin & Lumpkin, 2011; Simsek & Heavey, 2011)
- organizational culture (Chung & Gibbons, 1997; Antoncic & Hisrich, 2001; Kemelgor, 2002)
- structure (Naman & Slevin, 1993; Caruana, Morris, & Vella, 1998; Matsuno, Mentzer, & Ozsomer, 2002)
- human resources management practices (Hayton & Kelley, 2006; Simsek, Veiga, & Lubatkin, 2007; Goodale *et al.*, 2011)
- strategic management process (Kemelgor, 2002; Covin & Slevin, 2006; Heavey, Simsek, Roche, & Kelley, 2009)

- business orientation and strategy (Luo, Zuo, & Liu, 2005; Anderson, Covin, & Slevin, 2009; Baker & Sinkula, 2009)

These constructs that emerge from the literature, suggest an approach to manageable internal factors around the notion of a configuration where organizational components (e.g. people, structure, culture, processes) embody the purpose of entrepreneurial action. Considering the large number of variables that previous researchers have studied, which most certainly do not cover all the relevant organizational factors, and considering the contradictory results regarding some of those individual factors, for research design purposes we will need a proxy for the degree of fit of internal conditions towards IB. Therefore, a construct such as entrepreneurial orientation is the most suitable candidate for a proxy measure of internal manageable conditions towards IB. According to Covin and Lumpkin (2011), one would expect to find elements that pertain to the organization, for example organizational culture, associated with the exhibition of an entrepreneurial orientation, although such elements do not define entrepreneurial orientation.

According to Burgelman (1983), paradoxes exist when top managers desire corporate entrepreneurship as a strategic “safety valve” when things are not going so well, and the workforce lacks initiative; or just the opposite, a very resourceful and entrepreneurial workforce that faces the indifference/opposition of top managers, generating “orphan” entrepreneurial projects (Burgelman, 1983). In fact, this is consistent with an organizational behaviour theory approach to corporate entrepreneurship, where the basic assumption is that individual behaviour in an organizational context is determined both by individual dispositions (e.g. motivation, traits) and situational factors (e.g. organizational culture, management support, policies, and so on). At the level of analysis used in this study, we will not measure individual dispositions but our model recognizes its relevance by testing if firms with similar levels of EP might reveal a wide range of IB levels:

H1: There are distinct types of firms, according to the levels of EP and IB.

For communication purposes, we will use a metaphor of biome²⁹, borrowed from Biology, to name each type of firm (see Figure II.4.1).

²⁹ “...a major community of plants and animals with similar life forms and environmental conditions” *in* www.britannica.com.

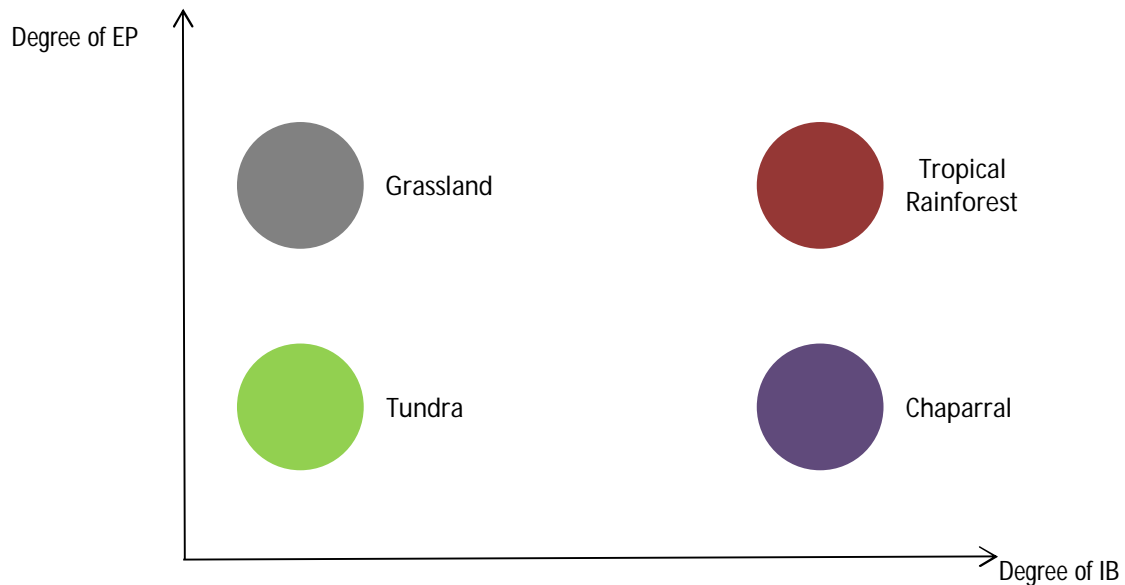


Figure II.4.1 Biomes of intrapreneurial behaviour (proposed)

Tropical rainforest-like type of firm, is one where EP is high and IB is high. As the tropical rainforest biome is rich in diverse animal and vegetal life, this type of firms are rich in intrapreneurial behaviour. This biome is ideal for intrapreneurs to thrive, even if they have diverse characteristics. This type of community exists when employees are exploring opportunities to innovate on a regular basis and, because freedom and support towards entrepreneurship is high, most of those opportunities are implemented, therefore producing high levels of innovation. Therefore:

H2: Tropical rainforest firms have higher levels of innovation than the other types of firms.

Chaparral is a type of firm where EP is low and IB high. In Nature, chaparral biome is characterized as being very hot and dry, so it requires plants and animals adapted to these conditions. In organizations, this type of community exists when employees are voicing opportunities to innovate on a regular basis, but since support is low, only a few are able to fight across organizational barriers to achieve success in implementing his or her project. In this case, there are many "orphan projects" and the risk of employees leaving the company to "try it on their own" or "try it elsewhere" is high (Burgelman, 1983). This means that intrinsic motives are predominant, and that it requires a very specific type of intrapreneur (i.e. individual dispositions become more relevant) to be successful in such an environment. In fact, because extra-role behaviour often is voluntary it depends on intrinsic motivational factors to a greater extent than in-role behaviour (Riketta, 2002). While extrinsically motivated behaviour refers to "the performance of an activity in order to attain some separable outcome" (Ryan & Deci, 2000, p. 71), intrinsically motivated behaviour is undertaken purely for its own sake (i.e. the activity itself is enjoyable). It reflects "the inherent tendency to seek out novelty and

challenges, to extend and exercise one's capacities, to explore, and to learn" (Ryan & Deci, 2000, p. 70). This suggests that innovation in chaparral firms might be more dependent on employees' level of education than in other types of firms. Moreover, unsatisfied highly educated employees will probably have high propensity to leave the firm.

H3: Chaparral firms have higher levels of educated employees, than the other types of firms.

H4: Chaparral firms have higher levels of employee turnover than the other types of firms.

Grassland-like type of firm is one where EP is high but IB is low. In Nature, grassland biome is usually characterized by erratic rains, which also demands animals adapted to the conditions. In organizations, this type of community exists when employees are not intrinsically motivated towards IB. It may be the case that for extrinsic motives (e.g. an idea-generation challenge), they sometimes voice some opportunities to innovate. They are not intrinsically motivated to innovate, however when they do, their probability of success is high because the organizational context is favourable. Managers in these firms will sense that the workforce is not up to the task, "unless it rains".

H5: Grassland firms have employees with inadequate skills/profile considering the firm's needs.

When employees are not voicing innovation opportunities, and organizational factors are not supportive, the levels of innovation will probably be low. We name these firms, tundra-like firms, as intrapreneurs will be rare. In Nature, tundra biome is characterized by low biotic diversity and nutrients come from dead organic material. We do not propose that these firms are necessarily in an immediate difficult market or financial situation. It might be the case these firms face a less hostile environment that does not require them to be innovative.

H6: Tundra firms have the lowest levels of innovation, from all types of firms

H7: Tundra firms face the lowest environmental hostility, from all types of firms

H8: Tundra firms have at least average financial performance, comparatively to the other types

The hypotheses derived were empirical tested in a sample of firms that operate in Portugal. In the following chapter we explain the method used.

Chapter 3. Method

Data was collected through an online survey that was directed to the CEOs or other high-level executives of firms on the 'PME Líder', '1000 Melhores PME' and '1000 Maiores Empresas'³⁰ ranks. A two-wave survey was used to enhance the response rate. The introductory e-mail explained the study's objective and assured executives of the confidentiality of their responses. Responses from 127 firms represented a response rate of 18%. Responding firms averaged 55 (s. d. = 87) full-time equivalent employees, ranging from 10 to 668, and the revenue mode is in the range of 500.000 to 2.000.000 Euros, with 50% of the firms with revenues from 150.001 to 5.000.000 Euros. This means the sample is heterogeneous regarding factors such as the number of employees and revenues, as it is regarding the sector (11 NACE³¹ sections are represented). Variation in the sample has the potential to increase generalizability of the findings.

The survey targeted the firms' CEOs or other senior executives because of their likely familiarity with company-wide strategic actions, especially corporate entrepreneurship efforts and overall performance. Analysis of the titles of respondents showed that 47 % were the top executive of the firm or the owner, 9% were CFO, 9% were CMO, 6% were HRM, and the remaining were other executives.

Section 3.01 Measures

(a) Entrepreneurial proclivity

We used Matsuno *et al.* (2002) entrepreneurial proclivity scale. Entrepreneurial proclivity refers to an organization's predisposition to accept entrepreneurial processes, practices, and decision-making, characterized by its preference for innovativeness, risk taking and proactiveness. Executives rated their firms' entrepreneurial proclivity using a 5-Point Likert-type scale where "1" corresponds to low EP and "5" represents high EP. The Cronbach's alpha for this scale was 0.830.

(b) Intrapreneurial behaviour

We propose to use an adapted version of Pearce II, Kramer, & Robbins's (1997) entrepreneurial behaviour scale. The scale proposed by these authors is used to assess a particular individual's entrepreneurial behaviour and is focused on behaviours that illustrate how intrapreneurs interact with

³⁰ "PME Líder" is a label issued by IAPMEI (Portuguese Agency for SMEs and Innovation) that distinguishes the best SMEs based in Portugal; '1000 Melhores PME' is the rank of the 1000 largest SME's based in Portugal (organized by Exame, a leading Portuguese business magazine); '1000 Maiores' is the rank of the 1000 largest firms based in Portugal (organized by Diário Económico, a leading Portuguese financial newspaper).

³¹ NACE = Nomenclature Generale des Activites Economiques dans l' Union Europeenne (General Name for Economic Activities in the European Union).

others within the organization. We adapted this scale as to reflect the degree in which each of the behaviours apply to the totality of the workforce over the preceding 3-year period as perceived by the executive. Respondents were asked to make a choice on a Likert-type 5-point scale. A firm's score was calculated as the average between the sum of the items for managers and the sum of the items for non-managers. The Cronbach's alphas for this scale were .969 for the subset of employees with managerial positions and 0.973 for the subset of employees in non-managerial positions.

(c) Innovation

To measure innovation, we used an adapted version of Zahra, Neubaum, & Huse's (2000) CE scale. The scale presents 10 items in total: six on process and organizational innovation and four items on product innovation. Using a 5-point scale, respondents rated their companies' emphasis over the previous three years. The Cronbach's alphas are .889 for the process innovation sub-scale, .854 for the product innovation subscale, and .796 for the global scale of innovation.

(d) Firm performance

To assess firms' performance we will use subjective measures, because these types of measures can be consistent with objective measures, thus enhancing reliability and validity (Venkatraman & Ramanujam, 1987), and executives are more willing to provide firm data this way. In our study, we consider financial, as well as non-financial, measures of performance. The financial measures include sales, sales growth, profit (measured by EBIDTA) and profitability (measured by ROA, ROI and ROE). The executives were asked to assess his or her firm performance over the past three years relative to competitors in a 5-Point Likert-type scale where "1" represents performance way under the industry's average and "5" represents results way above the industry's average.

(e) Control variables

We also included four control variables that are believed to have effects on a firm's EP as well as on employees' IB.

- Firm sector is controlled because we expect IB to be more relevant in certain industries, such as those where employee-client interactions are more significant. We used NACE codes aggregated at section level converted to a dummy variable.
- Firm size is controlled because larger firms are usually more likely to have slack resources that can be used in CE activities. Size was measured through the number of full-time employees' equivalent, and the natural logarithm transformation was taken.

- Firm age is controlled because older firms usually have a more risk-averse culture. Firm age is calculated by subtracting the year of foundation from 2013, and then natural logarithm transformation was taken.
- The level of internationalization was considered, as internationalized firms are more likely to be involved in innovation activities because of their exposure to more competitive markets. We therefore created a dummy variable to control for different levels of internationalization (firms that only act in the domestic market are coded '0', firms where international markets account for 50% or less of the total revenue were coded '1', the rest of the firms were coded '2').

Chapter 4. Results

We hypothesized in chapter 2 that different combinations of IB and EP might correspond to different internal environments regarding intrapreneurial behaviour (biomes). To test this hypothesis we conducted cluster analysis considering these two clustering variables: EP and IB. Four different clusters emerged (Cluster 1 with $n=35$; Cluster 2 with $n=21$; Cluster 3 with $n=52$ and Cluster 4 with $n=18$)³².

We then performed a MANOVA analysis to determine which variables from our model are relevant to differentiate the clusters. MANOVA showed that the clusters were multivariate different along the clustering variables. From the results of MANOVA analysis, we conclude that H1 is supported. There are four distinct types of firms according to different combinations of EP and IB. However, the profile of these types is not exactly as theoretical proposed. Data confirmed the existence of tropical rainforest, tundra and chaparral types, but grassland (high EP and low IB) firms were not confirmed, therefore H5 was not tested. However, a fourth type emerged, which has average EP and the highest levels of IB. This cluster of firms, share some characteristics with chaparral firms and others with tropical rainforest firms. Again, borrowing from Biology, this cluster seems to assume the form of an ecotone. An ecotone is a transition area between two biomes. Etymologically, ecotone means a place where ecologies are in tension.

Several variables were found relevant to distinguish between the biomes. The two clustering variables, entrepreneurial proclivity ($\text{sig.} = .000$) and intrapreneurial behaviour ($\text{sig.} = .000$), as well as other variables. These are innovation ($\text{sig.} = .000$), firm size ($\text{sig.} = .015$), firm age ($\text{sig.} = .001$), NACE sector ($\text{sig.} = .001$), unfavourability of environmental change ($\text{sig.} = .014$), employees' profile ($\text{sig.} = .000$), marketplace image ($\text{sig.} = .008$), organizational climate ($\text{sig.} = .000$), employees' commitment

³² One of the firms was excluded for being an outlier.

(sig. = .000), revenue (.002), EBIDTA (sig. = .044), ROE (sig. = .009), ROA (sig. = .001), and ROI (sig. = .000). Table II.4.1 displays the results for the post Hoc Dunnett T3 test.

Section 4.01 Tropical rainforest firms

Firms in this cluster are characterized by moderate to high levels of IB and the highest levels of EP. These are large firms, at least significantly larger than ecotones, considering both the number of employees and revenue. Employees' profile and organizational climate are adequate for the firm's needs. In both cases, these resources are significantly more adequate than in the case of tundra firms. Tropical rainforest firms have profits and profitability (measured by ROI, ROA and ROE) above their industry's average. These types of firms have the best results for ROA and ROI of all types of firms. Employees are considered to reveal good levels of commitment, being significantly higher than in tundra firms. Tropical rainforest firms show the highest levels of innovation (characteristic that is shared with the ecotone firms), thus supporting H2. The levels of innovation in tropical rainforest firms are significantly higher than that of tundra firms. This description is consistent with a human resource commitment system.

Section 4.02 Chaparral firms

Chaparral firms have relatively high IB but the lowest levels of EP. These firms perceived their environment as highly unfavourable, at least significantly different from tundra firms. Employees in chaparral firms have adequate skills considering the firm's needs, and organizational climate is perceived as adequate too. These firms have the lowest levels of ROA and ROI of the four biomes, which are significantly different from those of tropical rainforest firms. These firms are probably strategically drifting between exploitation and exploration, and concerning human resources between a control and a commitment system.

Because employees' level of education and employees turnover, are not found to discriminant variables of the biomes, H3 and H4 were not confirmed.

Variables	Standardized means				Dunnett T3 test ^a
	Trp. Rainforest (R) n = 35	Ecotone (E) n = 21	Tundra (T) n = 52	Chaparral (C) n = 18	
Characterization variables					
NACE sector (dummy)	.23	.265	-.437	.333	R≈E, R>T, R≈C, E≈T, E≈C, T<C
Firm age (ln of nr. of years)	-.159	-.664	.318	.172	R≈E, R≈T, R≈C, E<T,E<C, T≈C
Firm size 1 (ln of nr. of employees)	.304	-.580	.057	-.035	R>E, R≈T, R≈C, E<T, C≈E, T≈C
Firm size 2 (revenue)	.211	-.639	.230	-.318	R>E, R≈T, R≈C, E<T, E≈C, T≈C
Input variables					
Unfavourability of change	-.17	.426	-.229	.400	R≈E, R≈T, R≈C, E≈T, E≈C, T<C
Adequacy of employees' profile	.168	.572	-.412	.227	R≈E, R>T, R≈C, E>T, E≈C, T≈C
Adequacy of marketplace image	.387	.178	-.311	.096	R≈E, R>T, R≈C, E≈T, E≈C, T≈C
Adequacy of organizational climate	.441	.466	-.491	.171	R≈E, R>T, R≈C, E>T, E≈C, T≈C
CE process variables					
Entrepreneurial proclivity	1.182	-0.053	-.519	-.531	R>E, R>T, R>C, E>T, E>C, T≈C
Intrapreneurial behaviour	.489	1.344	-.947	.326	R<E, R>T, R≈C, E>C, E>T, T<C
Innovation	.47	.479	-.537	.094	R≈E, R>T, R≈C, E>T, E≈C, T<C
Performance variables					
Employee commitment	.236	.519	-.44	.134	R≈E, R>T, R≈C, E>T, E≈C, T≈C
EBIDTA (relative to industry's average)	.395	-.31	-.09	-.142	R>E, R≈T, R≈C, E≈T, E≈C, T≈C
ROA (relative to industry's average)	.576	-.235	-.197	-.244	R>E, R>T, R>C, E≈T, E≈C, T≈C
ROI (relative to industry's average)	.604	-.222	-.226	-.230	R>E, R>T, R>C, E≈T, E≈C, T≈C
ROE (relative to industry's average)	.447	-.056	-.288	.055	R≈E, R>T, R≈C, E≈T, E≈C, T≈C

Table II.4.1 Results of post Hoc test (Mean difference significant at .05 level)

Section 4.03 Tundra firms

These are the firms with the lowest levels of EP and IB. These are large firms, especially considering revenue. In that respect, these firms are significantly larger than ecotone firms are. Tundra firms belong mostly to manufacturing sectors, and therefore significantly different from tropical rainforest and chaparral firms. tundra firms have the lowest levels of innovation, from all types. Employees in tundra firms do not have the necessary profile considering the needs of the firm and in this respect are very different from employees of tropical rainforest and ecotone firms. In tundra firms, organizational climate is less adequate than needed by the firm. These firms' executives recognize their firms have an image in the marketplace that is not adequate. This separates these firms clearly from tropical rainforest firms.

