INNOVATION MANAGEMENT AND FIRMS PERFORMANCE:
THE ROLE OF BUSINESS STRATEGY, ORGANIZATIONAL
CAPABILITIES AND EXTERNAL ENVIRONMENT

PhD THESIS

CONSTANTINOS SOT. MAMMASSIS

BA Business Administration (University of Patras)
MSc Management with Entrepreneurship (Cass Business School, London, UK)

February, 2013
“Πᾶσα ἐπιστήμη χωρὶς δικαιοσύνης καὶ τῆς ἄλλης ἀρετῆς πανουργίαν, οὐ σοφία φαίνεται”

Πλάτωνος, Μενέξενος (246e - 247b)

“Every science that is separated from judgment and virtue is not wise”

Plato, Meneksenos (246e-247b)
Στους γονείς μου Σωτήρη και Κλεοπάτρα,
pου χωρίς την αμέριστη στήριξή τους δεν θα
eίχα καταφέρει τίποτα, στον αδερφό μου
Τριαντάφυλλο και στην ‘Αννα.
AKNOWLEDGMENTS

The thesis you are now holding is the result of three-years of hard work, enjoyment, and curiosity. Starting as a PhD student was not so obvious for me. In fact, becoming a researcher had never come to my mind until I received my master’s degree. From that moment, I have been able to experience the difficulty and excitement of translating preliminary research ideas into theoretical echoes and practical relevant research.

This thesis and related research could not have been realized without the assistance and support of many people that helped me throughout this doctoral ‘journey’. Specifically, I would like to express my gratitude to my supervisor, associate professor George Anastassopoulos, for his continuous support, guidance, and advice on a plethora of academic and professional issues. Dr. Anastassopoulos provided an outstanding environment for conducting PhD research, while his consistent orientation towards excellence was an unfailing source of inspiration. I, therefore, remain grateful for his invaluable contribution to my academic and professional development.

I would also like to thank lecturer Panagiotis Polychroniou for his endless faith and trust that made me understand that I am capable of running serious doctoral research and associate professor Ioannis Giannikos for his useful insights throughout various stages of this doctoral study. Furthermore, I would like to express my appreciation to lecturer Konstantinos Kostopoulos for his help and insightful comments on the conceptual framework and research hypotheses of this thesis. Special acknowledgments belong to professor emeritus Pantelis Pechlivanidis and associate professor Antonis Georgopoulos for their motivational speeches throughout these years. I would also like to thank professor Costas Siriopoulos and professor Leonidas Maroudas for their valuable support and their presence in my viva committee. In addition I would like to mention my friend and colleague, postdoctoral researcher Evangelos Syrigos, with whom we have shared many research ideas that we will try to explore in the near future.

Of course, I will not forget all those executives that participated in the field research, and provided me the opportunity to reach valid statistical inferences and uncover many antecedents and performance implications of organizational ambidexterity.
Finally, I want to thank my family, Anna and my friends for supporting me during the previous years. My work has been a challenging endeavour and it would not have been possible without their limitless patience, humour, support, and understanding.
ABSTRACT