The fact that tundra firms show the lowest levels of innovation supports H6. Both low EP and low IB are compromising these firms' ability to innovate. However, this is not necessarily disadvantageous for these firms, as they seem to face a relatively less unfavourable environment than the other types. In fact, results support H7. These firms do not perceive their environment as unfavourable, and for this reason are significantly different from chaparral firms. H8 is partially confirmed, as tundra firms present financial results similar to the other types of firms, except in the case of profitability measures, which are lower but only when comparing to tropical rainforest. However, concerning non-financial performance (measured by employee commitment) tundra firms have the lowest performance across all types, with results significantly lower than that of tropical rainforest and ecotone firms. This is consistent with a human resource control system.

Section 4.04 Ecotone firms

Firms in this cluster are characterized by average levels of EP and the highest levels of IB. These are young firms, significantly younger than tundra or chaparral firms are. Ecotone firms are also small sized firms, considering both the number of employees and revenue, and are therefore significantly smaller than tropical rainforest and tundra firms are. Ecotone firms seems to benefit from a highly skilled workforce and a highly adequate organizational climate, considering the firm's needs, and in this respect are significantly different form tundra firms. Regarding performance, ecotones are the firms with the highest levels of employees' commitment, which we would expect in relatively small and young firms, but also only significantly different from that of tundra firms. As ecotones, they share with tropical rainforest highly adequate organizational climate and the highest levels of innovation. Like chaparral firms, ecotone firms perceive the environment as highly unfavourable and face lower profitability than their industries averages. It seems these are firms in the early stages of its development, using

innovation obtained through high levels of IB as a way to deal with a highly unfavourable environment. They have average profits, only significantly lower than tropical rainforest firms have, but low profitability (ROA, ROI) maybe due to the relatively high level of investment. Some of these firms will become successful, and probably grow into tropical rainforests. Figure II.4.2 illustrates the differences between the types of firms.

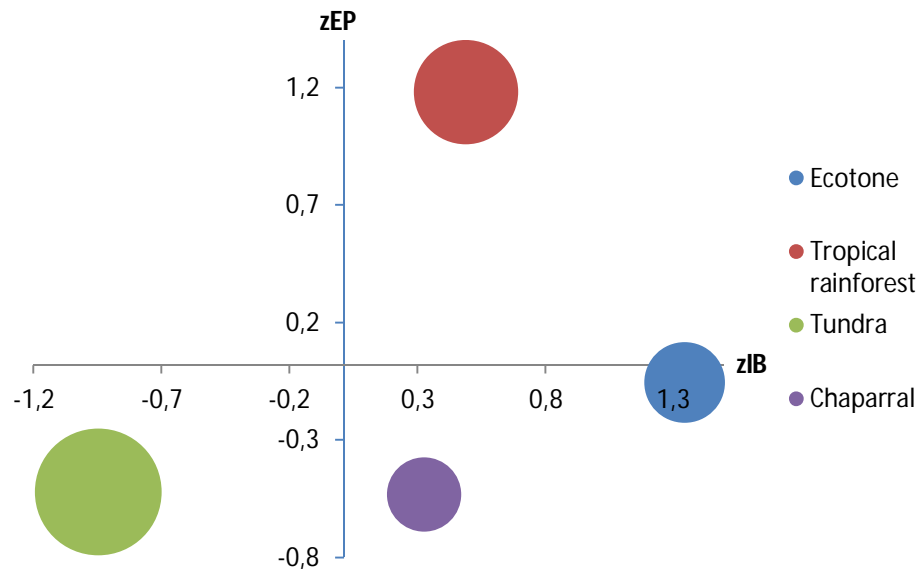


Figure II.4.2 Confirmed biomes of intrapreneurial behaviour (standardized values of EP and IB)

Chapter 5. Discussion and conclusions

Our goal with this study was to understand how internal conditions instigate different levels of intrapreneurial behaviour, as well as how similarly (un)favourable internal environments generate different levels of intrapreneurial behaviour depending on the characteristics of individuals. From an organizational behaviour perspective, we argue that intrapreneurial behaviour, as with every other type of behaviour within an organizational setting, is dependent on both organizational factors and personal dimensions. Moreover, we make a parallel between intrapreneurial behaviour and well-studied behaviours in the organizational behaviour literature, such as organizational citizenship behaviour (Organ, 1988) and extra-role behaviour (Van Dyne *et al.*, 1995). These are behaviours where intrinsic motivation is determinant, therefore supporting the possibility that there might be fluctuations across organizations that are not explained only by the level of incentives and rewards concerning intrapreneurial behaviour. We suggest that different configurations of organizational factors interact with the individual dispositions to create a certain type of environment that is characterized by different levels of intrapreneurial behaviour and therefore different levels of innovation. "Configurations are

reflected by densely occupied regions of the data space, each showing different multivariate relationships" (Miller, 1996, p. 506). Seminal works on the strategic entrepreneurship field (e.g. Burgelman, 1983) have already suggested the interaction between individual and organizational factors. The contribution of our study is that we empirically demonstrate how the circumstances of that interaction can be used to classify a certain firm according to a proposed typology. The recognition of the main characteristics of each type of firm is a first step towards helping practitioners diagnosing their firm's position regarding entrepreneurial proclivity, intrapreneurial behaviour and innovation.

We confirmed the existence of three distinct types of firms, and a fourth transition type, according to the interaction between entrepreneurial proclivity and intrapreneurial behaviour. Using an analogy to Earth's biomes, we characterize each type of firm as a different biome of "intrapreneurial life". High levels of entrepreneurial proclivity and moderate to high levels of intrapreneurial behaviour characterize tropical rainforest firms. These firms have the highest levels of innovation. Tundra firms are characterized by low levels of entrepreneurial proclivity and low levels of intrapreneurial behaviour. Tundra firms have the lowest levels of innovation. Chaparral type of firm (with low EP and moderate to high IB) reveal average levels of innovation. We called the fourth type ecotone, because we argue that these are transition firms. These are small young firms with the highest levels of IB and average levels of EP. In some aspects, these firms are close to chaparral and in others to tropical rainforest biome.

Miller (1996) summarizes three features a typology should possess. Firstly, typologies should be well informed by theory – and thus draw distinctions and relationships of conceptual importance. Our typology was derived from the strategic entrepreneurship and organizational behaviour literatures, and, by demonstrating that different conjugations of entrepreneurial proclivity and intrapreneurial behaviour have different consequences on innovation outcomes, it brings some theoretical insights into the corporate entrepreneurship process. Secondly, a typology should invoke contrasts that facilitate empirical progress (Miller, 1996). Our typology makes a clear contrast between biomes, for instance according to the degree of unfavourability of the external environment, the relevance of employees' knowledge, skills and experience, or organizational climate. Moreover, it draws attention to the relevance of motivation as the fundamental element of convergence between organizational conditions and personal dimensions, essential to explain intrapreneurial behaviour. Thirdly, the variables used to describe each type are shown to cohere in ways that have conceptual, evolutionary or normative implications (Miller, 1996). In fact, our study suggests some normative implications. First, in relatively favourable environments, and with a strategic focus on exploitation, firms might do well without significant levels of innovation (tundra firms). Second, with a strategic focus on both exploitation and

exploration of new opportunities, firms need to innovate constantly, and both entrepreneurial proclivity and intrapreneurial behaviour are critical for that purpose (tropical rainforest firms). Third, some firms may find themselves in a strategic drift, where management is not entrepreneurially responding to a highly unfavourable environment, and some employees reveal intrapreneurial behaviour as an intrinsically motivated “catch up” problem-fixing type of behaviour (chaparral firms). These are the firms, which would benefit the most from moving up in the entrepreneurial proclivity axis.

Our typology has also the advantage of having been empirically tested. However, it has a limitation concerning sample size. Future studies should try to replicate our findings in larger samples for generalization purposes. To further theory, a deeper analysis of the differences between, and within, these biomes is necessary. Future research should take a deeper look into each of these types of firms. This will probably require a multiple case study research design. It might be the case that within each type it is possible to encounter firms with different organizational configurations.

Article 5. Cases of organizational configurations towards intrapreneurial behaviour

Abstract

Previous research has demonstrated that firms can be classified according to the levels of entrepreneurial proclivity and intrapreneurial behaviour. Using a metaphor derived from Biology, these types of firms can be seen as different biomes of “intrapreneurial life”. Three main types of biomes were identified with differences in innovation levels. In this study, we use a multiple case research design to further explore the organizational configurations associated to each biome. Looking at individual cases, allowed us to reveal the themes beneath each configuration, and make some theoretical propositions. Results suggest that strategy is the central dimension in these biomes, and that intrapreneurial behaviour is mostly intrinsically motivated. Organizational culture, leadership and human resources management systems play a major role in the process.

Keywords: entrepreneurial proclivity, intrapreneurial behaviour, organizational behaviour, organizational configuration

Chapter 1. Introduction

Like any behaviour within an organizational context, intrapreneurial behaviour is dependent on both organizational factors and personal dimensions. Some of the most relevant internal conditions for intrapreneurial behaviour, according to the most recent researches in the strategic entrepreneurship field, are elements such as entrepreneurial leadership, organizational support, organizational resources and capabilities, organizational culture, structure, human resources management practices, and strategy. These constructs that emerge from the literature, suggest an approach to manageable internal factors around the notion of a configuration where organizational components (e.g. people, structure, culture, processes) embody the purpose of entrepreneurial action.

Previously, we have demonstrated that firms can be classified according to the interaction between entrepreneurial proclivity and intrapreneurial behaviour. Entrepreneurial proclivity refers to an organization's predisposition to accept entrepreneurial processes, practices, and decision-making, characterized by its preference for innovativeness, risk taking, and proactiveness (Matsuno, Mentzer, & Ozmer, 2002). Intrapreneurial behaviour refers to the extra-role behaviour of employees related to

innovation, that occur either inside or outside the current strategy. High levels of entrepreneurial proclivity and moderate to high levels of intrapreneurial behaviour characterize tropical rainforest biomes. Low levels of entrepreneurial proclivity and moderate levels of intrapreneurial behaviour characterize chaparral biomes. tundra biomes are characterized by low levels of entrepreneurial proclivity and low levels of intrapreneurial behaviour. Our goal in this study is to uncover organizational configurations associated with each biome. This requires a research approach that studies these issues in their natural context (Gummeson, 2003). We used a multiple case study research design because data from individual firms can better reveal the themes beneath each configuration. In addition, case studies facilitate a deeper understanding of soft variables and key relationships (Yin, 1994).

In chapter 2, we describe a framework to study organizational configurations towards intrapreneurial behaviour. In chapter 3, we present the case study research method used. Results for the case studies are described in chapter 4. Chapter 5 is dedicated to the discussion of results. In that chapter, we also draw some theoretical propositions.

Chapter 2. Conceptual framework

A deeper look into each biome is needed to investigate in more detail differences between configurations, and the relation of those differences to intrapreneurial behaviour and innovation. This requires a theoretical framework to study organizational configurations.

Section 2.01 Strategic management and configuration theory

A configuration is a commonly occurring cluster of attributes of organizational strategies, structures, and processes (Miller, 1987; Mintzberg, 1990). Organizational configurations might also be defined as clusters of firms sharing a common profile of organizational characteristics (Miller & Mintzberg, 1984). An approach to organizations as configuration provides useful insights into the sets of organizational factors (Venkatraman, 1989) relevant to performance under certain contexts. In fact, configuration literature has long argued that congruence is critical for the overall effectiveness of a firm (Fry & Smith, 1987). In spite of some criticism surrounding configuration theory, empirical studies have found evidence that fit among organizational characteristics is an important predictor of firm performance (e.g. Ketchen, Thomas, & Snow, 1993; Slater & Olson, 2000).

The configurational approach to organizational analysis has its roots in the work of Miller and Friesen (1984) and Mintzberg (1979, 1983). It builds on certain principles of contingency theory, but it also extends and challenges some of its assumptions. The similarities are (Doty, Glick, & Huber, 1993):

- (1) There is no one best way to organize.
- (2) Different organizational arrangements are valid for different strategic conditions.
- (3) Increased effectiveness is attributed to the internal consistency, or fit, among the patterns of relevant contextual, structural and strategic factors.

Three differences are relevant:

- (1) Configuration theory is concerned with a larger set of organizational elements.
- (2) Configuration theory assumes that the relationships between elements of a configuration are reciprocal rather than unidirectional – for instance, structure influences strategic choices but strategic choices may also influence structure.
- (3) There is more than one way to succeed in each type of setting. This is a central component of configuration theory.

Whichever is the configuration of internal characteristics in a certain firm, it will always have a fundamental influence on the organizational behaviour of individuals and therefore on performance. Understanding individual behaviour is a complex task but, in spite of that complexity, organizational behaviour has to be managed, since an organization's work is done by people, even when technology is a critical tool. That is why scholars from the organizational behaviour literature have been concerned with how configurational congruence, or its misfits, drives individual behaviour. In this study, we will use Nadler and Tushman's (1980) congruence model as a framework to analyse each case study.

Section 2.02 Congruence model

The Congruence Model of Nadler and Tushman (1980), is based upon several assumptions. These assumptions are that (1) organizations are open social systems within a larger environment, (2) organizations are dynamic entities (i.e., change is possible and it occurs), (3) organizational behaviour occurs at the individual, the group, and the systems level, and (4) interactions occur between the individual, group, and systems levels of organizational behaviour.

None of the above assumptions is in conflict with the common understanding in the entrepreneurship literature on how corporate entrepreneurship emerges. In fact, it is very consistent once we note that:

- (1) Environment has been established as relevant variable when studying corporate entrepreneurship (e.g. Zahra, 1993; Zahra & Garvis, 2000).

(2) Firms can become more entrepreneurial (Stopford & Baden-Fuller, 1994).

(3) Corporate entrepreneurship happens at the individual level (e.g. Burgelman, 1983; Pinchot, 1985), team level (e.g. Francis & Sandberg, 2000), and of course in the organization as a whole (e.g. Miller, 1983), the last being the predominantly researched level.

(4) The interaction between the different levels is commonly accepted in the corporate entrepreneurship literature (e.g. Hornsby, Kuratko & Zahra, 2002; Kuratko, Ireland, Covin, & Hornsby, 2005).

Nadler and Tushman's (1980) Congruence Model specifies inputs, throughputs and outputs in an open systems logic (Katz & Kahn, 1978). The inputs are factors such as the environment, resources, history (i.e., patterns of past behaviour) and organizational strategies. Strategy is considered the single most important input to the model. Throughputs are tasks, the individual, formal organizational arrangements and informal organization. The outputs of the model include individual, group and system outputs, these latter being products and services, performance, and effectiveness.

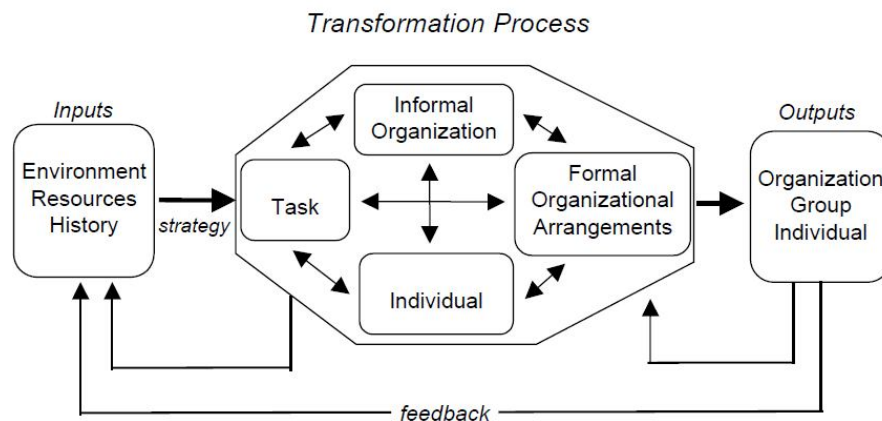


Figure II.5.1 – Components of the Congruence Model (Nadler & Tushman, 1980)

Through analysis of the congruence between the system parts, the whole organization is diagnosed as displaying relatively high or low total system congruence. Congruence or fit can be defined as "the degree to which the needs, demands, goals, objectives, and/or structure of one component are consistent with the needs, demands, goals, objectives, and/or structure of another component" (Nadler & Tushman, 1980, p. 40). The greater the congruence, the higher is the performance of an organization.

Chapter 3. Method

In this study, we used the case-study methodology to explore organizational configurations in each type of biome. From the differences between cases, theoretical insights will emerge regarding the why and how firms should instigate intrapreneurial behaviour. We will use Eisenhardt's (1989) methodology, which is appropriate to case-study research with theory building purposes.

Section 3.01 Research protocol

Cases were not selected randomly as we intended to compare firms that were previously classified according to our typology of firms. Eisenhardt (1989) considers that random selection is neither necessary, nor even preferable. Moreover, due to the principles of configuration theory that we use as a framework in this study, we decided to select cases that can be classified as atypical cases in each biome, thus stressing that different configurations can serve the same purposes and obtain similar results, depending on the circumstances.

Data was collected from multiple data collection methods, combining qualitative and quantitative evidence. The use of secondary data and multiple interviews in each case helps develop rich insights across multiple case studies, and provide the basis for greater transferability of the findings to other contexts (Eisenhardt, 1991). In a first phase, data was collected from a questionnaire to top managers. This allowed to identify to which biome the firm belonged. In a second phase, qualitative data was collected through in-depth interviews with one top executive and the human resource manager. In addition, both quantitative and qualitative data was collect from secondary sources collected in site (i.e. reports and brochures) and from open sources, such business associations and business databases. Triangulation provides stronger substantiation (Eisenhardt, 1989).

The questionnaire was not only concerned with entrepreneurial proclivity and intrapreneurial behaviour in the firm, but also with characterizing variables, such as: NACE sector, specific business activities, revenue, revenue for domestic and foreign markets, estimated growth perspective, equity (value), equity ownership, firm, number of employees and their level of education. The interview guide was constructed according to Nadler and Tushman's (1980) congruence model (available at the appendix). The interview guide used in all interviews, within each case, was the same for comparison purposes. However, the interview protocol was flexible and open to new topics that emerged during the interview. Furthermore, since in the methodology proposed by Eisenhardt (1989) data analysis overlaps data collection, some adjustments were made to the interview guide, even after some interviews had already been made. Therefore, sometimes during fieldwork, we found the need to get back to previous

interviewees (in this case, usually by e-mail or phone), and clarify some additional topics or address others in more depth.

Data analysis was conducted in two stages. At a first stage, each case was analysed as standalone entity. Therefore, a write-up was made, which consisted in describing the collected data for each case. In a second stage, we made a cross-case analysis.

Section 3.02 Reliability and validity

In this section, we assess our research design, regarding validity and reliability, according to the criteria defined by Yin (2003). This is relevant because case studies are sometimes criticized for being less rigorous than quantitative methods. Yin (2003) responds to that criticism by laying the main criteria to assess that quality of research designs: construct validity, internal validity, external validity and reliability.

Yin (2003) argues that construct validity is controlled for during data collection. Researchers should use multiple data sources and establish a chain of evidence. As explained above, we considered not only more than one respondent within each case, but also used diverse sources of evidence, primary and secondary. We also attempted to establish the chain of evidence between case descriptions and conclusions. We considered that our research meets Yin's (2003) construct validity criterion.

Internal validity is not an issue for exploratory studies. Yin (2003) notes that internal validity is an issue only for case studies aimed at determining causality. Although the results of our work might suggest some causality, it is not our intention to establish it. We leave that as suggestions for future research.

External validity is assured in our research design by the diversity that characterizes the chosen cases. We studied cases from both services and non-services industries; smaller and larger firms; and firms more focused on domestic or on international markets.

Reliability refers to the ability of different researchers to arrive at the same conclusions regarding the same cases. The protocol that we used can be replicated by other researchers and we kept all the transcriptions, field notes and documents collected during our research.

Chapter 4. Results

The goals of our study required the choice of cases representative of the three main biomes of intrapreneurial behaviour describe earlier in this article. This requirement for case selection, as well as other described in Chapter 3, led us to choose one hospitality firm representative of tropical rainforest firms, one construction firm representative of chaparral firms, and on events' organizing firm representing tundra firms. The following section, gives an overview of all cases. The firms' names are not disclosed but each case is codified using the name of the biome it belongs.

Section 4.01 Overview of cases

We characterized the cases using several variables with the intention to establish the main characteristics of firms.

Cases		Case Tropical Rainforest (TR)	Case Chaparral (CH)	Case Tundra (TD)
Variable				
NACE code (sector)		I55 – Accommodation	F42 – Civil engineering	N79 – Travel agency...
Firm age (years)		21	24	22
Equity (in Euros)		> 1 million	> 1 million	> 25.000
Equity ownership	Portuguese private		75%	100%
	Portuguese institutional	10%	25%	
	Foreign	90%		
Subsidiaries	Domestic	No	Yes	No
	Abroad	No	Yes	No
Revenue (in Euros)		Over 10 million	Over 10 million	Over 500.000
Estimates of revenue growth		+ 1 to 5%	+ 5 to 10%	0%
Revenue by market	Domestic	10%	95%	100%
	Europe (other)	70%	0%	0%
	Africa	0%	5%	0%
	America	15%	0%	0%
	Asia	5%	0%	0%
Nr. of employees		180	238	106 (mostly eventual workers)
% of employees by education level	<= 9 years	22%	54%	11%
	> 9 and <= 12 y.	34%	35%	67%
	BSc.	36%	11%	22%
	MSc. / PhD.	8%	0%	0%

Table II.5.1 Characterization of cases

We can observe that in most variables, cases possess quite different characteristics from each other. The exception is age, which is similar between cases. However, considering that these are mature firms, we are more certain that the classification in its respective biome is not transitional.

Section 4.02 Within-case results

(a) Case Tropical rainforest (TR)

TR is one of Europe's most luxurious resorts, located in a World Heritage site. TR recognizes that change is a constant and dynamic force but it also tries to benefit on the opportunities that change offers, by imbedding in its infrastructure, culture and individual behaviours the need to innovate constantly.

(i) Inputs

Environment. TR characterizes its environment as highly mutable. Technology, customers' demographics, and legislation have changed significantly in the last 3 years. Although the number of domestic and foreign competitors has grown, TR is more concerned with the rivalry from domestic competitors. Industry's expenses in marketing communication have grown significantly, in part to deal with the increased number of competitors in the industry. The HRM described the environment as "highly complex".

Resources. TR enjoys a very comfortable financial situation. Financial resources are far from being considered a constraint to its activities, as are the materials and technologies used in operations. TR employs 180 people from several nationalities. Diversity of the workforce is also considered an asset, as the guests are themselves diverse. The number of employees is considered more than adequate considering the firm's needs. TR does not usually resort to temporary agency work, a common practice in the industry, but it does frequently accept interns. The workforce is highly educated as 46% of them have at least a BSc. degree. Considering that TR has a very flat structure, this means the several operational level employees have a BSc. degree, some of them in Tourism or Hotel Management. For this reason, managers consider that TR has employees with the necessary profile - i.e. knowledge, skills and experience. TR annually surveys the organizational climate. In spite of the difficulties surrounding the industry, this year's organizational climate results were the best ever reported. Although, TR benefits from the renowned brand of the international chain it is associated with, it has also built its own image in the market, which is considered an important asset by the managers.

History. The history of TR is intertwined with the history of the international group. However, TR has its own positive landmarks in the 21 years since its opening. It has won several awards, domestic and internationally, and has been rated one of the 20th best luxury hotels in the world. However, 2008 was a marking year in the firm's history, as probably for the whole industry. In that year, the firm faced a less favourable market, but reacted rapidly, developing a contingency plan that has successfully steered the firm through these turbulent times.

Strategy. TR views itself as an elite institution (it targets the top of luxury travellers) whose mission is to create an exceptional experience for its customers and joy and pride among its employees. Its differentiation strategy rests on the estate attributes but also on an ultra-personalized service. Customers who come to TR pay a premium for perfection.

(ii) Throughputs

Individuals. The hotel has the tremendous challenge to meet and exceed customer expectations. Everything starts with how it selects employees. TR selects the right talent and then it is more of a matter of bringing it out and aligning it in the organization. The firm uses scientific interviews to understand if an individual has the necessary behavioural traits to make him or her successful in the company. TR looks for employees who exhibit "relationship extension" which is defined as their willingness and ability to anticipate customers' needs, and who are quick in his or her thinking.

Task. TR lets employees make their own decisions about how they do their jobs. Even, if that means leaving their work posts or authorizing a total refund to the guest. Of course, such latitude needs to be framed in the context of particular line duties, but TR employees are encouraged to think for themselves – and given the means to act when they see the need. The concept of lateral service – the requirement that all employees pitched in to help one another out, no matter what task, can also be presented as important tool to innovative behaviour, in the way that everyone is allowed to help a colleague implement an innovative idea.

Informal organization. TR organizational culture drives everyday behaviour. However, culture at TR is very well planned. It derives from very well defined service standards, values and lists of employee promises. Induction is almost all about this, and all employees are expected to carry a card in their pocket, with those ideas, at all times. Some of these standards are specifically addressed at intrapreneurial behaviour: "I continuously seek opportunities to innovate and improve (name of the company) experience" and "I own and immediately resolve guest problems". Top management maintains a very individualized and not formal relationship with the employees, who treat the general

manager by the first name, and always feel free to step in his office and present their ideas. Leadership at TR defines and ensures its culture.

Formal organizational arrangements. TR uses several practical ways to promote an infrastructure to raise awareness and explore opportunities. The company gathers benchmark information regarding its main competitors, every six months, and studies and surveys customers continually. This market information is distributed throughout the organization in weekly leaders' meetings and in daily staff "line-ups", a communication tactic designed to ensure all employees are on the same page. TR succeeds in using a very simple way to collect and implement employees' innovative ideas. The system has three in-coming ways. Since the company's culture is one of open door, any employee is free to bring his ideas to a manager, even to the general manager. The second way is the Idea Program, where the employee fills out a form to be appreciated by the top management team. The third way is the Quality Improvement Teams that meet weekly and where employees from any department can freely participate. Moreover, each employee is allowed and incentivized to spend up to approximately \$2.000 to implement his or her idea. The financial empowerment allows staff to do whatever is necessary to enhance a guest's stay or recover service – without seeking the approval of a supervisor. The message TR wants to send to its employees is, "We trust you to do the right things". The recruitment process incorporates current employees, so everyone feels responsible for the person hired and the team as a whole. Once selected, leadership orients and trains new hires not only in operational aspects of their jobs, but also in the desired outcomes they want their employees to produce for customers. TR service values are an example of an "enabling" type of formalization. Some of the firm's standards state that "each employee is empowered" and that when employees encounter a guest with a problem or special need they should "break away from their regular duties and address and resolve the issue." Employees are given great latitude to resolve problems and can even bend rules, if necessary. Communication and training practices, such as the daily "line-up", give life to the culture of empowerment. To ensure a well-prepared workforce, cross-training is also available at TR to every employee, as well as online courses. Both recruitment practices and training investment assure a well-prepared workforce.

(iii) Outputs

Individual. At TR several stories of intrapreneurial behaviour are told to new employees. In fact, the list is impressive. Some of these ideas are recognized by the international chain and are implemented worldwide. Mostly, these intrapreneurial behaviours are oriented to surpass or anticipate guests' needs and desires. There are also examples of innovation concerning the development of networks

with local partners to provide more services to guests. Most employees show the following behaviours:

- encourage others to take initiative and to think about their work in new ways
- create an environment where people get excited about making improvements
- get people to rally together
- move ahead when others might be more cautious
- display an enthusiasm for acquiring skills
- “go to bat” for the good ideas of others and devoting time to helping them
- find ways to improve services
- change the course of action when results are not being achieved
- efficiently get proposed actions into practice

Organization. TR is recognized as the most innovative firm in its industry. Because of the characteristics of this type of business, most product innovations are incremental, and therefore with limited potential for sustainability. It does not take long for direct competitors, other high-end luxury hotels and resorts, to imitate those innovations. Therefore, TR has to stay ahead of the game, being a first-mover. As consequence, TR does not have higher revenues or revenue growth, comparatively to the industry’s average. However, it does get higher returns, since its dynamic capability to innovate, allows it to have higher valued offering for which customers are willing to pay for.

(b) Case Chaparral (CH)

CH originates from a small family firm that grew into a larger corporation. It specializes in road improvement and maintenance. It is one of the most knowledgeable firms in its area of expertise. This knowledge comes from both experience (knowledge that was passed on from the previous generation of managers to the newest) and I&D in partnership with academic research groups. Its degree of specialization and knowledge protects CH from a declining market in new road construction. Road maintenance is always necessary, and institutional clients in a tight budget will tend to choose maintenance over new constructions. However, CH recognizes the limitations of the domestic market, and has already started its process of internationalization, seeking emergent markets.

(i) Inputs

Environment. CH characterizes its environment as mutable. Competitiveness from foreign firms, mainly from across the border, and regulatory demands, have changed significantly in the last 3 years. CH operates in an industry that it is highly regulated, especially in what concerns safety norms and environmental impacts. These complex regulations create pressure for the firm, and additional pressure

comes from the fact that this regulations change constantly and therefore firms in this industry are constantly under inspection from regulatory bodies. The CEO considers that *"this industry is over-regulated and because larger firms are usually more under the radar of inspectors, we sometimes feel harassed"*. Domestic competitors are not a major concern for CH but the number foreign competitors has grown.

Resources. Financial resources are far from being considered a constraint to CH. The same applies to the materials and technologies used in its operations. CH employs 238 people that work across six locations the firm possesses in the country but also abroad. The number of employees is considered more than adequate considering the firm's needs. The workforce is characterized by very low levels of education - more than 50% of employees possess less than the 9th grade, which is in fact expected in this type of industry. However, most of the employees have been with the firm for many years, some since the beginning, which makes them a very experienced workforce. For this reason, executives consider that CH has employees with the necessary profile. No employee, even between those with managerial positions, has a MSc. or PhD. degree. In spite of this, the firm has achieved significant levels of innovation. Executives recognize CH benefits from a very adequate internal climate that they characterize as "balanced between dedication, discipline and compliance, on one side, and informal relations and open communication channels between managers and operational level employees, on the other". CH employees are highly committed to the firm. Most of them see the firm as a "second family". Other than its workforce, CH activities are also dependent on another strategic resource: the machinery. CH invested in last generation machinery that allows some operational tasks *in situ* that most competitors have to do in its main facilities, allowing for significant time and cost advantages over the competition.

History. CH was established in 1989. The history of CH is intertwined with the history of the family, which possess the majority of equity, and is still very marked by the profile of the founding entrepreneur. The values of that entrepreneur still drive the values of the firm. Since its origins, CH has strived to achieve and maintain a status of high credibility in the industry. CH obtained several certifications over its history: ISO9001 in 2003, CE marking in 2005, and OHSAS 1800 in 2006. The steady growth from a small familiar firm to a corporation has never distracted the firm from cultivating transparent relations with its partners, and obsessively complying with every requirement agreed with the customer. In the last three-year period, the firm decided to grow into foreign emergent markets.

Strategy. 20 years ago, the domestic market for road construction in Portugal was at its peak, but CH executives back then had the vision that new road construction would eventually decline, as there is a

physical limit to the number of Km it is possible to construct in a certain territory. Therefore, CH made a strategic decision to specialize in road improvement and maintenance, developing an expertise in recycled pavements that is almost unique in the industry. CH strives for quality and constantly updated technical skills, with a high concern for environment-friendly solutions. To control the quality of the materials and the technologic processes necessary to support a “best value”, or value for money, type of generic strategy, CH has also been developing over the years a strategy of vertical integration. This is done by controlling all stages of the chain value from rock and gravel transformation, through waste management, to signalling and road safety instalments. CH has a low score on entrepreneurial proclivity. The firm is concerned with innovation, as it has developed a few radical process innovations under a partnership with an academic research team. However, this concern with innovation does not transpire internally as a strategic posture. Top executives are not considered risk-takers and there is not a spirit of high competitiveness in the way the firm operates. This last aspect might be justified by the fact that this is not very transparent industry, concerning market information, and CH lacks an ability to gather that type of intelligence.

(ii) Throughputs

Individuals. Some of CH’s employees have been in the firm since 1989. They have been selected personally by the founding entrepreneur based on personal relations. Nowadays CH uses recruitment and selection processes that are more formal, but that spirit is the same – CH recruits based on values, nothing else. The values of the individual must be aligned with the values of the firm. The consequence is a highly committed workforce. CH employees do not possess high levels of education, but they know their job. To ensure a well-prepared workforce, CH invests highly in training. The main topics are safety and environmental regulation, and operational techniques.

Task. Tasks are very standardized and routinized, as compliance with government regulations and client contractual requirements is critical. However, this does not mean that there is no room for employees’ contribution to improve processes. There are not many opportunities for in-role innovation activities but there are several for extra-role behaviour, mostly concerned with process improvement.

Informal organization. CH organizational culture is marked by a balance between the dedication, organization, discipline and the rigour this type of activity demands, and the openness of internal channel of communications and informality of the relationships. The values of the firm are family, honesty and trust. The openness and informality in relationships is not something planned, it derives naturally from the leadership of top executives. Of course, the fact that nine members of the family work

at the firm, contributes to that, too. However, an “open door” and “walk the floor” type of leadership characterizes the firm’s executives. They believe that everyone has viable ideas and considers that collaborative effort works well. These executives know everyone in the organization, at all levels. Employees find it easy to talk to top managers and trust them. Employees’ ideas are always welcome, and most of them implemented.

Formal organizational arrangements. CH has a very flat structure, but relatively formalised and centralized. Some executives in CH accumulate executive functions with operational ones. There are no formal communication tools with employees, except through team supervisors. There are also no standardized processes to explore employees’ innovative ideas, or any *a priori* incentives to instigate them.

(iii) Outputs

Individual. CH benefits from moderate to high levels of intrapreneurial behaviour. This intrapreneurial behaviour originates mainly from the middle-levels of the hierarchy, but also from operational level employees. Employees’ innovative ideas are usually concerned with process innovation, mostly concerning safety, time or cost savings, and machinery preservation. Many times, when employees go to executives with an innovative idea they go well prepared with a written plan and even a budget to implement the idea. These innovations are a result of employees’ behaviours such as:

- encourage their colleagues to take the initiative for their own ideas
- create an environment where people get excited about making improvements
- get people to rally together to meet a challenge
- “go to bat” for the good ideas of others
- quickly change course of action when results are not being achieved

Organization. CH is one of the most innovative firms in its industry. It is recognized by being the first in its industry to introduce new products, develop and introduce radically new technologies, and develop innovative management systems. For instance, CH has developed a way to produce bituminous mixtures from recycled tyres *in situ* (rubber modified bitumen), and a process to recycle the old pavement into the new, also *in situ*. These innovation outcomes do not rest only on informal activities but also on formal innovative efforts that require high investments. As consequence, CH has been growing at higher rates than its most direct competitors have.