In the modern highly competitive business environments innovation research has flourished as the need of organizations to develop new products, to compete intensively and to perform their tasks adequately has become vital (Brown & Eisenhardt, 1995; Damanpour, 1991). This continuous change leads firms to confront with the tension of exploring new opportunities or exploiting current competencies (Floyd & Lane, 2000; Lavie, Stettner, & Tushman, 2010). March’s (1991) “ambidexterity” premise refers to the simultaneous pursuit of these contrasting activities (exploration and exploitation). Specifically, firms seek to adjust to the turbulent environmental conditions through exploring new ideas, products and/or services while simultaneously developing their existing products, markets and competences (Benner & Tushman, 2003; Jansen, Van Den Bosch, & Volberda, 2006). Several literatures have increasingly argued about the antecedents of exploration and exploitation and their impact to firms’ ambidexterity as well as the relationship between ambidexterity and firms’ financial performance (He & Wong, 2004; Jansen, Volberda, & Van Den Bosch, 2005a). This doctoral study copes with the antecedents of firms’ ambidextrous orientation and the firm-level ambidexterity-financial performance relationship. Through the use of hierarchical regression modeling, the results of the empirical research at a sample of 133 top performing Greek companies show that: 1) top managers’ creative self-efficacy positively affects firms’ ambidextrous orientation, 2) top managers’ learning goal orientation positively impacts firms’ ambidextrous orientation, 3) top managers’ performance goal orientation negatively influences firms’ ambidextrous orientation, 4) firms’ external knowledge flows positively affect firms’ ambidextrous orientation, 5) firms’ innovation & flexibility climate positively impacts firms’ ambidextrous orientation, 6) firms’ social capital is not associated with firms’ ambidextrous orientation, 7) firms’ organizational capital positively influences firms’ ambidextrous orientation, 8) firms’ participative decision making positively affects firms’ ambidextrous orientation, 9) the complementary effect of the simultaneous pursuit of a differentiation and a low-cost strategy negatively impacts firms’ ambidextrous orientation, 10) firms’ ambidextrous orientation is positively related to firms’ financial performance and that, 11) Firm size moderates the relationship between firms’ ambidextrous innovation orientation and its subsequent financial performance in such a way that this positive effect is increased as size increases. Overall, these findings offer important contributions to organizational ambidexterity literature, by indicating new antecedents of firms’ ambidexterity and a positive relationship of ambidexterity and firms’ financial performance.
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>AKNOWLEDGMENTS</td>
<td>v</td>
</tr>
<tr>
<td>ABSTRACT</td>
<td>vii</td>
</tr>
<tr>
<td>TABLE OF CONTENTS</td>
<td>viii</td>
</tr>
<tr>
<td>LIST OF TABLES</td>
<td>x</td>
</tr>
<tr>
<td>LIST OF FIGURES</td>
<td>xi</td>
</tr>
<tr>
<td>CHAPTER ONE</td>
<td>12</td>
</tr>
<tr>
<td>INTRODUCTION</td>
<td>12</td>
</tr>
<tr>
<td>1.1 Introduction</td>
<td>12</td>
</tr>
<tr>
<td>1.2 Research Aim, Questions and Methods</td>
<td>13</td>
</tr>
<tr>
<td>1.3 Research Contributions</td>
<td>16</td>
</tr>
<tr>
<td>1.4 PhD Thesis Overview</td>
<td>16</td>
</tr>
<tr>
<td>CHAPTER TWO</td>
<td>19</td>
</tr>
<tr>
<td>ORGANIZATIONAL INNOVATION: BASIC CONCEPTS AND THEORETICAL STREAMS</td>
<td>19</td>
</tr>
<tr>
<td>2.1 Definitions of Innovation</td>
<td>19</td>
</tr>
<tr>
<td>2.2 Types of Innovation</td>
<td>21</td>
</tr>
<tr>
<td>2.3 Innovation Research Streams</td>
<td>22</td>
</tr>
<tr>
<td>2.4 Dimensions of Innovation</td>
<td>26</td>
</tr>
<tr>
<td>2.5 Determinants of Innovation</td>
<td>27</td>
</tr>
<tr>
<td>2.6 Inconsistencies in Innovation Research</td>
<td>32</td>
</tr>
<tr>
<td>CHAPTER THREE</td>
<td>34</td>
</tr>
<tr>
<td>EXPLORATION AND EXPLOITATION IN ORGANIZATION SCIENCE</td>
<td>34</td>
</tr>
<tr>
<td>3.1 Current State and Different Theoretical Lens</td>
<td>34</td>
</tr>
<tr>
<td>3.2 Ambidexterity VS Balance: Two Competing Schools of Thought</td>
<td>40</td>
</tr>
<tr>
<td>3.3 Antecedents of Exploration and Exploitation</td>
<td>45</td>
</tr>
<tr>
<td>3.4 Performance Outcomes of Exploration and Exploitation</td>
<td>54</td>
</tr>
<tr>
<td>CHAPTER FOUR</td>
<td>58</td>
</tr>
<tr>
<td>CONCEPTUAL FRAMEWORK AND RESEARCH HYPOTHESES</td>
<td>58</td>
</tr>
<tr>
<td>4.1 Theoretical Foundations of the Conceptual Framework</td>
<td>58</td>
</tr>
<tr>
<td>4.2 Firms’ Ambidextrous Orientation and its Antecedents</td>
<td>60</td>
</tr>
<tr>
<td>4.2.1 Ambidextrous Orientation and the Characteristics of the Top Management Team</td>
<td>60</td>
</tr>
<tr>
<td>4.2.2 Ambidextrous Orientation and the Characteristics of the Organizational Context</td>
<td>62</td>
</tr>
<tr>
<td>4.2.3 Ambidextrous Orientation and the Complementarity of Business Strategies</td>
<td>66</td>
</tr>
<tr>
<td>4.3 Firms’ Ambidextrous Orientation, Financial Performance and the Moderating role of Slack Resources</td>
<td>67</td>
</tr>
</tbody>
</table>
CHAPTER FIVE ............................................................................................................. 70
RESEARCH METHODOLOGY .................................................................................... 70
  5.1 Sample and Data Collection ............................................................................. 70
  5.2 Measures ........................................................................................................... 72
    5.2.1 Dependent Variables ................................................................................... 72
    5.2.2 Independent Variables ............................................................................... 73
    5.2.3 Control Variables ....................................................................................... 75
  5.3 Validation of Constructs using Confirmatory Factor Analysis (CFA) ............... 77
    5.3.2 Dependent Variables ................................................................................... 77
    5.3.3 Independent Variables ............................................................................... 79

CHAPTER SIX ............................................................................................................. 83
RESULTS .................................................................................................................... 83
  6.1 Statistical Analysis and Hypotheses Testing ..................................................... 83
    6.1.1 Firms’ Ambidextrous Orientation and its Antecedents ................................. 84
    6.1.2 Firms’ Ambidextrous Orientation, Slack Resources and Financial Performance .... 90

CHAPTER SEVEN ...................................................................................................... 95
DISCUSSION, LIMITATIONS & CONCLUSION ...................................................... 95
  7.1 Discussion of Results & Theoretical Implications ........................................... 95
    7.1.1 Firms’ Ambidextrous Orientation and its Antecedents ................................. 95
    7.1.2 Firms’ Ambidextrous Orientation, Slack Resources and Firms’ Financial Performance .... 99
  7.2 Managerial Implications .................................................................................. 100
  7.3 Limitations and Future Research Directions .................................................. 101
  7.4 Conclusion ...................................................................................................... 102

REFERENCES.......................................................................................................... 103

APPENDICES ............................................................................................................ 127
  Appendix 1: Dimensions of Innovation ................................................................. 127
  Appendix 2: Determinants of Organizational Innovation in the Existing Research ..... 128
  Appendix 3: Measurement Model of the Determinants of Organizational Innovation 129
# List of Tables

**LIST OF TABLES**

<table>
<thead>
<tr>
<th>Table</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Table 1</td>
<td>Thesis Structure and Research Activities</td>
<td>17</td>
</tr>
<tr>
<td>Table 2</td>
<td>Basic Types of Innovation</td>
<td>21</td>
</tr>
<tr>
<td>Table 3</td>
<td>Streams of Research in Organizational Innovation</td>
<td>23</td>
</tr>
<tr>
<td>Table 4</td>
<td>Theories Used in Innovation Research by Level</td>
<td>28</td>
</tr>
<tr>
<td>Table 5</td>
<td>Manifestation of Exploration and Exploitation Notion and its Trade-offs in Various Literatures</td>
<td>39</td>
</tr>
<tr>
<td>Table 6</td>
<td>Alternative Modes of Balancing Exploration and Exploitation</td>
<td>45</td>
</tr>
<tr>
<td>Table 7</td>
<td>Distribution of the Companies of Final Sample Based on Core NAICS (2007)</td>
<td>71</td>
</tr>
<tr>
<td>Table 8</td>
<td>Summary of the Survey Measures</td>
<td>76</td>
</tr>
<tr>
<td>Table 9</td>
<td>Summary Results of the Confirmatory Factor Analysis (CFA)</td>
<td>82</td>
</tr>
<tr>
<td>Table 10</td>
<td>Hierarchical Regression 1 Normality Tests</td>
<td>84</td>
</tr>
<tr>
<td>Table 11</td>
<td>Hierarchical Regression 1: Ambidextrous Innovation Orientation as Dependent Variable</td>
<td>87</td>
</tr>
<tr>
<td>Table 12</td>
<td>Correlations, Means and Std. Deviations of Regression 1 Variables</td>
<td>88</td>
</tr>
<tr>
<td>Table 13</td>
<td>Hierarchical Regression 1 Results: Ambidextrous Innovation Orientation Antecedents - Coefficients</td>
<td>89</td>
</tr>
<tr>
<td>Table 14</td>
<td>Hierarchical Regression 2 Normality Tests</td>
<td>90</td>
</tr>
<tr>
<td>Table 15</td>
<td>Correlations, Means and Std. Deviations of Regression 2 Variables</td>
<td>92</td>
</tr>
<tr>
<td>Table 16</td>
<td>Hierarchical Regression 2: Firms’ Financial Performance as Dependent Variable</td>
<td>93</td>
</tr>
<tr>
<td>Table 17</td>
<td>Hierarchical Regression 2 Results: Coefficients of Ambidextrous Innovation Orientation on Financial Performance</td>
<td>94</td>
</tr>
<tr>
<td>Table 18</td>
<td>Hypotheses Results of the Antecedents of Ambidextrous Orientation</td>
<td>96</td>
</tr>
<tr>
<td>Table 19</td>
<td>Hypotheses Results of Ambidextrous Orientation, Slack Resources and Firms’ Financial Performance</td>
<td>99</td>
</tr>
</tbody>
</table>
LIST OF FIGURES