(c) Case Tundra (TD)

TD operates as an event organizer, usually outdoor events. TD works for to two distinct market segments: the in-coming tourist groups segment, and the corporate segment. This means the events range from pure leisure-oriented to business-oriented. Although TD is a SME, it is the second largest firm in its industry, which is pulverized by many very small firms.

(i) Inputs

Environment. TD characterizes its environment as highly unfavourable. In this industry, competitiveness is very high. The number of new small competitors is constantly rising since there are no significant entrance-barriers in the industry. Competitiveness also originates from the fact that the most important market, the corporate segment, is shrinking due to clients' budgetary restrictions for these events. Technology used in the industry has also significantly changed because many clients now demand technology-based events (e.g. high-tech multimedia, digital interaction between participants).

Resources. Financial resources are seen as a constraint to TD's activities. The firm struggles to break-even because prices in the industry are falling. TD usually employs 106 people, most of them on a temporary basis. Therefore, availability of workers is rarely an issue for this firm. Most of the workforce has secondary education, although the firm has been recently changing its strategy to recruit more qualified applicants (for instance with a BSc. in Events Management), which are now more available in the labour market at lower wages. The workforce is considered sufficiently skilled, considering the firm's needs. HRM recognizes TD struggles with its internal climate that characterize as "the workers being very confused with conflicting instructions" *but* recognize they are committed to their jobs, that demands from them an almost constant fire-fighting attitude.

History. TD was established in 1991 by a group of friends that decide to turn their outdoor leisure activities into a business. Since its origins, TD has become a reference in the industry. It is usually the clients' first choice for large-scale events, as it has developed overtime the skills necessary to efficiently deal with the logistics and coordination tasks necessary for these events with hundreds of participants.

Strategy. TD operates in a market characterized very small margins, where price is the main driver. Many times margins are smaller because there is an intermediary in the process, usually a consulting firm that is helping the client with the content of the event. Most of the time, TD's service is only concerned with the logistics of the event. This is very much similar in each event. Therefore, the firm has optimized processes that allow for significant cost reduction, being therefore able to offer competitive prices and "ready-to-go" solutions. TD has a very low score on entrepreneurial proclivity.

The firm is not strategically concerned with innovation. There is a creative department, but it is very oriented to communication design. Top executives are not considered risk-takers and although there is a spirit of high competitiveness, this translates only to selling tactics and price negotiation.

(ii) Throughputs

Individuals. Some of TD's full-time employees have been in the firm since the beginning. They used to propose innovative ideas frequently but, over time, this behaviour has faded away due to the feeling that their ideas were never being implemented. TD's full-time employees do not possess high levels of education, but they know their job.

Task. In the planning phase of the event, tasks are very standardized and routinized. In the implementation phase, workers have to be able to deal with the unexpected. In any case, innovative behaviours are not expected and rarely welcomed.

Informal organization. TD organizational climate is very marked by top management leadership style. A very directive style that focuses on instructing employees on what they are expected to do and how to perform the expected tasks, forces employees to withdraw from contributing for the improvement of services. The relationship between management and employees is usually very stressful and the relation between departments not very cooperative. Internal communication is very poor, and many times the cause of service failures.

Formal organizational arrangements. TD has a very flat structure, but highly formalised and centralized. There are no formal processes to explore employees' innovative ideas, or any *a priori* incentives to instigate them. There is an incentive program concerned with sales objectives, which has an individual and an organizational component. Because organizational goals are never achieved, no one has ever received the bonus. Training opportunities are scarce, and the most recent recruitment policy gives preference for the highest qualified candidate at the lowest salary. The intention is to reduce the firm's personnel costs.

(iii) Outputs

Individual. TD's employees demonstrate very low levels of intrapreneurial behaviour. There are no significantly relevant examples of innovation originating from employees. The most common behaviours are "devoting time to helping other colleagues find ways to improve services", and "displaying enthusiasm for acquiring skills".

Organization. TD is one of the less innovative firms in its industry. The examples of what the firm considers innovation are in fact “novel for the company”, not “novel for the market” technology that was demanded by clients. Although it is the second largest in the industry, and it benefits from the image of being one of the few in the market able to organize large-scale events, the firm is not growing and profit margins are slim.

Section 4.03 Cross-cases analysis

In Table II.5.2, we summarize each organizational configuration. The analysis of these cases suggests the relevance of strategy, human resources management practices, organizational culture and leadership as the main facets of a biome for intrapreneurial life. Sometimes these facets align towards strategically instigating intrapreneurial behaviour (case TR), sometimes these facets align to welcome intrapreneurial behaviour even if not strategically instigated (case CH), and sometimes those facets align to exclude intrapreneurial behaviour (Case TD). In Case TD, executives do not consider innovation strategically relevant. The focus of the firm on cost reduction is not considered compatible with intrapreneurial behaviour.

The relation between firm’s strategy and innovation is very significant. Intrapreneurial behaviour is actively instigated (case TR) or tolerated (case CH) if it is perceived by executives as being strategically relevant, either to differentiate the product from that of the competitors, or as a source of efficiency.

When employee contribution is perceived as determinant to achieve the desired level of innovation, then the firm develops a specific human resource strategy to instigate that behaviour (Case TR). That strategy is more oriented towards creating the conditions for intrapreneurial behaviour to emerge from intrinsic motivation, than from extrinsic motivation. In Case CH, although there is no deliberate strategy to instigate intrapreneurial behaviour, this is welcomed because any incremental innovation is relevant in a competitive market. In this Case, intrapreneurial behaviour derives from the favourable organizational climate, which in turn derives from firm’s values and leadership style. Again, intrinsic motivation is determinant.

Configuration dimensions	Tropical rainforest	Chaparral	Tundra
Environment	Perceived as highly unfavourable (changes in market needs and technology)	Perceived as moderately unfavourable (changes in rivalry and highly regulated industry)	Perceived as highly unfavourable (changes in rivalry, depressed demand)
Available resources (adequate)	Financial, materials, firm's market image, organizational climate	Technology, number of employees, employees' skills	Employees' skills
Strategy	Differentiation by ultra-personalization of service and product innovation	Value for money High investment in formal I&D processes (innovation as a source of quality, cost reduction, and environmental impacts reduction) Vertical integration	Cost leadership
Individuals	Highly educated and qualified workforce Highly motivated and committed to the client	Qualified workforce Highly motivated and committed to the firm	Qualified workforce Committed to the job
Task	Balance between routine and empowerment Innovation is expected either as in-role and as extra-role behaviour	Routine tasks with low levels of autonomy Innovative behaviour is welcomed	Mostly routine tasks with low to moderate levels of autonomy Innovative behaviour is not desired
Formal organizational arrangements	Flexible structure Moderate levels of formalization, centralization and specialization High levels of formal and informal communication High scanning ability Formal support for innovative behaviour Strategic importance of selection, induction and training processes	Flat structure High levels of formalization and centralization High levels of informal communication Strategic importance of selection and training processes	High levels of formalization and centralization
Informal organization	Entrepreneurial leadership Balance between formal and informal relations Company values and history drive behaviour	Participative leadership Informal relations Company values and history drive behaviour High levels of trust	Directive leadership Formal relations

Table II.5.2 Biomes' configurations

Chapter 5. Discussion and conclusions

In this study, we used a multiple case research design to explore further the differences between organizational configurations associated to three types of biomes for “intrapreneurial life”. These biomes are tropical rainforest firms, which demonstrate high levels of entrepreneurial proclivity and moderate to high levels of intrapreneurial behaviour, chaparral firms characterized by low levels of entrepreneurial proclivity and moderate levels of intrapreneurial behaviour, and tundra firms characterized by low levels of entrepreneurial proclivity and low levels of intrapreneurial behaviour. Our goal in this study was to uncover the organizational configurations in each biome. Although we do not suggest that the specificities of these cases are generalizable to other firms, even within the same biomes, we nonetheless consider that they reveal the main themes in these configurations.

The results are consistent with configuration theory as they imply that a firm has some strategic objectives, related to its focus on exploration vs. exploitation, it has internal characteristics, and it achieves a certain level of performance. The congruence between the internal characteristics and the firm’s strategy will be associated higher performance. However, results also suggest that in some cases intrapreneurial behaviour might well be characterized as a misfit, non-congruent behaviour with firm’s strategy and goals.

Results suggest the following propositions:

- (1) Strategy is the central dimension in a biome of intrapreneurial life.
- (2) When employees’ contribution through intrapreneurial behaviour is perceived to be a source of competitive advantage, the firm will develop systems to instigate the quantity and quality of this type of behaviour.
- (3) When employees’ contribution through intrapreneurial behaviour is considered marginal for a firm’s strategy but the firm is otherwise involved in formal innovation processes, intrapreneurial behaviour will be tolerated and welcomed, but not intentionally instigated.
- (4) Intrapreneurial behaviour is an intrinsically motivated behaviour.
- (5) Culture (mainly history, values and norms), and leadership are the main enablers or obstacles to intrapreneurial behaviour,
- (6) Human resources processes, especially selection, induction and training and development play a major role in promoting intrapreneurial behaviour.

(7) Some firms with cost leadership strategies and directive leaders perceive intrapreneurial behaviour as a misfit.

These propositions can serve as stringboards for future research.

PART III - FINAL CONCLUSIONS

Summary of conclusions

Building on the previous theoretical and empirical studies of the strategic management and entrepreneurship fields, we intended to bring an organizational behaviour field view to the study of employees' entrepreneurial behaviour – intrapreneurial behaviour. This research aimed to provide a better understanding of how that behaviour might be fostered by appropriate organizational configurations and how particularly relevant intrapreneurial behaviour is for service sectors' firms.

Ontology of corporate entrepreneurship

The rapid growth of research on corporate entrepreneurship, and the incongruence in the way researchers use the related concepts, called for the need to consolidate current knowledge and to provide directions for future research. In this study, we reviewed 58 articles and followed an ontological process to propose a structure of the corporate entrepreneurship domain that includes 38 classes organized into three main branches: the antecedents, features and consequences of the corporate entrepreneurship process. Our ontology describes the ways previous researchers have studied how corporate entrepreneurship works inside the firm, from which we derived an integrative multi-level model of corporate entrepreneurship.

Inputs and outputs of intrapreneurial behaviour

In this study, we predicted that intrapreneurial behaviour is dependent on external and internal input factors, and that it has consequences on firm performance - financial and non-financial. Results provide strong support for these predictions. We demonstrated how intrapreneurial behaviour is dependent on how unfavourable change in the environment is. Results also show how some internal factors explain intrapreneurial behaviour and others do not. We also confirmed that intrapreneurial behaviour is associated with the financial performance of the firm, especially profitability, and with non-financial results, such as employee commitment.

Entrepreneurial proclivity, intrapreneurial behaviour and innovation: specificities of services' firms

The results of our study confirmed that entrepreneurial proclivity and intrapreneurial behaviour are associated. This suggests that when employees' perceive that there is a predisposition of top management towards innovativeness, risk taking, and proactiveness, they will behave more

intrapreneurially. However, our results indicate that the importance of entrepreneurial proclivity is more relevant in non-services' firms. This may be justified by the pressure services' employees suffer from customers, i.e. they might be impelled to innovate even if, or because, they perceive top management are not being very entrepreneurial. Our results also show differences between services' and non-services' firms, concerning the relation between intrapreneurial behaviour and innovation. Services' firms show stronger association between these variables.

Metaphor of firms as biomes of 'intrapreneurial life'

We confirmed the existence of three distinct main types of firms, and a fourth transition type, according to the interaction between entrepreneurial proclivity and intrapreneurial behaviour. Using an analogy with Earth's biomes, we characterize each type of firm as a different biome of 'intrapreneurial life'. High levels of entrepreneurial proclivity and moderate to high levels of intrapreneurial behaviour characterize tropical rainforest firms. These firms have the highest levels of innovation. Tundra firms are characterized by low levels of entrepreneurial proclivity and low levels of intrapreneurial behaviour. Tundra firms have the lowest levels of innovation. Chaparral firms (with low entrepreneurial proclivity and moderate to high intrapreneurial behaviour), reveal average levels of innovation. We called, the fourth type ecotone, because we argue that this is a transition biome. These are small young firms with the highest levels of intrapreneurial behaviour and average levels of entrepreneurial proclivity.

Organizational configuration of firms in the main biomes

Using a multiple case-study research design, we explored configurations related to each of the three main biomes. The analysis of these cases suggested the relevance of strategy, human resources management practices, organizational culture and leadership as the main facets of a biome for "intrapreneurial life". Sometimes these facets align towards strategically instigating intrapreneurial behaviour, sometimes these facets align to welcome intrapreneurial behaviour even if not strategically instigated, and sometimes these facets align to exclude intrapreneurial behaviour.

The results are consistent with configuration theory as they imply that a firm has some strategic objectives, related to its focus on exploration vs. exploitation, it has internal characteristics, and it achieves a certain level of performance. Therefore, in some cases intrapreneurial behaviour might well be characterized as a misfit, a non-congruent behaviour with the firm's strategy and goals.

Limitations

In our survey, we used self-reported measures from only one individual in each firm, which might be considered a limitation of this study. However, the survey targeted the firms' CEOs or other senior executives, which are most likely familiar with company-wide issues, especially concerning innovation. In what refers to firm's performance, we assumed that asking for objective financial performance data in our questionnaire would limit the response rate with the resulting statistical limitations that would bring. Nevertheless, the use of self-reported and perceived measures is a usual method in this field of research (Miller, 1983; Zahra, 1991).

Sample size might also be considered a limitation of this study, although statistical tests revealed high reliability.

The cross-sectional approach adopted in this research does not allow to fully understand the effects intrapreneurial behaviour and innovation on firm performance over time, which would only be possible through the adoption of a longitudinal design. Anyway, because we used subjective measures of performance, where top executives were asked to consider the firms last three-year period, the effects over time were incorporated in their opinions, which would not have happened if we have used objective measures of performance.

Theoretical contributions and future research

Our study proposes for the first time in the literature, an ontology of corporate entrepreneurship. It also proposes a multi-level integrative model of corporate entrepreneurship that stresses the role of intrapreneurial behaviour in the process. The construct of intrapreneurial behaviour has been concealed in previous research underneath the constructs of entrepreneurial orientation and corporate entrepreneurship, the most used constructs in the domain. This does not permit to make a clear distinction between dispositions, behaviour and innovation outcomes, which might justify contradictory results of previous research. In our study, we confirmed that both external and internal factors explain intrapreneurial behaviour, and that it is associated with innovation and firm performance. This study also confirms that intrapreneurial behaviour is particularly relevant for services' firms. Finally, we proposed and confirmed the existence of four types of firms, characterized as different biomes (organizational configurations) of "intrapreneurial life". Using a multiple case-study approach, we took an in-depth analysis of firms that belong to each of the main biomes, from which we derived several propositions that can be used as a stringboard for future research:

(1) Strategy is the central dimension in a biome of intrapreneurial life.

(2) When intrapreneurial behaviour is perceived as a source of competitive advantage, the firm will develop systems to instigate the quantity and quality of this type of behaviour.

(3) When intrapreneurial behaviour is considered marginal for a firm's strategy, but the firm is otherwise involved in formal innovation processes, intrapreneurial behaviour will be tolerated and welcomed, but not intentionally instigated.

(4) Intrapreneurial behaviour is essentially an intrinsically motivated behaviour.

(5) Culture (mainly history, values and norms) and leadership are the main enablers or obstacles to intrapreneurial behaviour.

(6) Human resources processes, especially selection, induction and training and development play a major role in promoting intrapreneurial behaviour.

(7) Some firms, with cost leadership strategies and a directive leadership style, perceive intrapreneurial behaviour as a misfit.

Additionally, we propose that our ontology of corporate entrepreneurship should be revised and updated as new relevant research articles on the domain are published, and that our multilevel integrative model should be tested using a large-sized sample, eventually with a longitudinal research design.

Practical implications

Our results suggest some managerial implications, which are business-relevant because intrapreneurial behaviour is linked to innovation and performance. To foster intrapreneurial behaviour, internal environment matters. Firms should be concerned with identifying which organizational factors are promoting, and which are impeding innovation from intrapreneurs. Managers that wish to stimulate intrapreneurial behaviour should be concerned with the following aspects:

(1) Environmental scanning and communication (how well are employees informed about environmental opportunities and threats?),

(2) Organizational norms, systems and procedures (in what degree do these instigate a common perception - or climate, that extra-role behaviour and discretionary opportunity exploration from employees is welcome or not?),

(3) Strategic orientation towards entrepreneurship (does it transpire from top managers' posture?).

These implications are particularly relevant for services' firms because in these firms the impact of intrapreneurial behaviour on innovation is stronger.

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APPENDIX 1: Questionnaire (English)

1. Firm characterization

- (1.1) CAE/NACE code (3-digit) of main activity _
- (1.2) Describe firms main business _
- (1.3) Year of foundation (in Portugal) _
- (1.4) Equity _
 - 1. Not applicable
 - 2. Less than 5 001 Euros
 - 3. Between 5 001 and 10 000 Euros
 - 4. Between 10 001 and 25 000 Euros
 - 5. Between 25 001 and 100 000 Euros
 - 6. More than 100 000 Euros.
- (1.5) Percentage of equity by type of holder
% private Portuguese holders _ % Portuguese State _ % Foreign holders _
- (1.6) Revenue (last year) _
 - 1. Less than 50 001 Euros
 - 2. Between 50 001 and 150 000 Euros
 - 3. Between 150 001 and 500 000 Euros
 - 4. Between 500 001 and 2 000 000 Euros
 - 5. Between to 2 000 001 and 10 000 000 Euros
 - 6. Between 10 000 001 and 50 000 000 Euros
 - 7. 50 000 001 Euros or more.
- (1.7) What's your firm's percentage of total sales in the following markets?
% Domestic _
% International _
- (1.8) Does your firm have subsidiaries in the country? No /Yes
- (1.9) Does your firm have subsidiaries abroad? No /Yes
- (1.10) Is your firm a subsidiary of another firm? No / Yes
- (1.10) Number of employees full-time _
- (1.11) Number of employees part-time _
- (1.12) What is the percentage of employees in your company by degree of education?
Up to 9th grade __%
From 9th to 12th grade __ %
Bachelors /Undergraduate degree __%
Master/PHD __%

2. Taking in consideration the last three years, how do you agree with the following statements regarding your firm's main industry?

1 - Strongly disagree; 2 - Disagree; 3 - Nor agree/neither disagree; 4 - Agree; 5 - Strongly agree

- (2.1) The technology relevant to our industry has changed significantly
- (2.2) The demographic characteristics of our industry's consumers has changed significantly
- (2.3) The Government regulations that affect our industry have changed significantly
- (2.4) The number of domestic competitors in our industry has changed significantly
- (2.5) The number of foreign competitors in our industry has changed significantly
- (2.6) Industry-wide spending on marketing communication has changed significantly
- (2.7) Our firm has been facing significant competition from domestic producers
- (2.8) Our firm has been facing significant competition from foreign producers

3. Taking in consideration the last three years, how do you assess each of the following aspects, relative to the firm's needs?

1 - Completely inadequate 2 - Inadequate; 3 - Slightly inadequate; 4 - Slightly adequate; 5 - Adequate; 6 - Completely adequate

- (3.1) Financial resources
- (3.2) Materials for operations
- (3.3) Technology
- (3.4) Number of employees
- (3.5) Employees' profile (knowledge, skills, profile)
- (3.6) Information on the environment/market
- (3.7) Firm's image in the marketplace
- (3.8) Organizational climate

4. How do you agree with the following statements, regarding your firm?

1 - Strongly disagree; 2 - Disagree; 3 - Nor agree/neither disagree; 4 - Agree; 5 - Strongly agree

- (4.1) When it comes to problem solving, our firm values creative new solutions more than the solutions of conventional wisdom.
- (4.2) Top managers here encourage the development of innovative marketing strategies, knowing well that some will fail.
- (4.3) Our firm values the orderly and risk-reducing management process much more highly than initiatives for change
- (4.4) Top managers in this firm like to "play it safe"
- (4.5) Top managers around here like to implement plans only if they are very certain that they will work
- (4.6) In our firm, we firmly believe that a change in market creates a positive opportunity for us.
- (4.7) In our firm, we tend to talk more about opportunities rather than problems.

5. How do you agree with the following statements, considering your firm's workforce?

'1 - Strongly disagree; 2 - Disagree; 3 - Nor agree/neither disagree; 4 - Agree; 5 - Strongly agree

Employees in managerial positions	Remaining employees
---	------------------------

In general,

- (5.1) Our employees are able to vividly describe how things could be in the future and what is needed to get the firm there
- (5.2) Our employees encourage their colleagues to take the initiative for their own ideas
- (5.3) Our employees inspire their colleagues to think about their work in new and stimulating ways
- (5.4) Our employees create an environment where people get excited about making improvements
- (5.5) Our employees get people to rally together to meet a challenge
- (5.6) Our employees boldly move ahead with a promising new approach when others might be more cautious
- (5.7) Our employees display an enthusiasm for acquiring skills
- (5.8) Our employees 'go to bat' for the good ideas of their colleagues
- (5.9) Our employees devote time to helping other colleagues find ways to improve our products and services
- (5.10) Our employees quickly change course of action when results aren't being achieved
- (5.11) Our employees efficiently get proposed actions through 'bureaucratic red tape' and into practice

6. How do you agree with the following statements, regarding your firm's activity over the last three years?

1 - Strongly disagree; 2 - Disagree; 3 - Nor agree/neither disagree; 4 - Agree; 5 - Strongly agree

- (6.1) Our firm is usually the first company in your industry to introduce new products to the market
- (6.2) Our firm created radically new products for sale in new markets
- (6.3) Our firm created radically new products for sale in existing markets
- (6.4) Our firm commercialized new products
- (6.5) Our firm has been investing heavily in cutting edge process technology-oriented R&D
- (6.6) Our firm is usually the first company in the industry to develop and introduce radically new technologies
- (6.7) Our firm is usually the first in the industry to develop innovative management systems
- (6.8) Our firm is usually the first in the industry to introduce new business concepts and practices
- (6.9) Our firm has changed the organizational structure in significant ways to promote innovation
- (6.10) Our firm has introduced innovative human resource programs to spur creativity and innovation

7. How do you agree with the following statements, regarding your firm's results over the last three years?

1 - Strongly disagree; 2 - Disagree; 3 - Nor agree/neither disagree; 4 - Agree; 5 - Strongly agree

- (7.1) Our revenue has been much higher than that of our competitors
- (7.2) Our revenue grew more than the industry's average
- (7.3) Our earnings before taxes have been above the industry's average
- (7.4) Our return on investment has been above the industry's average
- (7.5) Our return on assets has been above the industry's average
- (7.6) Our return on equity has been above the industry's average
- (7.7) Our employee turnover has been above the industry's average
- (7.8) Our absenteeism rate has been above the industry's average – reverse score
- (7.9) Our employees have been showing high commitment to the firm

APPENDIX 2: Questionnaire (Portuguese)

1. Caracterização da empresa

- (1.1) Código CAE (3-dígitos) da actividade principal _
- (1.2) Descreva o principal negócio da empresa _
- (1.3) Ano de constituição da empresa (em Portugal) _
- (1.4) Capital social: ____
1. Não aplicável
 2. Inferior a 5 001 Euros
 3. Entre 5 001 e 10 000 Euros
 4. Entre 10 001 e 25 000 Euros
 5. Entre 25 001 e 100 000 Euros
 6. Superior a 100 000 Euros.
- (1.5) Percentagem do Capital Social por tipo de detentor
% detentores privados nacionais _ % Estado português _ % detentores estrangeiros _
- (1.6) Volume de negócios (no último ano) _
1. Inferior a 50 001 Euros
 2. Entre 50 001 e 150 000 Euros
 3. Entre 150 001 e 500 000 Euros
 4. Entre 500 001 e 2 000 000 Euros
 5. Entre 2 000 001 e 10 000 000 Euros
 6. Entre 10 000 001 e 50 000 000 Euros
 7. Superior a 50 000 000 Euros.
- (1.7) Qual a percentagem do total de vendas da empresa relativa a cada um dos seguintes mercados?
Mercado nacional _
Mercado internacional _
- (1.8) A sua empresa possui subsidiárias em Portugal? Não/Sim
- (1.9) A sua empresa possui subsidiárias no estrangeiro? Não/Sim
- (1.10) A sua empresa é subsidiária de outra? Não/Sim
- (1.11) Número de empregados em full-time _
- (1.12) Número de empregados em part-time _
- (1.13) Qual a percentagem do total de empregados, por grau de ensino completado?
Até ao 9º ano inclusivé ____ %
Do 10º ao 12º ano inclusivé ____ %
Bacharelato/Licenciatura ____ %
Mestrado/Doutoramento ____ %

2. Tendo em consideração os últimos três anos, qual o seu grau de concordância com as seguintes afirmações relativamente ao principal sector de actividade em que a sua empresa se insere?

1 – Discordo completamente; 2 – Discordo; 3 – Não discordo, nem concordo; 4 – Concordo; 5 – Concordo completamente

- (2.1) A tecnologia relevante para o nosso sector de actividade mudou significativamente
- (2.2) As características demográficas dos nossos consumidores finais mudaram significativamente
- (2.3) A regulamentação que afecta o nosso sector de actividade mudou significativamente
- (2.4) O número de concorrentes no mercado nacional aumentou significativamente
- (2.5) O número de concorrentes no mercado internacional aumentou significativamente
- (2.6) Os gastos globais das empresas deste sector, em comunicação de marketing, aumentaram significativamente
- (2.7) A nossa empresa tem enfrentado grande competitividade por parte dos concorrentes nacionais
- (2.8) A nossa empresa tem enfrentado grande competitividade por parte dos concorrentes estrangeiros

3. Tendo em consideração os últimos três anos, como avalia os seguintes aspectos, tendo em atenção as necessidades da empresa?

1 – Completamente inadequado 2 – Inadequado; 3 – Ligeiramente inadequado; 4 – Ligeiramente adequado; 5 – Adequado; 6 – Completamente adequado

- (3.1) Recursos financeiros
- (3.2) Materiais necessários às operações
- (3.3) Tecnologia
- (3.4) Número de trabalhadores
- (3.5) Perfil dos trabalhadores (conhecimentos, skills, experiência)
- (3.6) Informação sobre a envolvente/ mercado
- (3.7) Imagem da empresa no mercado
- (3.8) Clima organizacional

4. Qual o seu grau de concordância com as seguintes afirmações relativas à sua empresa:

1 – Discordo completamente; 2 – Discordo; 3 – Não discordo, nem concordo; 4 – Concordo; 5 – Concordo completamente

- (4.1) Quando se trata de resolver um problema, na empresa valorizamos mais novas soluções criativas do que soluções convencionais.
(4.2) Os gestores de topo na nossa empresa encorajam o desenvolvimento de estratégias de marketing inovadoras, mesmo sabendo que algumas não serão bem sucedidas.
(4.3) Na nossa empresa valorizamos muito mais processos de gestão orientados para a redução do risco do que iniciativas orientadas para a mudança. – *reverse scored*
(4.4) Na nossa empresa os gestores de topo gostam de ‘jogar pelo seguro’ – *reverse scored*
(4.5) Na nossa empresa os gestores de topo gostam de implementar planos apenas se estão muito certos de que esses planos terão sucesso. – *reverse scored*
(4.6) Na nossa empresa acreditamos firmemente que uma mudança no mercado gera oportunidades para a nossa empresa.
(4.7) Na nossa empresa, temos tendência para falar mais das oportunidades do que dos problemas.

5. Qual o seu grau de concordância com as seguintes afirmações, se aplicadas aos trabalhadores da sua empresa?

1 – Discordo completamente; 2 – Discordo; 3 – Não discordo, nem concordo; 4 – Concordo; 5 – Concordo completamente

Em geral...

- (5.1) Os nossos trabalhadores são capazes de descrever claramente como as coisas deveriam ser no futuro e o que é necessário para levar a empresa até lá
(5.2) Os nossos trabalhadores encorajam os colegas a tomar iniciativa
(5.3) Os nossos trabalhadores inspiram os colegas a pensar sobre o seu trabalho de forma nova e estimulante
(5.4) Os nossos trabalhadores criam um ambiente em que as pessoas se entusiasmam para fazer melhor
(5.5) Os nossos trabalhadores levam os colegas a unirem esforços para enfrentar um desafio
(5.6) Os nossos trabalhadores avançam corajosamente com novas abordagens quando outros seriam mais cuidadosos
(5.7) Os nossos trabalhadores mostram entusiasmo por adquirir novas capacidades / conhecimentos
(5.8) Os nossos trabalhadores fazem o que for preciso para apoiar as boas ideias dos seus colegas
(5.9) Os nossos trabalhadores dedicam tempo a ajudar colegas a encontrar formas de melhorar os nossos produtos e serviços
(5.10) Os nossos trabalhadores mudam rapidamente o curso das coisas quando os resultados esperados não estão a ser alcançados
(5.11) Os nossos trabalhadores conseguem fazer passar as suas propostas à prática, ultrapassando eficientemente eventuais ‘burocracias’.

Trabalhadores com
responsabilidades
de gestão
Restantes
trabalhadores

6. Qual o seu grau de concordância com as seguintes afirmações, considerando a actividade da sua empresa nos últimos 3 anos?

1 – Discordo completamente; 2 – Discordo; 3 – Não discordo, nem concordo; 4 – Concordo; 5 – Concordo completamente

- (6.1) A nossa empresa é habitualmente a primeira no nosso sector a lançar novos produtos no Mercado
(6.2) A nossa empresa criou produtos radicalmente novos para comercializar em novos mercados
(6.3) A nossa empresa criou produtos radicalmente novos para comercializar nos mercados habituais
(6.4) A nossa empresa comercializou novos produtos
(6.6) A nossa empresa tem investido fortemente em investigação de ponta para o desenvolvimento de novos processos tecnológicos
(6.7) A nossa empresa é habitualmente a primeira do sector a desenvolver e introduzir tecnologias radicalmente novas
(6.8) A nossa empresa é habitualmente a primeira do sector a desenvolver sistemas de gestão inovadores
(6.9) A nossa empresa é habitualmente a primeira do sector a introduzir novos conceitos e práticas de negócio
(6.10) A nossa empresa mudou a estrutura organizacional de forma significativa para promover a inovação
(6.11) A nossa empresa lançou programas inovadores de gestão dos recursos humanos para estimular a criatividade e a inovação

6. Qual o seu grau de concordância com as seguintes afirmações, considerando os resultados da sua empresa ao longo dos últimos 3 anos?

1 – Discordo completamente; 2 – Discordo; 3 – Não discordo, nem concordo; 4 – Concordo; 5 – Concordo completamente

- (6.1) O nosso volume de negócios é muito superior ao dos nossos concorrentes
(6.2) O nosso volume de negócios cresceu mais do que a média do sector
(6.3) Os nossos resultados antes de impostos têm estado acima da média do sector
(6.4) O retorno sobre o investimento da nossa empresa tem sido superior à média do sector
(6.5) A rentabilidade do Activo tem sido superior à média do sector
(6.6) A rentabilidade do Capital Próprio tem sido superior à média do sector
(6.7) A rotatividade dos nossos recursos humanos (turnover) tem sido superior à média do sector – *reverse score*
(6.8) O absentismo dos nossos trabalhadores tem sido superior à média do sector - *reverse score*
(6.9) Os nossos trabalhadores têm demonstrado elevado empenhamento para com a empresa

APPENDIX 3: SPSS Outputs (Relative to Article 2)

Multiple Regression

Table A.3.1 Variables Entered/Removed ^a

Model	Variables Entered	Variables Removed	Method
1	Zscore(INTERN), Zscore(AGE_Ln), Zscore: NACE sector, Zscore(EMPLOYEE_Ln) ^b	.	Enter
2	Zscore: COMPUTE UNF_CHANGE ^b	.	Enter
3	Zscore: MATERIAL RESOURCES, Zscore: NR. OF EMPLOYEES, Zscore: ORGAN. CLIMATE, Zscore: MARKET INFORMATION, Zscore: FINANCIAL RESOURCES, Zscore: FIRM'S MARKETPLACE IMAGE, Zscore: EMPLOYEES' PROFILE, Zscore: TECHNOLOGY ^b	.	Enter
4	Zscore(EP) ^b	.	Enter

a. Dependent Variable: Zscore(IB)

b. All requested variables entered.

Table A.3.2 Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	,444 ^a	,197	,171	,91052665	,197	7,495	4	122	,000
2	,508 ^b	,258	,228	,87883884	,061	9,956	1	121	,002
3	,710 ^c	,503	,446	,74413493	,245	6,972	8	113	,000
4	,744 ^d	,553	,497	,70898229	,050	12,483	1	112	,001

a. Predictors: (Constant), Zscore(INTERN), Zscore(AGE_Ln), Zscore: NACE sector, Zscore(EMPLOYEE_Ln)

b. Predictors: (Constant), Zscore(INTERN), Zscore(AGE_Ln), Zscore: NACE sector, Zscore(EMPLOYEE_Ln), Zscore: COMPUTE UNF_CHANGE

c. Predictors: (Constant), Zscore(INTERN), Zscore(AGE_Ln), Zscore: NACE sector, Zscore(EMPLOYEE_Ln), Zscore: COMPUTE UNF_CHANGE, Zscore: MATERIAL RESOURCES, Zscore: NR. OF EMPLOYEES, Zscore: ORGAN. CLIMATE, Zscore: MARKET INFORMATION, Zscore: FINANCIAL RESOURCES, Zscore: FIRM'S MARKETPLACE IMAGE, Zscore: EMPLOYEES' PROFILE, Zscore: TECHNOLOGY

d. Predictors: (Constant), Zscore(INTERN), Zscore(AGE_Ln), Zscore: NACE sector, Zscore(EMPLOYEE_Ln), Zscore: COMPUTE UNF_CHANGE, Zscore: MATERIAL RESOURCES, Zscore: NR. OF EMPLOYEES, Zscore: ORGAN. CLIMATE, Zscore: MARKET INFORMATION, Zscore: FINANCIAL RESOURCES, Zscore: FIRM'S MARKETPLACE IMAGE, Zscore: EMPLOYEES' PROFILE, Zscore: TECHNOLOGY, Zscore(EP)