FIGURE 1: RESEARCH AIM ........................................................................................................... 13
FIGURE 2: OVERALL FRAMEWORK OF THE PhD THESIS .......................................................... 13
FIGURE 3: RESEARCH QUESTIONS PART 1 .................................................................................. 14
FIGURE 4: RESEARCH QUESTIONS PART 2 .................................................................................. 15
FIGURE 5: ORGANIZATION OF THE PhD THESIS .................................................................... 18
FIGURE 6: A MULTI-DIMENSIONAL FRAMEWORK OF ORGANIZATIONAL INNOVATION ....... 26
FIGURE 7: A MAP OF INNOVATION RESEARCH ......................................................................... 33
FIGURE 8: DIFFERENT OPERATIONALIZATIONS OF EXPLORATION AND EXPLOITATION ........ 41
FIGURE 9: A FRAMEWORK OF EXPLORATION – EXPLOITATION ............................................. 46
FIGURE 10: THESIS CONCEPTUAL FRAMEWORK ..................................................................... 59
FIGURE 11: REGRESSIONS & HYPOTHESIZED RELATIONSHIPS BASED ON THESIS CONCEPTUAL FRAMEWORK 83
FIGURE 12: REGRESSION 1: HISTOGRAM AND NORMAL PROBABILITY PLOT ......................... 85
FIGURE 13: SCATTERPLOT OF RESIDUALS (DEPENDENT VARIABLE: AMIDIBEXTROUS ORIENTATION) 86
FIGURE 14: REGRESSION 2: HISTOGRAM AND NORMAL PROBABILITY PLOT ......................... 91
FIGURE 15: SCATTERPLOT OF RESIDUALS (DEPENDENT VARIABLE: FINANCIAL PERFORMANCE) 91
CHAPTER ONE

INTRODUCTION

1.1 Introduction

Over the past decades business environments have become complicated and changed in many ways. Firms are since trying to find the appropriate responses in rapid technological change and the globalization of new markets though their transformation in rapid, lean and flexible structures (Grant, 1996). In this intensive and competitive landscape, innovation research has flourished as the need of organizations to develop new products, to compete intensively and to perform their tasks adequately has become vital (Brown & Eisenhardt, 1995; Damanpour, 1991; Kimberly & Evanisko, 1981). However, this continuous change leads firms to confront with the tension of exploring new opportunities or exploiting current competencies (Floyd & Lane, 2000; Lavie et al., 2010; March, 1991). Specifically, they seek to adjust to the turbulent environmental conditions through exploring new ideas, products and/or services while simultaneously developing their existing products, markets and competences (Benner & Tushman, 2003; Jansen et al., 2006).

Previous research defines organizational ambidexterity, as the firms’ ability “to be aligned and efficient in their management of today’s business demands while simultaneously adaptive to changes in the environment” (Raisch & Birkinshaw, 2008, p.375). Whereas Duncan (1976) initially used this term, it is March’s (1991) prominent article that has led to the concept’s recent evolution. March suggested that there are two profoundly incompatible learning processes, exploration that “includes things captured by terms such as search, variation, risk taking, experimentation, play, flexibility, discovery, innovation” and exploitation that encompasses “refinement, choice, production, efficiency, selection, implementation, execution” (March, 1991, p.71), which are the necessary yet opposing activities that organizations must undertake in order to survive and be prosperous in the long-term (Andriopoulos & Lewis, 2010; Piao, 2010; Raisch, Birkinshaw, Probst, & Tushman, 2009; Tushman & O'Reilly, 1996). As Raisch and Birkinshaw point out (2008, p.377) “March’s argument that successful firms are ambidextrous contributed to a general shift in organizational research from trade-off to paradoxical thinking” because previous studies strongly argued about the organizations’ ability to simultaneously pursue competing or
contrasting activities (Hannan & Freeman, 1977; McGill, Slocum, & Lei, 1992) emphasizing on following either exploration or exploitation (Burns & Stalker, 1961; Ghemawat & Ricart Costa, 1993).

1.2 Research Aim, Questions and Methods

The literatures of strategic management, organizational theory, organizational learning and organizational change have increasingly argued about the need of organizations to achieve either a balance between exploration and exploitation or ambidexterity (Floyd & Lane, 2000; Gibson & Birkinshaw, 2004; Lavie et al., 2010; March, 1991; O'Reilly & Tushman, 2004). However, scholars have long disputed about the antecedents of exploration and exploitation and their impact to firms’ ambidexterity as well as the relationship between ambidexterity and firms’ financial performance (Cao, Gedajlovic, & Zhang, 2009; He & Wong, 2004; Jansen et al., 2005a). This PhD thesis is aligned with the latest literature developments and its research aim

"is to advance our understanding on the antecedents of firms’ ambidexterity and to shed light to ambidexterity-performance effects"

Figure 1: Research Aim

To adequately fulfill this research aim, various research questions were developed and examined. As shown in Figure 2, this thesis addresses ambidexterity, its antecedents and financial performance. The overall framework of this PhD can be divided in two parts.