Table A.3.3 Correlations

		Zscore (IB)	Zscore (EMPL. Ln)	Zscore: NACE sector	Zscore (AGE_In)	Zscore (INTERN)	Zscore: COMPUTE UNF_CHG	Zscore: EMPLOY.' PROFILE	Zscore: ORGAN. CLIMATE	Zscore: MARKET INFORMAT.	Zscore: MATERIAL RESOUR.	Zscore: TECHN.	Zscore: FINANC. RESOURC.	Zscore: FIRM'S M. IMAGE	Zscore: NR. OF EMPL.	Zscore (EP)
Pearson Correlation	Zscore(IB)	1,000	-,070	,317	-,303	-,247	,290	,496	,547	,044	,048	-,060	,269	,318	,229	,458
	Zscore(EMPLOYEE_Ln)	-,070	1,000	,129	,370	,178	-,031	,049	,023	-,112	-,064	-,046	,226	,157	,097	,196
	Zscore: NACE sector	,317	,129	1,000	-,116	-,191	,315	,394	,213	-,001	-,058	-,100	-,074	,105	,096	,126
	Zscore(AGE_In)	-,303	,370	-,116	1,000	,145	-,032	-,099	-,064	-,103	,018	,095	,127	-,052	,051	-,174
	Zscore(INTERNAR)	-,247	,178	-,191	,145	1,000	,146	-,166	,001	,100	,013	,051	,002	,102	-,011	-,029
	Zscore: COMPUTE UNF_CHANGE	,290	-,031	,315	-,032	,146	1,000	,279	,224	-,085	-,013	-,045	,096	,123	,085	-,001
	Zscore: EMPL. PROFILE	,496	,049	,394	-,099	-,166	,279	1,000	,496	,016	-,027	-,085	,324	,422	,509	,169
	Zscore: ORGAN. CLIMATE	,547	,023	,213	-,064	,001	,224	,496	1,000	,104	-,032	-,020	,404	,522	,369	,456
	Zscore: MARK.INFORM.	,044	-,112	-,001	-,103	,100	-,085	,016	,104	1,000	,399	,401	,060	,070	-,121	,065
	Zscore: MAT. RESOURC.	,048	-,064	-,058	,018	,013	-,013	-,027	-,032	,399	1,000	,726	,118	-,063	-,030	-,074
	Zscore: TECHNOLOGY	-,060	-,046	-,100	,095	,051	-,045	-,085	-,020	,401	,726	1,000	,117	-,040	-,039	-,095
	Zscore: FINANCIAL RES.	,269	,226	-,074	,127	,002	,096	,324	,404	,060	,118	,117	1,000	,350	,435	,223
	Zscore: FIRM'S MARKETPLACE IMAGE	,318	,157	,105	-,052	,102	,123	,422	,522	,070	-,063	-,040	,350	1,000	,468	,299
	Zscore: NR. EMPLOYEES	,229	,097	,096	,051	-,011	,085	,509	,369	-,121	-,030	-,039	,435	,468	1,000	,122
	Zscore(EP)	,458	,196	,126	-,174	-,029	-,001	,169	,456	,065	-,074	-,095	,223	,299	,122	1,000
Sig. (1-tailed)	Zscore(IB)	.	,216	,000	,000	,003	,000	,000	,000	,313	,295	,251	,001	,000	,005	,000
	Zscore(EMPLOYEE_Ln)	,216	.	,075	,000	,022	,365	,291	,400	,106	,236	,305	,005	,039	,140	,014
	Zscore: NACE sector	,000	,075	.	,097	,016	,000	,000	,008	,495	,260	,131	,204	,120	,141	,079
	Zscore(AGE_In)	,000	,000	,097	.	,052	,359	,133	,238	,124	,418	,145	,077	,282	,286	,025
	Zscore(INTERN)	,003	,022	,016	,052	.	,051	,031	,494	,131	,441	,285	,491	,126	,452	,374
	Zscore: COMPUTE UNF_CHANGE	,000	,365	,000	,359	,051	.	,001	,006	,172	,443	,308	,142	,084	,170	,495
	Zscore: EMPL. PROFILE	,000	,291	,000	,133	,031	,001	.	,000	,427	,383	,172	,000	,000	,000	,029
	Zscore: ORGAN. CLIMATE	,000	,400	,008	,238	,494	,006	,000	.	,121	,361	,412	,000	,000	,000	,000
	Zscore: MARK. INFORM.	,313	,106	,495	,124	,131	,172	,427	,121	.	,000	,000	,251	,218	,088	,234
	Zscore: MAT. RESOURC.	,295	,236	,260	,418	,441	,443	,383	,361	,000	.	,000	,092	,241	,369	,203
	Zscore: TECHNOLOGY	,251	,305	,131	,145	,285	,308	,172	,412	,000	,000	.	,095	,327	,331	,144
	Zscore: FINANCIAL RES.	,001	,005	,204	,077	,491	,142	,000	,000	,251	,092	,095	.	,000	,000	,006
	Zscore: FIRM'S MARKETPLACE IMAGE	,000	,039	,120	,282	,126	,084	,000	,000	,218	,241	,327	,000	.	,000	,000
	Zscore: NR. EMPLOYEES	,005	,140	,141	,286	,452	,170	,000	,000	,088	,369	,331	,000	,000	.	,086
	Zscore(EP)	,000	,014	,079	,025	,374	,495	,029	,000	,234	,203	,144	,006	,000	,086	.

Table A.3.4 ANOVA ^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	24,855	4	6,214	7,495	,000 ^b
	Residual	101,145	122	,829		
	Total	126,000	126			
2	Regression	32,545	5	6,509	8,427	,000 ^c
	Residual	93,455	121	,772		
	Total	126,000	126			
3	Regression	63,428	13	4,879	8,811	,000 ^d
	Residual	62,572	113	,554		
	Total	126,000	126			
4	Regression	69,703	14	4,979	9,905	,000 ^e
	Residual	56,297	112	,503		
	Total	126,000	126			

a. Dependent Variable: Zscore(IB)

b. Predictors: (Constant), Zscore(INTERN), Zscore(AGE_In), Zscore: NACE sector, Zscore(EMPLOYEE_Ln)

c. Predictors: (Constant), Zscore(INTERN), Zscore(AGE_In), Zscore: NACE sector, Zscore(EMPLOYEE_Ln), Zscore: COMPUTE UNF_CHANGE

d. Predictors: (Constant), Zscore(INTERN), Zscore(AGE_In), Zscore: NACE sector, Zscore(EMPLOYEE_Ln), Zscore: COMPUTE UNF_CHANGE, Zscore: MATERIAL RESOURCES, Zscore: NR. OF EMPLOYEES, Zscore: ORGAN. CLIMATE, Zscore: MARKET INFORMATION, Zscore: FINANCIAL RESOURCES, Zscore: FIRM'S MARKETPLACE IMAGE, Zscore: EMPLOYEES' PROFILE Zscore: TECHNOLOGY

e. Predictors: (Constant), Zscore(INTERN), Zscore(AGE_In), Zscore: NACE sector, Zscore(EMPLOYEE_Ln), Zscore: COMPUTE UNF_CHANGE, Zscore: MATERIAL RESOURCES, Zscore: NR. OF EMPLOYEES, Zscore: ORGAN. CLIMATE, Zscore: MARKET INFORMATION, Zscore: FINANCIAL RESOURCES, Zscore: FIRM'S MARKETPLACE IMAGE, Zscore: EMPLOYEES' PROFILE Zscore: TECHNOLOGY, Zscore(EP)

Table A.3.5 Coefficients ^a

Model		Unstandardized Coefficients		Stand. Coeff.	t	Sig.	Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	1,006E-013	,081		,000	1,000					
	Zscore(EMPLOYEE_Ln)	,022	,090	,022	,243	,809	-,070	,022	,020	,808	1,237
	Zscore: NACE sector	,252	,085	,252	2,968	,004	,317	,260	,241	,911	1,098
	Zscore(AGE_In)	-,258	,089	-,258	-2,904	,004	-,303	-,254	-,236	,834	1,199
	Zscore(INTERN)	-,165	,085	-,165	-1,952	,053	-,247	-,174	-,158	,919	1,088
2	(Constant)	1,002E-013	,078		,000	1,000					
	Zscore(EMPLOYEE_Ln)	,057	,088	,057	,654	,514	-,070	,059	,051	,795	1,258
	Zscore: NACE sector	,150	,088	,150	1,699	,092	,317	,153	,133	,788	1,269
	Zscore(AGE_In)	-,265	,086	-,265	-3,090	,002	-,303	-,270	-,242	,834	1,200
	Zscore(INTERN)	-,229	,084	-,229	-2,726	,007	-,247	-,241	-,213	,866	1,155
3	Zscore: COMPUTE UNF_CHANGE	,269	,085	,269	3,155	,002	,290	,276	,247	,842	1,187
	(Constant)	-1,004E-013	,066		,000	1,000					
	Zscore(EMPLOYEE_Ln)	,009	,079	,009	,116	,908	-,070	,011	,008	,707	1,414
	Zscore: NACE sector	,065	,082	,065	,802	,424	,317	,075	,053	,660	1,515
	Zscore(AGE_In)	-,226	,074	-,226	-3,037	,003	-,303	-,275	-,201	,794	1,260
	Zscore(INTERN)	-,196	,075	-,196	-2,623	,010	-,247	-,240	-,174	,790	1,265
	Zscore: COMPUTE UNF_CHANGE	,146	,076	,146	1,926	,057	,290	,178	,128	,762	1,312
	Zscore: EMPLOYEES' PROFILE	,173	,094	,173	1,851	,067	,496	,172	,123	,501	1,996
	Zscore: ORGAN. CLIMATE	,372	,088	,372	4,251	,000	,547	,371	,282	,574	1,743
	Zscore: MARKET INFORMATION	-,023	,078	-,023	-,299	,766	,044	-,028	-,020	,714	1,401
	Zscore: MATERIAL RESOURCES	,155	,099	,155	1,568	,120	,048	,146	,104	,448	2,234
	Zscore: TECHNOLOGY	-,108	,100	-,108	-1,085	,280	-,060	-,102	-,072	,442	2,264
	Zscore: FINANCIAL RESOURCES	,092	,084	,092	1,093	,277	,269	,102	,072	,623	1,606
	Zscore: FIRM'S MARKET. IMAGE	,040	,086	,040	,459	,647	,318	,043	,030	,591	1,692
	Zscore: NR. OF EMPLOYEES	-,068	,088	-,068	-,775	,440	,229	-,073	-,051	,572	1,748
	(Constant)	-1,001E-013	,063		,000	1,000					
4	Zscore(EMPLOYEE_Ln)	-,062	,078	-,062	-,803	,423	-,070	-,076	-,051	,659	1,517
	Zscore: NACE sector	,059	,078	,059	,758	,450	,317	,071	,048	,660	1,516
	Zscore(AGE_In)	-,162	,073	-,162	-2,213	,029	-,303	-,205	-,140	,745	1,343
	Zscore(INTERNAR)	-,181	,071	-,181	-2,543	,012	-,247	-,234	-,161	,788	1,269
	Zscore: COMPUTE UNF_CHANGE	,168	,073	,168	2,312	,023	,290	,213	,146	,757	1,321
	Zscore: EMPLOYEES' PROFILE	,207	,090	,207	2,304	,023	,496	,213	,146	,495	2,019
	Zscore: ORGAN. CLIMATE	,246	,091	,246	2,717	,008	,547	,249	,172	,485	2,061
	Zscore: MARKET INFORMATION	-,035	,075	-,035	-,465	,643	,044	-,044	-,029	,713	1,403
	Zscore: MATERIAL RESOURCES	,156	,094	,156	1,654	,101	,048	,154	,104	,448	2,234
	Zscore: TECHNOLOGY	-,086	,095	-,086	-,904	,368	-,060	-,085	-,057	,440	2,274
	Zscore: FINANCIAL RESOURCES	,075	,080	,075	,930	,354	,269	,088	,059	,620	1,612
	Zscore: FIRM'S MARKET. IMAGE	,022	,082	,022	,267	,790	,318	,025	,017	,589	1,698
	Zscore: NR. OF EMPLOYEES	-,054	,084	-,054	-,644	,521	,229	-,061	-,041	,571	1,752
	Zscore(EP)	,272	,077	,272	3,533	,001	,458	,317	,223	,675	1,482

a. Dependent Variable: Zscore(IB)

Table A.3.6 Collinearity Diagnostics ^a

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions													
				(Constant)	Zscore (EMPLOYEE_Ln)	Zscore: NACE sector	Zscore (AGE_In)	Zscore (INTERN)	Zscore: COMPUTE UNF_CHANGE	Zscore: EMPLOYEE S' PROFILE	Zscore: ORGAN. CLIMATE	Zscore: MARKET INFORMAT.	Zscore: MATERIAL RESOURCES	Zscore: TECHNOL.	Zscore: FINANCIAL RESOURC.	Zscore: FIRM'S M.IMAGE	Zscore: NR. OF EMPLOYEES
1	1	1,492	1,000	,00	,19	,02	,22	,14									
	2	1,152	1,138	,00	,14	,51	,01	,12									
	3	1,000	1,221	1,00	,00	,00	,00	,00									
	4	,820	1,349	,00	,01	,16	,29	,63									
	5	,537	1,667	,00	,66	,31	,48	,11									
2	1	1,494	1,000	,00	,18	,03	,22	,12	,00								
	2	1,329	1,060	,00	,05	,28	,00	,00	,28								
	3	1,042	1,197	,00	,10	,08	,04	,42	,16								
	4	1,000	1,222	1,00	,00	,00	,00	,00	,00								
	5	,687	1,474	,00	,23	,05	,54	,18	,21								
3	6	,448	1,827	,00	,44	,56	,20	,28	,35								
	1	2,926	1,000	,00	,00	,01	,00	,00	,01	,04	,04	,00	,00	,00	,03	,04	,03
	2	2,104	1,179	,00	,00	,01	,00	,00	,00	,00	,00	,07	,07	,08	,01	,00	,00
	3	1,637	1,337	,00	,12	,04	,15	,06	,01	,01	,00	,01	,00	,00	,02	,00	,00
	4	1,201	1,561	,00	,05	,16	,03	,04	,21	,00	,00	,00	,00	,00	,03	,01	,03
	5	1,099	1,632	,00	,04	,05	,06	,35	,05	,01	,01	,02	,01	,01	,00	,03	,00
	6	1,000	1,711	1,00	,00	,00	,00	,00	,00	,00	,00	,00	,00	,00	,00	,00	,00
	7	,869	1,835	,00	,14	,06	,02	,00	,23	,00	,01	,21	,01	,01	,03	,04	,03
	8	,654	2,115	,00	,01	,02	,09	,10	,04	,01	,15	,08	,03	,02	,16	,03	,22
	9	,605	2,198	,00	,22	,00	,56	,00	,02	,02	,03	,03	,01	,00	,25	,01	,03
	10	,528	2,353	,00	,01	,00	,00	,05	,00	,09	,16	,30	,02	,05	,08	,27	,11
	11	,434	2,598	,00	,00	,06	,02	,23	,24	,00	,40	,13	,01	,01	,00	,40	,00
	12	,377	2,786	,00	,10	,41	,01	,00	,00	,66	,00	,01	,02	,00	,11	,01	,16
	13	,304	3,104	,00	,30	,18	,05	,16	,18	,12	,19	,12	,00	,00	,28	,14	,37
	14	,263	3,337	,00	,00	,00	,02	,00	,00	,03	,01	,00	,81	,82	,00	,01	,00
4	1	3,101	1,000	,00	,00	,01	,00	,00	,01	,03	,03	,00	,00	,00	,02	,03	,03
	2	2,104	1,214	,00	,00	,00	,00	,00	,00	,00	,00	,07	,07	,07	,01	,00	,00
	3	1,638	1,376	,00	,11	,04	,15	,06	,01	,01	,00	,02	,00	,00	,02	,00	,01
	4	1,246	1,577	,00	,01	,12	,05	,00	,20	,02	,01	,01	,01	,01	,01	,01	,00
	5	1,137	1,651	,00	,02	,01	,02	,24	,06	,02	,01	,05	,00	,00	,03	,00	,07
	6	1,062	1,709	,00	,16	,12	,01	,15	,06	,00	,00	,00	,00	,00	,00	,02	,03
	7	1,000	1,761	1,00	,00	,00	,00	,00	,00	,00	,00	,00	,00	,00	,00	,00	,00
	8	,741	2,046	,00	,01	,05	,00	,04	,21	,03	,02	,15	,01	,00	,13	,09	,04
	9	,636	2,207	,00	,08	,00	,37	,04	,00	,00	,10	,23	,05	,02	,01	,01	,08
	10	,563	2,347	,00	,07	,00	,16	,00	,01	,01	,09	,19	,01	,05	,38	,08	,00
	11	,471	2,565	,00	,05	,02	,02	,21	,07	,04	,01	,00	,00	,00	,01	,61	,18
	12	,382	2,851	,00	,03	,00	,07	,09	,21	,17	,24	,19	,01	,01	,01	,02	,34
	13	,375	2,874	,00	,07	,52	,00	,03	,08	,47	,05	,02	,02	,01	,21	,00	,01
	14	,284	3,307	,00	,38	,11	,15	,12	,07	,12	,37	,06	,07	,04	,16	,13	,19
	15	,261	3,450	,00	,01	,00	,00	,01	,00	,07	,08	,00	,74	,77	,01	,00	,01

a. Dependent Variable: Zscore(IB)

APPENDIX 4: SPSS Outputs (Relative to Article 3)

Multiple Regression

A.4.1 Variables Entered/Removed ^a

Model	Variables Entered	Variables Removed	Method
1	Zscore(INTERNAR), Zscore(AGE_Ln), Zscore: NACE sector, Zscore(EMPLOYEE_Ln) ^b	.	Enter
2	Zscore(IB)	.	Stepwise (Criteria: Probability-of-F-to-enter <= ,050, Probability-of-F-to-remove >= ,100).
3	Zscore(EP)	.	Stepwise (Criteria: Probability-of-F-to-enter <= ,050, Probability-of-F-to-remove >= ,100).
4	Z_EP_IB_interact ^b	.	Enter

a. Dependent Variable: Zscore(INNOV)

b. All requested variables entered.

Table A.4.2 Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	,403 ^a	,162	,135	,93011705	,162	5,911	4	122	,000
2	,630 ^b	,397	,372	,79234980	,235	47,113	1	121	,000
3	,662 ^c	,439	,411	,76773561	,042	8,883	1	120	,003
4	,663 ^d	,440	,407	,77001311	,001	,291	1	119	,590

a. Predictors: (Constant), Zscore(INTERN), Zscore(AGE_Ln), Zscore: NACE sector, Zscore(EMPLOYEE_Ln)

b. Predictors: (Constant), Zscore(INTERN), Zscore(AGE_Ln), Zscore: NACE sector, Zscore(EMPLOYEE_Ln), Zscore(IB)

c. Predictors: (Constant), Zscore(INTERN), Zscore(AGE_Ln), Zscore: NACE sector, Zscore(EMPLOYEE_Ln), Zscore(IB), Zscore(EP)

d. Predictors: (Constant), Zscore(INTERN), Zscore(AGE_Ln), Zscore: NACE sector, Zscore(EMPLOYEE_Ln), Zscore(IB), Zscore(EP), Z_EP_IB_interact

A.4.3 Correlations

		Zscore (INNOV)	Zscore: NACE sector	Zscore (EMPLOYEE_ Ln)	Zscore (AGE_In)	Zscore (INTERNAR)	Zscore (EP)	Zscore (IB)	Z_EP_IB _interact
Pearson Correlation	Zscore(OUTC_CE)	1,000	,302	,191	-,122	,109	,475	,528	-,038
	Zscore: NACE sector	,302	1,000	,129	-,116	-,191	,126	,317	,196
	Zscore(EMPLOYEE_Ln)	,191	,129	1,000	,370	,178	,196	-,070	-,001
	Zscore(AGE_In)	-,122	-,116	,370	1,000	,145	-,174	-,303	-,028
	Zscore(INTERNAR)	,109	-,191	,178	,145	1,000	-,029	-,247	-,015
	Zscore(EP)	,475	,126	,196	-,174	-,029	1,000	,458	-,126
	Zscore(IB)	,528	,317	-,070	-,303	-,247	,458	1,000	-,167
	Z_EP_IB_interact	-,038	,196	-,001	-,028	-,015	-,126	-,167	1,000
Sig. (1-tailed)	Zscore(OUTC_CE)	.	,000	,016	,086	,112	,000	,000	,336
	Zscore: NACE sector	,000	.	,075	,097	,016	,079	,000	,013
	Zscore(EMPLOYEE_Ln)	,016	,075	.	,000	,022	,014	,216	,494
	Zscore(AGE_In)	,086	,097	,000	.	,052	,025	,000	,377
	Zscore(INTERNAR)	,112	,016	,022	,052	.	,374	,003	,434
	Zscore(EP)	,000	,079	,014	,025	,374	.	,000	,079
	Zscore(IB)	,000	,000	,216	,000	,003	,000	.	,030
	Z_EP_IB_interact	,336	,013	,494	,377	,434	,079	,030	.

Table A.4.4 Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	1,011E-013	,083		,000	1,000					
	Zscore: NACE Sector	,285	,087	,285	3,282	,001	,302	,285	,272	,911	1,098
	Zscore(EMPLOYEE_Ln)	,195	,092	,195	2,113	,037	,191	,188	,175	,808	1,237
	Zscore(AGE_Ln)	-,183	,091	-,183	-2,018	,046	-,122	-,180	-,167	,834	1,199
	Zscore(INTERN)	,155	,086	,155	1,792	,076	,109	,160	,149	,919	1,088
2	(Constant)	1,008E-013			,000	1,000					
	Zscore: NACE Sector	,149	,077	,149	1,939	,055	,302	,174	,137	,850	1,177
	Zscore(EMPLOYEE_Ln)	,183	,079	,183	2,329	,022	,191	,207	,164	,808	1,238
	Zscore(AGE_Ln)	-,044	,080	-,044	-,546	,586	-,122	-,050	-,039	,780	1,282
	Zscore(INTERN)	,244	,075	,244	3,267	,001	,109	,285	,231	,891	1,122
3	Zscore(IB)	,541	,079	,541	6,864	,000	,528	,529	,485	,803	1,246
	(Constant)	1,010E-013	,068		,000	1,000					
	Zscore: NACE sector	,165	,074	,165	2,213	,029	,302	,198	,151	,845	1,183
	Zscore(EMPLOYEE_Ln)	,114	,080	,114	1,434	,154	,191	,130	,098	,740	1,352
	Zscore(AGE_Ln)	-,007	,078	-,007	-,086	,931	-,122	-,008	-,006	,761	1,314
4	Zscore(INTERN)	,234	,073	,234	3,220	,002	,109	,282	,220	,889	1,124
	Zscore(IB)	,429	,085	,429	5,040	,000	,528	,418	,345	,646	1,547
	Zscore(EP)	,241	,081	,241	2,980	,003	,475	,263	,204	,715	1,399
	(Constant)	-,017	,075		-,221	,826					
	Zscore: NACE sector	,154	,077	,154	1,992	,049	,302	,180	,137	,789	1,268
	Zscore(EMPLOYEE_Ln)	,115	,080	,115	1,437	,153	,191	,131	,099	,739	1,352
	Zscore(AGE_Ln)	-,004	,079	-,004	-,048	,962	-,122	-,004	-,003	,757	1,321
	Zscore(INTERN)	,234	,073	,234	3,218	,002	,109	,283	,221	,889	1,125
	Zscore(IB)	,439	,087	,439	5,025	,000	,528	,418	,345	,617	1,621
	Zscore(EP)	,243	,081	,243	2,994	,003	,475	,265	,205	,713	1,403
	Z EP IB interact	,036	,067	,039	,540	,590	-,038	,049	,037	,894	1,118

a. Dependent Variable: Zscore(INNOV)

Table A.4.5 ANOVA ^a

	Model	Sum of Squares	df	Mean Square	F	Sig.
1	Regression	20,456	4	5,114	5,911	,000 ^b
	Residual	105,544	122	,865		
	Total	126,000	126			
2	Regression	50,034	5	10,007	15,939	,000 ^c
	Residual	75,966	121	,628		
	Total	126,000	126			
3	Regression	55,270	6	9,212	15,628	,000 ^d
	Residual	70,730	120	,589		
	Total	126,000	126			
4	Regression	55,442	7	7,920	13,358	,000 ^e
	Residual	70,558	119	,593		
	Total	126,000	126			

a. Dependent Variable: Zscore(INNOV)

b. Predictors: (Constant), Zscore(INTERN), Zscore(AGE_In), Zscore: NACE sector, Zscore(EMPLOYEE_Ln)

c. Predictors: (Constant), Zscore(INTERN), Zscore(AGE_In), Zscore: NACE sector, Zscore(EMPLOYEE_Ln), Zscore(IB)

d. Predictors: (Constant), Zscore(INTERN), Zscore(AGE_In), Zscore: NACE sector, Zscore(EMPLOYEE_Ln), Zscore(IB), Zscore(EP)

e. Predictors: (Constant), Zscore(INTERN), Zscore(AGE_In), Zscore: NACE sector, Zscore(EMPLOYEE_Ln), Zscore(IB), Zscore(EP), Z_EP_IB_interact

Table A.4.6 Collinearity Diagnostics^a

Model	Dimension	Eigenvalue	Condition Index	Variance Proportions							
				(Constant)	Zscore: NACE sector	Zscore (EMPLOYEE_Ln)	Zscore (AGE_In)	Zscore (INTERN)	Zscore (IB)	Zscore (EP)	Z_EP_IB_interact
1	1	1,492	1,000	,00	,02	,19	,22	,14			
	2	1,152	1,138	,00	,51	,14	,01	,12			
	3	1,000	1,221	1,00	,00	,00	,00	,00			
	4	,820	1,349	,00	,16	,01	,29	,63			
	5	,537	1,667	,00	,31	,66	,48	,11			
2	1	1,759	1,000	,00	,06	,06	,12	,10	,13		
	2	1,247	1,188	,00	,25	,29	,06	,00	,05		
	3	1,000	1,326	1,00	,00	,00	,00	,00	,00		
	4	,844	1,444	,00	,02	,01	,19	,75	,06		
	5	,630	1,671	,00	,58	,07	,03	,00	,62		
	6	,520	1,838	,00	,09	,58	,60	,14	,14		
3	1	1,910	1,000	,00	,06	,01	,08	,06	,12	,06	
	2	1,397	1,169	,00	,04	,28	,08	,03	,01	,09	
	3	1,000	1,382	1,00	,00	,00	,00	,00	,00	,00	
	4	,998	1,383	,00	,25	,01	,08	,32	,01	,15	
	5	,763	1,582	,00	,44	,00	,13	,44	,01	,08	
	6	,529	1,899	,00	,00	,30	,52	,15	,38	,02	
	7	,403	2,176	,00	,20	,40	,11	,00	,48	,59	
4	1	1,914	1,000	,00	,05	,01	,08	,06	,11	,07	,00
	2	1,459	1,145	,18	,01	,04	,02	,02	,00	,03	,23
	3	1,386	1,175	,04	,08	,25	,06	,02	,01	,06	,04
	4	,998	1,385	,13	,20	,01	,07	,27	,01	,13	,00
	5	,803	1,544	,18	,21	,00	,15	,42	,01	,02	,04
	6	,578	1,819	,22	,13	,08	,12	,18	,17	,18	,23
	7	,480	1,996	,18	,01	,38	,49	,03	,07	,12	,29
	8	,381	2,240	,08	,31	,24	,02	,00	,61	,40	,17

a. Dependent Variable: Zscore(INNOV)

APPENDIX 5: SPSS Outputs (Relative to Article 4)

Cluster analysis

Table A.5.1 Cluster Membership

Case	4 Clusters	3 Clusters	2 Clusters
1: 674	1	1	1
2: 213	1	1	1
3: 233	2	2	1
4: 499	3	3	2
5: 55	1	1	1
6: 191	4	1	1
7: 211	2	2	1
8: 240	4	1	1
9: 241	4	1	1
10: 249	3	3	2
11: 250	3	3	2
12: 251	2	2	1
13: 264	4	1	1
14: 268	1	1	1
15: 278	4	1	1
16: 279	1	1	1
17: 286	1	1	1
18: 288	3	3	2
19: 296	1	1	1
20: 306	2	2	1
21: 307	4	1	1
22: 309	1	1	1
23: 319	4	1	1
24: 322	3	3	2
25: 326	1	1	1
26: 327	4	1	1
27: 330	3	3	2
28: 340	3	3	2
29: 353	1	1	1
30: 357	2	2	1
31: 358	1	1	1
32: 362	1	1	1
33: 365	4	1	1
34: 375	1	1	1
35: 377	4	1	1
36: 388	4	1	1
37: 389	1	1	1
38: 396	3	3	2
39: 398	4	1	1
40: 402	4	1	1
41: 404	3	3	2
42: 406	1	1	1
43: 410	1	1	1
44: 427	1	1	1
45: 430	1	1	1
46: 433	2	2	1
47: 451	4	1	1
48: 454	2	2	1
49: 456	2	2	1
50: 460	1	1	1
51: 465	1	1	1
52: 469	4	1	1
53: 471	4	1	1
54: 477	3	3	2
55: 500	4	1	1
56: 503	1	1	1
57: 508	4	1	1
58: 513	1	1	1
59: 514	3	3	2
60: 529	4	1	1
61: 537	1	1	1
62: 539	3	3	2
63: 545	1	1	1
64: 546	3	3	2

Case	4 Clusters	3 Clusters	2 Clusters
65: 550	3	3	2
66: 552	1	1	1
67: 556	1	1	1
68: 558	1	1	1
69: 571	1	1	1
70: 584	2	2	1
71: 587	2	2	1
72: 590	4	1	1
73: 591	4	1	1
74: 610	1	1	1
75: 612	1	1	1
76: 629	3	3	2
77: 635	1	1	1
78: 637	4	1	1
79: 638	2	2	1
80: 645	1	1	1
81: 648	1	1	1
82: 652	2	2	1
83: 676	4	1	1
84: 678	4	1	1
85: 686	4	1	1
86: 712	3	3	2
87: 457	3	3	2
88: 485	1	1	1
89: 128	2	2	1
90: 178	2	2	1
91: 475	1	1	1
92: 35	1	1	1
93: 50	1	1	1
94: 78	1	1	1
95: 179	1	1	1
96: 700	1	1	1
97: 701	2	2	1
98: 26	1	1	1
99: 37	1	1	1
100: 43	2	2	1
101: 64	2	2	1
102: 69	4	1	1
103: 87	4	1	1
104: 99	1	1	1
105: 125	1	1	1
106: 127	1	1	1
107: 136	2	2	1
108: 189	1	1	1
109: 691	1	1	1
110: 692	1	1	1
111: 694	2	2	1
112: 707	1	1	1
113: 75	2	2	1
114: 199	2	2	1
115: 200	2	2	1
116: 11	2	2	1
117: 66	3	3	2
118: 85	1	1	1
119: 93	1	1	1
120: 118	2	2	1
121: 41	2	2	1
122: 53	1	1	1
123: 187	1	1	1
124: 47	3	3	2
125: 61	1	1	1
126: 97	1	1	1
127: 140	2	2	1

MANOVA Analysis

Table A.5.2 Between-Subjects Factors

	N
1	34
2	21
3	52
4	18

Table A.5.3 Box's Test of Equality of Covariance Matrices ^a

Box's M	448,220
F	1,384
df1	231
df2	15394,345
Sig.	,000

Tests the null hypothesis that the observed covariance matrices of the dependent variables are equal across groups.

a. Design: Intercept + CLU4_1

Table A.5.4 Multivariate Tests ^a

Effect		Value	F	Hypothesis df	Error df	Sig.	Noncent. Parameter	Observed Power ^a
Intercept	Pillai's Trace	,308	2,144 ^b	21,000	101,000	,006	45,031	,985
	Wilks' Lambda	,692	2,144 ^b	21,000	101,000	,006	45,031	,985
	Hotelling's Trace	,446	2,144 ^b	21,000	101,000	,006	45,031	,985
	Roy's Largest Root	,446	2,144 ^b	21,000	101,000	,006	45,031	,985
CLU4_1	Pillai's Trace	1,553	5,262	63,000	309,000	,000	331,524	1,000
	Wilks' Lambda	,066	7,124	63,000	302,325	,000	445,416	1,000
	Hotelling's Trace	5,850	9,255	63,000	299,000	,000	583,063	1,000
	Roy's Largest Root	4,197	20,586 ^c	21,000	103,000	,000	432,296	1,000

a. Design: Intercept + CLU4_1

b. Exact statistic

c. The statistic is an upper bound on F that yields a lower bound on the significance level.

d. Computed using alpha = ,05

Table A.5.5 Levene's Test of Equality of Error Variances ^a

	F	df1	df2	Sig.
Zscore (EP)	5,942	3	121	,001
Zscore (IB)	3,884	3	121	,011
Zscore (EMPLOYEE_Ln)	3,012	3	121	,033
Zscore (AGE_Ln)	1,536	3	121	,209
Zscore (INTERN)	3,631	3	121	,015
Zscore: NACE sector	17,310	3	121	,000
Zscore: COMPUTE UNF_CHANGE	,708	3	121	,549
Zscore: MARKET INFORMATION	,342	3	121	,795
Zscore: MATERIAL RESOURCES	,939	3	121	,424
Zscore: TECHNOLOGY	,377	3	121	,770
Zscore: EMPLOYEES' PROFILE	,516	3	121	,672
Zscore: FIRM'S MARKETPLACE IMAGE	8,511	3	121	,000
Zscore: FINANCIAL RESOURCES	1,538	3	121	,208
Zscore: NR. OF EMPLOYEES	,128	3	121	,943
Zscore: ORGAN. CLIMATE	1,334	3	121	,266
Zscore (PERF_ABSENT_RC)	,899	3	121	,444
Zscore: COMMITMENT	2,067	3	121	,108
Zscore: RAI	2,193	3	121	,092
Zscore: TURNOVER	1,456	3	121	,230
Zscore: TURNOVER GROWTH	2,515	3	121	,062
Zscore PERF_EMPLOYEE TURNOVER_RC)	1,341	3	121	,264

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Design: Intercept + CLU4_1

Post-hoc Tests

Table A.5.6 Multiple Comparisons (Test Dunnett T3)

Dependent Variable	(I) Average Linkage (Within Group)	(J) Average Linkage (Within Group)	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Zscore(EP)	1	2	1,2350899	,13994240	,000	,8512069	1,6189728
		3	1,7011271	,13982263	,000	1,3247530	2,0775012
		4	1,7124856	,11301177	,000	1,4035630	2,0214082
	2	1	-1,2350899	,13994240	,000	-1,6189728	-,8512069
		3	,4660372	,14919679	,017	,0602151	,8718594
		4	,4773957	,12442257	,003	,1302965	,8244949
	3	1	-1,7011271	,13982263	,000	-2,0775012	-1,3247530
		2	-,4660372	,14919679	,017	-,8718594	-,0602151
		4	,0113584	,12428785	1,000	-,3249982	,3477151
	4	1	-1,7124856	,11301177	,000	-2,0214082	-1,4035630
		2	-,4773957	,12442257	,003	-,8244949	-,1302965
		3	-,0113584	,12428785	1,000	-,3477151	,3249982
Zscore(IB)	1	2	-,8542358	,13015214	,000	-1,2092388	-,4992328
		3	1,4363058	,12396261	,000	1,0998718	1,7727398
		4	,1638523	,11545512	,641	-,1527175	,4804220
	2	1	,8542358	,13015214	,000	,4992328	1,2092388
		3	2,2905416	,10558665	,000	2,0019757	2,5791074
		4	1,0180881	,09545521	,000	,7522130	1,2839632
	3	1	-1,4363058	,12396261	,000	-1,7727398	-1,0998718
		2	-2,2905416	,10558665	,000	-2,5791074	-2,0019757
		4	-1,2724535	,08682653	,000	-1,5078637	-1,0370433
	4	1	-,1638523	,11545512	,641	-,4804220	,1527175
		2	-1,0180881	,09545521	,000	-1,2839632	-,7522130
		3	1,2724535	,08682653	,000	1,0370433	1,5078637
Zscore(EMPLOYEE_Ln)	1	2	,8844637	,23423471	,002	,2455105	1,5234169
		3	,2475778	,23120272	,863	-,3776225	,8727781
		4	,3388190	,28350949	,792	-,4446042	1,1222423
	2	1	-,8844637	,23423471	,002	-1,5234169	-,2455105
		3	-,6368858	,20636317	,019	-1,1987423	-,0750294
		4	-,5456447	,26364501	,241	-1,2839245	,1926352
	3	1	-,2475778	,23120272	,863	-,8727781	,3776225
		2	,6368858	,20636317	,019	,0750294	1,1987423
		4	,0912412	,26095496	1,000	-,6365880	,8190704
	4	1	-,3388190	,28350949	,792	-1,1222423	,4446042
		2	,5456447	,26364501	,241	-,1926352	1,2839245
		3	-,0912412	,26095496	1,000	-,8190704	,6365880
Zscore(AGE_Ln)	1	2	,5043888	,28505657	,396	-,2760759	1,2848535
		3	-,4774037	,22685523	,212	-1,0948879	,1400804
		4	-,3308761	,28516120	,813	-1,1154355	,4536834
	2	1	-,5043888	,28505657	,396	-1,2848535	,2760759
		3	-,9817926	,23865291	,001	-1,6470177	-,3165674
		4	-,8352649	,29463338	,043	-1,6519309	-,0185989
	3	1	,4774037	,22685523	,212	-,1400804	1,0948879
		2	,9817926	,23865291	,001	,3165674	1,6470177
		4	,1465277	,23877787	,989	-,5257076	,8187629
	4	1	,3308761	,28516120	,813	-,4536834	1,1154355
		2	,8352649	,29463338	,043	,0185989	1,6519309
		3	-,1465277	,23877787	,989	-,8187629	,5257076