Figure 2: Overall Framework of the PhD Thesis
The first part of this thesis, depicted on the left part of the figure above, copes with the antecedents of firms’ ambidextrous orientation. Recent developments in the field have deployed various antecedents, which affect an organization’s ability to explore, exploit or balance these activities, including environmental factors, such as dynamism, shocks, competition and appropriability regimes, and organizational factors such as absorptive capacity, resources, structure, identity, age and size (Lavie et al., 2010). In the same line of reasoning, scholars have strongly supported that top management teams (TMT) play a crucial role in achieving ambidexterity (Gibson & Birkinshaw, 2004; Rosing, Frese, & Bausch, 2011) and have merely focused in uncovering various aspects of leadership in different ambidexterity configurations (Cao, Simsek, & Zhang, 2010; O’Reilly & Tushman, 2011; Probst, Raisch, & Tushman, 2011). In literature, TMTs have a crucial role in resolving conflicts and contradictions (O’Reilly & Tushman, 2004) and take important resource allocation decisions that lead to ambidexterity (Mom, Van Den Bosch, & Volberda, 2009; O’Reilly & Tushman, 2011). Top managers, on the other hand, are obliged to implement creative and collective activities (Sheremata, 2000), to execute routine and non routine actions (Adler, Goldofias, & Levine, 1999) and to be multitaskers in a way that they adapt to various roles and competences (Floyd & Lane, 2000), thus, possessing specific unidentified characteristics. Furthermore, through a different line of reasoning, current research has overlooked the association between the pursuit of competitive business strategies and their impact on firms’ ambidexterity. Based on that theoretical grounding and drawing on identified literature gaps, this PhD thesis examines the effects that various characteristics of top management team, organizational context and competitive business strategies have on firms’ ambidextrous orientation based on the initial research questions presented in Figure 3:

| 1. How does top management team characteristics affect firms’ ambidextrous orientation? |
| 2. How does organizational context characteristics affect firms’ ambidextrous orientation? |
| 3. How does competitive business strategies affect firms’ ambidextrous orientation? |

Still, March (1991) early recognized that organizations that would solely focus in exploration would suffer the costs of experimentation and, thus, great risk leading to failure, as the benefits of exploitation would eclipse (Volberda & Lewin, 2003). In turn, firms allocating resources to increase efficiency and short-term performance, through engaging on
exploitation, could be trapped to organizational inertia and become obsolete in the long-term as they would not be able to respond to environmental changes (Ahuja & Lampert, 2001; Levitt & March, 1988). However, since March’s (1991) publication, little is known about the actual performance implications of engaging mainly on exploration or exploitation and scholars’ arguments have been contradictory (Auh & Menguc, 2005; Cao et al., 2009; Jansen et al., 2006). In light of the performance outcomes of balancing or simultaneously pursuing exploration and exploitation, March (1991) was the first to acknowledge the “ambidexterity premise”, which refers to the simultaneous pursuing of both activities. While some researchers have supported that organizations should favor an activity over the other for superior performance (Barney, 1991; Ghemawat & Ricart Costa, 1993; Porter, 1980; Wernerfelt & Montgomery, 1988), others state that the engagement in both activities is the key to sustainable competitive advantage considering exploration and exploitation as inseparable (Floyd & Lane, 2000; He & Wong, 2004; Tushman & O’Reilly, 1996). Similarly, several scholars posit the ability to be ambidextrous as the key point of an organization’s dynamic capabilities (Eisenhardt & Martin, 2000; Teece, Pisano, & Shuen, 1997) and use different research methods —such as simulations or surveys— to enhance the consequences of exploration and exploitation, though ignoring their short and long-term performance outcomes (Fang, Lee, & Schilling, 2010; Lavie, Kang, & Rosenkopf, 2011; Posen & Levinthal, 2012; Uotila, Maula, Keil, & Zahra, 2009). In respect to the literature gaps identified by our literature review, the second part of this PhD thesis -depicted on the right part of Figure 2- copes with the following research questions:

In order to examine the research questions placed above, the empirical research was initially targeted at the sample of the 300 top performing Greek companies (i.e. those with the highest total revenues for the year 2010). Specifically, a survey questionnaire was designed and the firms’ top managers were contacted. The final sample consisted of 133 companies, for a response rate of 44.3%, with mean size (number of full-time employees) of 336.32 (standard deviation [s.d.] = 72.34). Top managers responded to this firm level survey (n=133) had an average tenure of 19.75 years ([s.d.] = 9.96) and an average age of 45.782 ([s.d.] = 10.59).
Finally, Hierarchical Regression Modeling was the principal analytic technique employed to test the hypothesized conceptual model in the study’s final sample. As previous research indicates hierarchical regression modeling is the appropriate technique for analyzing the relationships between controls, ambidextrous orientation, antecedents and firms’ financial performance (He & Wong, 2004; Jansen et al., 2006; Mom et al., 2009).

1.3 Research Contributions

The results of this PhD thesis strongly support the theoretical arguments presented and contribute in the organizational ambidexterity literature (Gibson & Birkinshaw, 2004; Lavie et al., 2010; March, 1991; O'Reilly & Tushman, 2004) as:

• They provide strong empirical evidence on the characteristics that top managers should possess in order to successfully drive firms towards ambidexterity (creative self-efficacy, performance/learning goal orientation).

• They extend the causes of exploration and exploitation and/or ambidexterity in light of their organizational context antecedents. Specifically, they empirically support the relationships between external knowledge flows, innovation and flexibility climate, social and organizational capital and, participative decision making with firms’ ambidextrous orientation.

• They enlighten, for the first time, the association between competitive business strategies (differentiation and low-cost) and firm-level ambidexterity.

• They further add on the intriguing and contrasting arguments about the relationship between ambidexterity and financial performance and provide empirical evidence on revealing the underlying factors affecting this relationship. Finally, besides the direct implications of firm-level ambidexterity to financial performance, they reveal factors that moderate this relationship.