Zscore(INTERN)	1	2	,2653047	,27695192	,912	-,4980982	1,0287075
		3	-,4577117	,22132438	,224	-,10551065	,1396830
		4	-,2278083	,22327072	,886	-,8392462	,3836297
	2	1	-,2653047	,27695192	,912	-,10287075	,4980982
		3	-,7230164	,26492022	,055	-,14557772	,0097444
		4	-,4931129	,26654841	,352	-,12351051	,2488793
	3	1	,4577117	,22132438	,224	-,1396830	1,0551065
		2	,7230164	,26492022	,055	-,0097444	1,4557772
		4	,2299035	,20815900	,845	-,3391161	,7989231
	4	1	,2278083	,22327072	,886	-,3836297	,8392462
		2	,4931129	,26654841	,352	-,2488793	1,2351051
		3	-,2299035	,20815900	,845	-,7989231	,3391161
Zscore: NACE sector	1	2	-,0350856	,32191451	1,000	-,9239021	,8537309
		3	,6665539	,20177173	,011	,1114936	1,2216143
		4	-,1027684	,31706775	1,000	-,9836877	,7781510
	2	1	,0350856	,32191451	1,000	-,8537309	,9239021
		3	,7016395	,27103413	,090	-,0732760	1,4765550
		4	-,0676828	,36507482	1,000	-,10794210	,9440554
	3	1	-,6665539	,20177173	,011	-,12216143	-,1114936
		2	-,7016395	,27103413	,090	-,14765550	,0732760
		4	-,7693223	,26525932	,050	-,15385732	-,0000714
	4	1	,1027684	,31706775	1,000	-,7781510	,9836877
		2	,0676828	,36507482	1,000	-,9440554	1,0794210
		3	,7693223	,26525932	,050	,0000714	1,5385732
Zscore: COMPUTE UNF_CHANGE	1	2	-,5957564	,26753098	,167	-,13284369	,1369241
		3	,0593673	,22944592	1,000	-,5613915	,6801261
		4	-,5701810	,24834454	,144	-,12508752	,1105132
	2	1	,5957564	,26753098	,167	-,1369241	1,3284369
		3	,6551237	,24140263	,055	-,0100871	1,3203346
		4	,0255754	,25943171	1,000	-,6934303	,7445811
	3	1	-,0593673	,22944592	1,000	-,6801261	,5613915
		2	-,6551237	,24140263	,055	-,13203346	,0100871
		4	-,6295483	,21994867	,038	-,12353803	-,0237163
	4	1	,5701810	,24834454	,144	-,1105132	1,2508752
		2	-,0255754	,25943171	1,000	-,7445811	,6934303
		3	,6295483	,21994867	,038	,0237163	1,2353803
Zscore: MARKET INFORMATION	1	2	,5166461	,27375870	,327	-,2382361	1,2715283
		3	,2582193	,21809575	,800	-,3303896	,8468282
		4	,1573770	,28312907	,994	-,6308441	,9455980
	2	1	-,5166461	,27375870	,327	-,12715283	,2382361
		3	-,2584268	,26260832	,901	-,9848766	,4680230
		4	-,3592691	,31868392	,831	-,12431030	,5245648
	3	1	-,2582193	,21809575	,800	-,8468282	,3303896
		2	,2584268	,26260832	,901	-,4680230	,9848766
		4	-,1008423	,27236257	,999	-,8628242	,6611395
	4	1	-,1573770	,28312907	,994	-,9455980	,6308441
		2	,3592691	,31868392	,831	-,5245648	1,2431030
		3	,1008423	,27236257	,999	-,6611395	,8628242
Zscore: MATERIAL RESOURCES	1	2	,0382094	,28820935	1,000	-,7544660	,8308847
		3	-,0125374	,22711844	1,000	-,6270852	,6020103
		4	-,3204014	,26670323	,789	-,10546508	,4138481
	2	1	-,0382094	,28820935	1,000	-,8308847	,7544660
		3	-,0507468	,26403539	1,000	-,7834560	,6819624
		4	-,3586107	,29876832	,789	-,11865674	,4693460
	3	1	,0125374	,22711844	1,000	-,6020103	,6270852
		2	,0507468	,26403539	1,000	-,6819624	,7834560
		4	-,3078639	,24037609	,738	-,9757857	,3600578
	4	1	,3204014	,26670323	,789	-,4138481	1,0546508

Zscore: TECHNOLOGY	1	2	,3586107	,29876832	,789	-,4693460	1,1865674
		3	,3078639	,24037609	,738	-,3600578	,9757857
		2	,0297216	,27755247	1,000	-,7410193	,8004626
		3	-,1964122	,20027164	,905	-,7365791	,3437548
	2	4	,1292441	,27442082	,997	-,6388890	,8973771
		1	-,0297216	,27755247	1,000	-,8004626	,7410193
		3	-,2261338	,27135044	,952	-,9814570	,5291894
		4	,0995224	,32989259	1,000	-,8147581	1,0138030
	3	1	,1964122	,20027164	,905	-,3437548	,7365791
		2	,2261338	,27135044	,952	-,5291894	,9814570
		4	,3256562	,26814637	,780	-,4272920	1,0786044
		1	-,1292441	,27442082	,997	-,8973771	,6388890
Zscore: EMPLOYEES PROFILE	4	2	-,0995224	,32989259	1,000	-1,0138030	,8147581
		3	-,3256562	,26814637	,780	-1,0786044	,4272920
		2	-,4042733	,24096525	,457	-1,0649132	,2563665
		3	,5802571	,21028937	,043	,0124211	1,1480932
	2	4	-,0587632	,27148033	1,000	-,8134786	,6959522
		1	,4042733	,24096525	,457	-,2563665	1,0649132
		3	,9845305	,22616174	,000	,3629785	1,6060824
		4	,3455101	,28395260	,779	-,4444106	1,1354308
	3	1	-,5802571	,21028937	,043	-1,1480932	-,0124211
		2	-,9845305	,22616174	,000	-1,6060824	-,3629785
		4	-,6390204	,25843074	,106	-1,3621284	,0840877
		1	,0587632	,27148033	1,000	-,6959522	,8134786
Zscore: Imagem da empresa no mercado	4	2	-,3455101	,28395260	,779	-1,1354308	,4444106
		3	,6390204	,25843074	,106	-,0840877	1,3621284
		2	,2089357	,23451218	,934	-,4545682	,8724395
		3	,6984612	,18098379	,001	,2101262	1,1867963
	2	4	,2911557	,21566178	,691	-,3241367	,9064482
		1	-,2089357	,23451218	,934	-,8724395	,4545682
		3	,4895256	,26957652	,369	-,2526188	1,2316699
		4	,0822201	,29398362	1,000	-,7323711	,8968112
	3	1	-,6984612	,18098379	,001	-1,1867963	-,2101262
		2	-,4895256	,26957652	,369	-1,2316699	,2526188
		4	-,4073055	,25334866	,507	-1,1061584	,2915474
		1	-,2911557	,21566178	,691	-,9064482	,3241367
Zscore: Recursos financeiros	4	2	-,0822201	,29398362	1,000	-,8968112	,7323711
		3	,4073055	,25334866	,507	-,2915474	1,1061584
		2	,2428411	,29503069	,955	-,5754961	1,0611783
		3	,4343120	,20990442	,224	-,1325162	1,0011402
	2	4	,0404735	,27522184	1,000	-,7254566	,8064036
		1	-,2428411	,29503069	,955	-1,0611783	,5754961
		3	,1914709	,28286940	,982	-,5977274	,9806692
		4	-,2023676	,33421893	,990	-1,1284510	,7237158
	3	1	-,4343120	,20990442	,224	-1,0011402	,1325162
		2	-,1914709	,28286940	,982	-,9806692	,5977274
		4	-,3938385	,26214319	,584	-1,1283802	,3407032
		1	-,0404735	,27522184	1,000	-,8064036	,7254566
Zscore: Número de trabalhadores	4	2	,2023676	,33421893	,990	-,7237158	1,1284510
		3	,3938385	,26214319	,584	-,3407032	1,1283802
		2	-,0060300	,28716887	1,000	-,7979396	,7858795
		3	,2995309	,22254772	,693	-,3017473	,9008092
	1	4	,0879382	,27546974	1,000	-,6747453	,8506217
		1	,0060300	,28716887	1,000	-,7858795	,7979396
		3	,3055610	,27054940	,830	-,4451539	1,0562759
		4	,0939682	,31552031	1,000	-,7802952	,9682316
	3	1	-,2995309	,22254772	,693	-,9008092	,3017473
		2	-,3055610	,27054940	,830	-1,0562759	,4451539

Zscore: Clima organizacional (interno)	4	4	-,2115928	,25809803	,955	-,9314680	,5082825
		1	-,0879382	,27546974	1,000	-,8506217	,6747453
		2	-,0939682	,31552031	1,000	-,9682316	,7802952
		3	,2115928	,25809803	,955	-,5082825	,9314680
	1	2	-,0246850	,22301881	1,000	-,6400894	,5907194
		3	,9318330	,18693027	,000	,4282110	1,4354550
		4	,2698025	,24076100	,835	-,4032324	,9428373
		1	,0246850	,22301881	1,000	-,5907194	,6400894
	2	3	,9565179	,22357889	,001	,3413122	1,5717237
		4	,2944875	,27020446	,851	-,4556829	1,0446579
		1	-,9318330	,18693027	,000	-1,4354550	-,4282110
		2	-,9565179	,22357889	,001	-1,5717237	-,3413122
	3	4	-,6620305	,24127989	,056	-1,3349893	,0109284
		1	-,2698025	,24076100	,835	-,9428373	,4032324
		2	-,2944875	,27020446	,851	-1,0446579	,4556829
		3	,6620305	,24127989	,056	-,0109284	1,3349893
Zscore(PERF_ABS ENT_RC)	1	2	,0085052	,29228981	1,000	-,7975068	,8145172
		3	,4200264	,22568900	,334	-,1898538	1,0299066
		4	,2012899	,24716003	,958	-,4773457	,8799255
		1	-,0085052	,29228981	1,000	-,8145172	,7975068
	2	3	,4115212	,27460369	,586	-,3507854	1,1738277
		4	,1927847	,29250597	,985	-,6194657	1,0050351
		1	-,4200264	,22568900	,334	-1,0299066	,1898538
		2	-,4115212	,27460369	,586	-1,1738277	,3507854
	3	4	-,2187365	,22596888	,908	-,8415480	,4040751
		1	-,2012899	,24716003	,958	-,8799255	,4773457
		2	-,1927847	,29250597	,985	-1,0050351	,6194657
		3	,2187365	,22596888	,908	-,4040751	,8415480
	4	2	-,2826693	,21538548	,716	-,8728448	,3075062
		3	,6763140	,20453035	,008	,1252371	1,2273908
		4	,1026676	,27513807	,999	-,6687525	,8740877
		1	,2826693	,21538548	,716	-,3075062	,8728448
Zscore: COMMITMENT	2	3	,9589832	,21542855	,000	,3711609	1,5468056
		4	,3853369	,28333329	,684	-,4080038	1,1786776
		1	-,6763140	,20453035	,008	-1,2273908	-,1252371
		2	-,9589832	,21542855	,000	-1,5468056	-,3711609
	3	4	-,5736463	,27517179	,234	-1,3439221	,1966294
		1	-,1026676	,27513807	,999	-,8740877	,6687525
		2	-,3853369	,28333329	,684	-1,1786776	,4080038
		3	,5736463	,27517179	,234	-,1966294	1,3439221
	4	2	,7046122	,24661476	,037	,0292581	1,3799663
		3	,4849369	,22989731	,205	-,1349503	1,1048241
		4	,5371437	,22519520	,118	-,0796241	1,1539114
		1	-,7046122	,24661476	,037	-1,3799663	-,0292581
Zscore: RAI	2	3	-,2196753	,23974801	,928	-,8748381	,4354874
		4	-,1674685	,23524288	,978	-,8196399	,4847029
		1	-,4849369	,22989731	,205	-1,1048241	,1349503
		2	,2196753	,23974801	,928	-,4354874	,8748381
	3	4	,0522068	,21765373	1,000	-,5413445	,6457581
		1	-,5371437	,22519520	,118	-1,1539114	,0796241
		2	,1674685	,23524288	,978	-,4847029	,8196399
		3	-,0522068	,21765373	1,000	-,6457581	,5413445
	4	2	,4229021	,26063757	,494	-,2893653	1,1351695
		3	,5492227	,23373680	,122	-,0834322	1,1818777
		4	,5004848	,27430164	,363	-,2543944	1,2553641
		1	-,4229021	,26063757	,494	-1,1351695	,2893653
Zscore: TURNOVER	2	3	,1263206	,23031420	,994	-,5060541	,7586953
		4	,0775828	,27139111	1,000	-,6756826	,8308481

Zscore: TURNOVER GROWTH	3	1	-,5492227	,23373680	,122	-,1818777	,0834322
		2	-,1263206	,23031420	,994	-,7586953	,5060541
		4	-,0487379	,24567068	1,000	-,7315084	,6340326
	4	1	-,5004848	,27430164	,363	-,12553641	,2543944
		2	-,0775828	,27139111	1,000	-,8308481	,6756826
		3	,0487379	,24567068	1,000	-,6340326	,7315084
	1	2	,1727802	,24424835	,978	-,4993287	,8448891
		3	,4767041	,21845639	,175	-,1116774	1,0650855
		4	,4067216	,25258397	,507	-,2945674	1,1080106
	2	1	-,1727802	,24424835	,978	-,8448891	,4993287
		3	,3039238	,24814892	,774	-,3757095	,9835572
		4	,2339414	,27866352	,951	-,5389216	1,0068043
	3	1	-,4767041	,21845639	,175	-,10650855	,1116774
		2	-,3039238	,24814892	,774	-,9835572	,3757095
		4	-,0699825	,25635774	1,000	-,7783201	,6383552
	4	1	-,4067216	,25258397	,507	-,11080106	,2945674
		2	-,2339414	,27866352	,951	-,10068043	,5389216
		3	,0699825	,25635774	1,000	-,6383552	,7783201
	1	2	,1749031	,31446871	,994	-,6928268	1,0426330
		3	,1944853	,22386042	,944	-,4130859	,8020564
		4	-,0559051	,29426194	1,000	-,8697751	,7579649
	2	1	-,1749031	,31446871	,994	-,10426330	,6928268
		3	,0195821	,28277475	1,000	-,7732756	,8124399
		4	-,2308082	,34123036	,983	-,11763295	,7147131
Zscore(PERF_EMP LOYEE_TURNOVER _RC)	3	1	-,1944853	,22386042	,944	-,8020564	,4130859
		2	-,0195821	,28277475	1,000	-,8124399	,7732756
		4	-,2503904	,26011743	,909	-,9835951	,4828143
	4	1	,0559051	,29426194	1,000	-,7579649	,8697751
		2	,2308082	,34123036	,983	-,7147131	1,1763295
		3	,2503904	,26011743	,909	-,4828143	,9835951

Based on observed means.

The error term is Mean Square(Error) = 1,017.

*. The mean difference is significant at the ,05 level.

APPENDIX 6: Interview guide (Relative to article 5)

Topic: Environment

1. What demands does the environment make on the organization?
2. How does the environment put constraints on organizational action?

Topic: Resources

1. What is the relative quality of the following resources:
 - a. Human resources
 - b. Technology
 - c. Capital
 - d. Information
 - e. Recognition in the market
 - f. Other resources
2. To what extent are resources fixed rather than flexible in their configuration?

Topic: History

1. What have been the major stages or phases of the organization's development?
2. What is the current impact of such historical factors as strategic decisions, acts of key leaders, crises, and core values and norms?

Topic: Strategy

1. How has the organization defined its core mission, including the markets it serves and the products/services it provides to those markets?
2. On what bases does it compete?
3. What supporting strategies has the organization employed to achieve the core mission?
4. What specific objectives have been set for organizational output?

Topic: Individuals

1. Knowledge and skills individuals have
2. Individual needs and preferences
3. Perceptions and expectancies
4. Background factors

Topic: Task

1. The types of skills and knowledge demands the work poses.
2. The types of rewards the work can provide
3. The degree of uncertainty associated with the work, including such factors as interdependence, routineness, and so on
4. The constraints on performance demands inherent in the work (given a strategy)

Topic: Formal Organizational Arrangements

1. Organizational design, including grouping of functions, structure of subunits, and coordination and control mechanisms
2. Job design
3. Work environment
4. Human resource management systems

Topic: Informal organization

1. Leader behaviour
2. Intragroup relations
3. Intergroup relations
4. Informal working arrangements
5. Communication and influence patterns