1.4 PhD Thesis Overview

Table 1 provides an overview of this thesis structure and the corresponding research activities. Following this introductory chapter, chapter two provides a literature review on organizational innovation. Accordingly, it presents the definitions and types of organizational innovation, its research streams, its dimensions and determinants and the inconsistencies observed in literature.
Table 1: Thesis Structure and Research Activities

<table>
<thead>
<tr>
<th>Thesis Structure</th>
<th>Research Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chapter One: Introduction</td>
<td></td>
</tr>
<tr>
<td>Chapter Two: Organizational Innovation: Basic</td>
<td>Literature Review</td>
</tr>
<tr>
<td>Concepts and Theoretical Streams</td>
<td></td>
</tr>
<tr>
<td>Chapter Three: Exploration and Exploitation in</td>
<td>Literature Review</td>
</tr>
<tr>
<td>Organization Science</td>
<td></td>
</tr>
<tr>
<td>Chapter Four: Conceptual Framework and Research</td>
<td>Literature Review</td>
</tr>
<tr>
<td>Hypotheses</td>
<td>In-depth Interviews</td>
</tr>
<tr>
<td>Chapter Five: Research Methodology</td>
<td>Questionnaire Development</td>
</tr>
<tr>
<td></td>
<td>In-depth Interviews</td>
</tr>
<tr>
<td></td>
<td>Data Collection</td>
</tr>
<tr>
<td>Chapter Six: Results</td>
<td>In-depth Interviews</td>
</tr>
<tr>
<td></td>
<td>Data Collection &amp; Analysis</td>
</tr>
<tr>
<td>Chapter Seven: Discussion &amp; Conclusions</td>
<td>Feedback Sessions</td>
</tr>
</tbody>
</table>

Next, chapter three discusses the state and the different theoretical lens of various literatures in examining the exploration and exploitation framework, the dilemma of ambidexterity versus balance and, the antecedents and performance implications of the notion. Chapter four, based on the previous extensive literature review, defines the hypotheses and proceeds to in-depth interviews in order to conceptualize the PhD thesis model. Chapter five describes the research methodology, the measures used in thesis survey and performs the preliminary analysis of the constructs. Chapter six proceeds to the statistical analysis of the final dataset and provides the research’s results. Finally, chapter seven concludes with the discussion of the theoretical and managerial implications of this study and articulates the thesis’ limitations and future research suggestions. The organization of the thesis, as analytically described above, is illustrated in Figure 5.
INTRODUCTION
(Chapter One)
- Research Aim, Questions & Methods
- Research Contributions
- Thesis Overview

THEORY - EVIDENCE
(Chapter Two)
- Review of Organizational Innovation Types & Streams of Research
- Review of Organizational Innovation Dimensions & Determinants
- Inconsistencies in Organizational Innovation Research

FACTS
(Chapter Three)
- Exploration and Exploitation State and Theoretical Lens
- Ambidexterity VS Balance
- Antecedents of Exploration and Exploitation
- Performance Outcomes of Exploration and Exploitation

EMPIRICAL ANALYSIS - HYPOTHESES TESTING
(Chapter Four)
- Theoretical Foundations of the Conceptual Framework
- Research Hypotheses Development

(Chapter Five)
- Research Methodology
- Preliminary Analysis

(Chapter Six)
- Results

CONCLUSIONS
(Chapter Seven)
- Discussion
- Limitations & Future Research Directions
- Managerial Implications
- Conclusion

Figure 5: Organization of the PhD Thesis
CHAPTER TWO

ORGANIZATIONAL INNOVATION: BASIC CONCEPTS AND THEORETICAL STREAMS

Innovation research has recently drawn substantial growth, as it is widely regarded as a key driver of competitive advantage deploying industrial and firm competitiveness in changing environments (Damanpour, 1991; Damanpour & Gopalakrishnan, 2001; Dess & Picken, 2000; Mone, McKinley, & Barker, 1998).

In this chapter the basic definitions, concepts and theoretical streams of organizational innovation will be outlined. In specific, the following paragraphs will focus on the antecedents of organizational innovation, the researchers’ theoretical arguments and the existent literature inconsistencies.

2.1 Definitions of Innovation

Over time, management scholars have illustrated the importance of firms’ innovation capability as a dire source of competitive advantage leading to outstanding firm performance (Mone et al., 1998). Schumpeter was the first to define innovation in the late 1920’s by emphasizing to the novelty aspect (Hansen & Wakonen, 1997). According to Hagedoorn (1996, p.886), Schumpeterian definitions of innovation are quite “broad and vague” and “refer to a new product or to a new quality of product, a new method of production, a new market, a new source of supply of raw materials and finally implementing the new organization of any industry” (Schumpeter, 1934 p.66 ; 1939, pp.84-85). Since then, several definitions have been used to describe innovation usually incorporating or substituting creativity, knowledge or change. (Drucker, 1993; Gopalakrishnan & Damanpour, 1997)

Specifically, as Van de Ven (1986, p.591) states “an innovation is a new idea, which may be a recombination of old ideas, a schema that challenges the present order, a formula, or a unique approach which is perceived as new by the individuals involved”. Damanpour (1991, p.556), on the other hand, highlights that “innovation is defined as adoption of an internally generated or purchased device, system, policy, program, process, product or service that is new to the
adopting organization”. OECD (1991) defines innovation somehow differently: as a process that is lead by the perception of a new market and/or as a new service for a technology-based invention that incorporates the creation, production and marketing assignments for the commercial success of the invention. The importance in OECD’s definition is twofold. It, firstly, recognizes that innovation encompasses not only the idea or its development but also its introduction to the market and its diffusion through customers and, secondly, that the process of innovation is naturally repetitive and includes the reintroduction to the market of an advanced novelty (Ali, Krapfel, & LaBahn, 2003; Garcia & Calantone, 2003; Katila & Shane, 2005). This definition is also consistent with Schumpeter’s (1939, p.85) argument that “the making of the invention and the carrying out of the corresponding innovation are, economically and sociologically, two entirely different things”.

Scholars have also acknowledged that studies of “innovativeness” are not necessarily similar to those of “innovation” besides the synchronous use of the both terms for the same meaning in a numerous studies (Van de Ven & Rogers, 1988). In specific, Rogers (1983) suggests that innovativeness is an ability that an organization may possesses while innovation is an outcome. In accordance with his behavioral perspective Rogers (1983) defines innovativeness as “…the degree to which an individual or other unit of adoption is relatively earlier in adapting new ideas from any other member of the systems”.

Another constant scholarly debate lies on the differences of “innovation” and “invention” and, especially, to whether inventions have those characteristics –necessity, sufficiency, implementation, beneficial nature, diffusion- that promote them to innovations (Camison-Zornoza, Lapedra-Alcamos, Segarra-Cipros, & Boronat-Navarro, 2004; Hobday, Davies, & Prencipe, 2005; Klein & Knight, 2005; Pittaway, Robertson, Munir, Denyer, & Neely, 2004; Rosenkopf & McGrath, 2011).

However, recent studies brought into light a more broad and comprehensive definition (the one adopted to the purposes of this PhD thesis): “Innovation is: production or adoption, assimilation, and exploitation of a value-added novelty in economic and social spheres; renewal and enlargement of products, services, and markets; development of new methods of production; and establishment of new management systems. It is both a process and an outcome” (Crossan & Apaydin, 2010, p.1155). Under this scope, innovation is the organizations’ appropriate response to the rapidly changing external environment, which is
implemented by the development of new products and services or by the establishment of those procedures and systems that ensure their viability and prosperity.

2.2 Types of Innovation

As innovation research flourishes numerous studies have tried to conceptualize, categorize and disseminate the knowledge concerning organizational innovation research (Anderson, De Dreu, & Nijstad, 2004; Crossan & Apaydin, 2010; Damanpour, 1991; Downs & Mohr, 1976; Wolfe, 1994). Specifically, Damanpour (1991), following the critique of Downs & Mohr (1976), conducted a meta analysis research in order to explore the relationship and moderators between organizational determinants and innovation. Similarly, Wolfe (1994) highlighted the different theoretical streams in organizational innovation research and its inconsistent and inconclusive nature. Anderson et al. (2004), on the other hand, argued about the reliable identification of the facilitarors of organizational innovation and suggested a “distressed-related innovation model” in order to uncover the relationships among innovation and its antecedents. In sum, Table 2 presents the three basic types of innovation –administrative versus technical, product versus process and incremental versus radical- which are commonly accepted in the relevant literature.

Table 2: Basic Types of Innovation

<table>
<thead>
<tr>
<th>Type of Innovation</th>
<th>Definition of Type of Innovation</th>
<th>Notable References</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administrative Innovation</td>
<td>It refers to organizational structure and administrative processes which are indirectly related to the basic work activities and concern either products or processes</td>
<td>(Damanpour &amp; Evan, 1984; Kimberly &amp; Evanisko, 1981; Knight, 1967; Rowe &amp; Boise, 1974)</td>
</tr>
<tr>
<td>Technical Innovation</td>
<td>It pertains to products, services and production processes which are related to basic work activities and concern either products or processes</td>
<td>(Damanpour, 1996; Damanpour &amp; Evan, 1984; Knight, 1967)</td>
</tr>
<tr>
<td>Product Innovation</td>
<td>It refers to new products or services created to fill an external user or market need.</td>
<td>(Damanpour &amp; Gopalakrishnan, 2001; Schilling, 2005)</td>
</tr>
<tr>
<td>Process Innovation</td>
<td>It pertains to new features introduced in an organization’s operations such as input materials, task specifications, work and information flow</td>
<td>(Damanpour &amp; Gopalakrishnan, 2001; Schilling, 2005; Utterback &amp; Abernathy, 1975)</td>
</tr>
</tbody>
</table>
However, besides the aforementioned basic types, several scholars have also proposed different conceptualizations of innovation that entail characteristics of these types. According to Fleming & Sorenson (2003), component or modular innovation refers to changes to one or more modules that do not drastically affect the overall system structure. Adversely, architectural innovation pertains that the undergoing changes of system create an overall shift in its design or in the way that system modules interact with each other (Henderson & Clark, 1990). Hence, architectural shifts significantly affect the industry and the users in the long-term. Discontinuous innovation, on the other hand, entails temporal technological changes in a core subsystem of a product leading to changes in its secondary elements and in their association linkages (Tripsas & Gavetti, 2000; Tushman & Murmann, 1998), whereas disruptive innovations change the competition into an industry by providing lower-cost products, targeting non-consumption and/or over-served customers, thus, enabling new firms to displace the existent organizations (Christensen, Suarez, & Utterback, 1998). However, it is a common sense that incumbents usually cope with various inadequacies when trying to implement discontinuous innovation (architectural and/or radical), even if they enhance the appropriate technical assets and capabilities (Klepper, 1996; Sull, 1999; Tushman & Smith, 2002).

In sum, while there are numerous types of innovation, the consensus is that none of these can fully describe its nature. Nonetheless, the different aspects of innovation are classified in a way that it provides researchers with valuable tools that built the knowledge base on which they categorize the similarities, differences and the relationship between the innovation types.

### 2.3 Innovation Research Streams

In light of the innovation research streams, Wolfe (1994) assesses three core research questions, each incorporating a different level of analysis, in order to identify the differences

<table>
<thead>
<tr>
<th>Innovation Type</th>
<th>Description</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radical Innovation</td>
<td>It refers to innovations that lead to fundamental changes in the activity of an organization resulting to the departure of existing practices.</td>
<td>(Daft &amp; Becker, 1978; Ettlie, Bridges, &amp; O'Keefe, 1984; Hage, 1980; Hull, Hage, &amp; Azumi, 1985)</td>
</tr>
<tr>
<td>Incremental Innovation</td>
<td>It pertains to innovations causing a minor shift in existing rules, norms and practices.</td>
<td>(Dewar &amp; Dutton, 1986; Ettlie et al., 1984)</td>
</tr>
</tbody>
</table>
in each of the following streams: diffusion of innovation, organizational innovativeness and process theory research (see Table 3).

**Table 3: Streams of Research in Organizational Innovation**
(Source: Wolfe, 1994, p.407 and own elaboration)

<table>
<thead>
<tr>
<th>Research Question</th>
<th>Research Approach</th>
<th>Research Focus</th>
<th>Notable References</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. What is the pattern of diffusion of an innovation through a population of potential adopter organizations?</td>
<td>Diffusion of innovation (DI) research</td>
<td>Addresses the diffusion of an innovation over time and/or space</td>
<td>(Attewell, 1992; Mohr, 1987; Rogers, 1978; Souder &amp; Quaddus, 1982; Tolbert &amp; Zucker, 1983)</td>
</tr>
<tr>
<td>3. What are the processes organizations go through in implementing innovations?</td>
<td>Process Theory (PT) Research</td>
<td>Addresses the process of innovation within organizations</td>
<td>(Downs, 1978; Rogers, 1983; Schroeder, Van de Ven, Scudder, &amp; Polley, 1989; Van de Ven, 1986; Van de Ven, Polley, Garud, &amp; Venkataraman, 1999)</td>
</tr>
</tbody>
</table>

Diffusion of Innovation (DI) research stream views innovation as the unit of analysis and deals with the prediction of the rates and patterns of innovation across nations, sectors and organizations (Brown & Eisenhardt, 1995; O’Neill, Pouder, & Buchholtz, 1998). In specific, scholars have recognized social network, adopter’s, environmental and innovation characteristics and the way that innovation is communicated as the main aspects that affect the DI (Rogers, 1983). Tornatzky, Fleischer & Chakrabarti (1990) highlight that DI stream mainly focuses on the innovation attributes that boost diffusion -such as relative advantage, compatibility, complexity, trialability and observability- and on the classification of innovation adopters based on their capacity to adopt (e.g. innovators, early adopters, early majority, late majority, and laggards).
However, the core restriction of DI is the harsh assumptions of the diffusion model and, especially, the invariant unit of innovation and the non-easily definable population of different adopters. As Wolfe (1994, p.408) states “as organizations became the adopters, the organization was treated as an individual and characteristics of the organization’s leaders and structure replaced the characteristics of individuals as variables of interest”. Hence, the “anthropomorphising” of organizational characteristics has often created theoretical gaps and misleading results (Yin, 1978).

In terms of the Organizational Innovativeness (OI) research stream, scholars are confronting organizations as the level of analysis and investigate the factors that enable firms to innovate by using composite scores based on the number of innovations adopted by firms (Baldridge & Burnham, 1975; Bigoness & Perreault, 1981; Kimberly & Evanisko, 1981). In a further categorization, researchers usually focus on either project or firm (SBU – strategic business unit) level. The supporters of the first perspective assess the processes that organizations enhance in order to envision, design, produce and introduce a product or service to the market (Myers & Marquis, 1969; Zirger & Maidique, 1990). Those that emphasize on the SBU perspective view innovation as an aspect of entrepreneurial strategy of an organization either as an objective (through R&D expenditures, number of scientists etc.) or as a subjective form (through new product developments, frequency or speed of products introduced in a market etc.) (Covin & Slevin, 1989; Li & Atuahene-Gima, 2001; Olson et al., 2005; Zahra & Covin, 1993). This PhD is in alignment with OI research stream as depicted in the research methodology used (see also §4.1 Theoretical Foundations of Conceptual Framework).

In the same vein, several scholars have examined several organizational antecedents such as environmental, individual and team characteristics as facilitators of organizational innovativeness (Damanpour, 1991; Kimberly & Evanisko, 1981; Whittington, Pettigrew, Peck, Fenton, & Conyon, 1999). However, these studies clearly have a static orientation and underestimate the ongoing organizational changes during innovation process, its implementation and its sustainability (Wolfe, 1994). Furthermore, the large variety of those antecedents, their under-examined interrelationships and the broad focus of the innovation attributes (e.g. compatibility, advantage, predictability) have early raised the criticism against the OI research stream (Anderson et al., 2004; Downs, 1978; Rogers, 1983; Tornatzky et al., 1983). Nonetheless, in order to promote the further development of the field, researchers have suggested: a) shifts from the organization to innovation-into-organization level, b) switch
from adoption to the implementation phase of innovations, and c) move from the static orientation to the nature and the factors affecting innovation processes (Downs & Mohr, 1976; Kimberly & Evanisko, 1981; Tornatzky et al., 1983; Wolfe, 1994).

The process theory stream of research has focused on why and how innovations are envisioned, developed, and terminated. Hence, its primary level of analysis is the process of innovation and, in contrast with DI and OI, highlights the temporal sequence of the activities that promote the progress and the accomplishment of innovations. In the same line of reasoning, PT research takes advantage of relative stability and simplicity at each process stage and overwhelms various discrepancies caused by the interrelations of different aspects of the innovation process (Downs, 1978; Wolfe, 1994). PT theory entails two different categories: a) the Stage Model (SM), which represents innovation as a sequence of stages deploying over time and b) the Process Research (PR), which concentrates on the in-depth longitudinal research of the sequences and conditions that define innovation process through theory building and qualitative data analysis.

In terms of the SM view scholars have recognized several models of organizational innovation following a common logic: a decision-making unit identifies an innovation, a problem or opportunity is matched to the innovation, the innovation’s cost and paybacks are acknowledged, supporters and opponents of the innovation are influencing the process, a positive or negative decision is made, the implementation starts, the innovation decision is reviewed and confirmed, the innovation turns into a routine and, finally, is diffused into an organization (Wolfe, 1994). However, only limited empirical evidence exist and verify that these stages occur as the degree and time of the stages development is heavily dependent on the nature of innovation itself. The charm of the SM perspective that provides a respected structure for analyzing organizational innovation is quite deceptive as there is no linearity or simplicity in innovation process but complex and iterative procedures with many feed forward and feedback cycles (Schroeder et al., 1989; Van de Ven et al., 1999).

Nonetheless, the restrictions of the SM research include the lack of in-depth longitudinal studies defining and unfolding the processes, sequences and conditions that shape innovation (Rogers, 1983; Van de Ven, 1986; Van de Ven & Rogers, 1988). PR view, on the other hand, has been developed in order to fill this research gap by providing inductive, in-depth, longitudinal analyses of how innovations occur over time. In specific, Van de Ven’s et al.
(1999) seminal book highlights three common periods – the initiation, developmental and implementation/termination period – in innovation developments and clearly uncovers the complex and unpredictable nature of innovation generation. To that end Van de Ven et al. (1999, pp. 6-7) state “…innovation journey was defined as new ideas that are developed and implemented to achieve outcomes by people who engage in transactions (relationships) with others in changing institutional and organizational contexts”.

2.4 Dimensions of Innovation

Besides the even chaotic and random nature of innovation several scholars have tried to disseminate the knowledge around the concept of organizational innovation (see Appendices 1, 2 and 3) (Anderson et al., 2004; Damanpour, 1991; Fiol, 1996; Wolfe, 1994). In the most recent development in the field, Crossan and Apaydin (2010) classified the different aspects of innovation in a way that they provide researchers with valuable tools on which they categorize the similarities, differences and the relationship between the determinants and the dimensions of innovation (see Figure 6). Accordingly, following the suggestions of theory development within a field (Bunge, 1997; Sutton & Staw, 1995; Weick, 1995), they adopt a sequential perspective of innovation as a process and as an outcome, whereas innovation process always precedes innovation outcome even if this distinction is usually blurred as innovation outcomes are commonly confused with market performance (Sood & Tellis, 2005).

Figure 6: A Multi-Dimensional Framework of Organizational Innovation
(Adopted from Crossan and Apaydin, 2010, p.1167)
In specific, in terms of the innovation-as-a-process distinction, ‘driver’ and ‘source’ dimensions of innovation give an answer to the question “how” and ‘locus’ refers to the extent of an innovation process. ‘View’ dimension pertains to the start and development of an innovation –top-down or bottom-up- and ‘level’ dimension identifies the splits between individual, group and firm processes. The innovation-as-an-outcome categorization, on the other hand, tries to answer to the question “what” or “what kind”. The ‘referent’ dimension is closely related to ‘magnitude’ as, for instance, an incremental innovation may create radical innovation to the market or to the industry. Furthermore, ‘form’ dimension recognizes three ‘forms’ of innovation: product or service innovation, process innovation and business model innovation. As Wang and Ahmed (2004, pp.304-305) highlight, product or service innovation ‘is the novelty and meaningfulness of new products introduced to the market in a timely fashion’ and process innovation is “the introduction of new production methods, new management approaches, and new technology that can be used to improve production and management processes”. Similarly, business model innovation is “how company creates, sells and delivers value to its customers” (Davila, Epstein, & Shelton, 2006, p.32). In a meta-analytic research of the determinants on product and process innovations, scholars found no significant differences among them and argued that these two distinct types of innovation outcomes are complementary and not contrary to each other (Damanpour & Aravind, 2006). Nonetheless, as Crossan and Apaydin (2010, p.1168) clarify “process as a form of innovation should not be confused with innovation viewed as a process...Organization processes of ideation and problem solving may result in an outcome in the form of a new process”. Moreover, ‘magnitude’ dimension shows the newness of an innovation outcome related to the appropriate referent. This dimension involves radical and incremental innovation as well as some of the aforementioned secondary types of innovation while ‘type’ mainly refers to administrative and technical innovations only (see §2.2 Types of Innovation). Finally, ‘nature’ can be applied to both “how” and “what” questions, as innovation as a product is mainly tacit and innovation in services or processes, for instance, is explicit.

2.5 Determinants of Innovation

In light of the innovation determinants research has offered valuable insights through different theoretical lenses (see Table 3). While numerous studies (Anderson et al., 2004; Damanpour, 1991; Fiol, 1996; Wolfe, 1994) include comprehensive reviews of the determinants of organizational innovation (see Appendix 2), this PhD adopts the
categorization of determinants based on the three meta-theoretical constructs presented by Crossan and Apaydin (2010) (see Figure 6).

Table 4: Theories Used in Innovation Research by Level
(Adopted from Crossan and Apaydin, 2010, p.1163)

<table>
<thead>
<tr>
<th>Multilevel</th>
<th>Macro (economy/industry/market)</th>
<th>Organization</th>
<th>Micro (group/team/individual)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>(Blundell, Griffith, &amp; Van Reenen, 1995)</td>
<td>(contingency)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(Brown &amp; Eisenhardt, 1997; Pil &amp; MacDuffie, 1996)</td>
<td>(Lam, 2005)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(Blundell, Griffith, &amp; Van Reenen, 1995)</td>
<td>(path dependence)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(Brown &amp; Eisenhardt, 1997; Pil &amp; MacDuffie, 1996)</td>
<td>(contingency)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(Blundell, Griffith, &amp; Van Reenen, 1995)</td>
<td>(path dependence)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(Brown &amp; Eisenhardt, 1997; Pil &amp; MacDuffie, 1996)</td>
<td>(contingency)</td>
</tr>
<tr>
<td>Learning, knowledge management, adaptation, change</td>
<td>(Hargadon &amp; Sutton, 1997) (org. memory)</td>
<td>(Blundell, Griffith, &amp; Van Reenen, 1995)</td>
<td>(path dependence)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(Brown &amp; Eisenhardt, 1997; Pil &amp; MacDuffie, 1996)</td>
<td>(contingency)</td>
</tr>
<tr>
<td>Other theories</td>
<td>(Woodman, Sawyer, &amp; Griffin, 1993)</td>
<td>(Finnemore, 1993)</td>
<td>(Cohen &amp; Levinthal, 1990; Denison, Hart, &amp; Kahn, 1996; Edmondson, Bohmer, &amp; Pisano, 2001; Eisenhardt &amp; Tabrizi, 1995; Grindley &amp; Teece, 1997; Lam, 2005; McGrath, 2001; Powell, 1998; Powell et al., 1996; Sorensen &amp; Stuart, 2000; Tushman &amp; O'Reilly, 1996)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(McGrath, 1997) (real options)</td>
<td>(Leonard &amp; Sensiper, 1998; Orlikowski &amp; Gash, 1994)</td>
</tr>
</tbody>
</table>
|                     |                                 | (Agarwal & Prasad, 1999; Chatman, Polzer, Barsade, & Neale, 1998;
More specifically, emphasizing on the role of innovation leadership (see Figure 6) as an innovation determinant scholars have long argued about its positive impact on firm performance (Adams, Bessant, & Phelps, 2006; Crossland & Hambrick, 2007; Mumford & Licuanan, 2004). Upper echelon theory suggests that leaders’ behaviors are a function of their values, experiences and personalities (Hambrick & Mason, 1984). Thus, leaders must possess certain skills, expertise and motivation in order to innovate as well as to understand the dynamic environment and be able to respond to subsequent threats and opportunities (Mumford, Scott, Gaddis, & Strange, 2002; Sternberg, Kaufman, & Pretz, 2003). On the individual level (CEO), leaders’ appropriate abilities include tolerance of ambiguity (Barron & Harrington, 1981; Patterson, 1999), self-confidence (Barron & Harrington, 1981), openness to experience (George & Zhou, 2001; West, 1987), unconventionality (Frese, Teng, & Wijnen, 1999; Simonton, 1991; West & Wallace, 1991), originality (Patterson, 1999; West & Wallace, 1991), authoritarianism (Simonton, 1991), rule governess (Frese et al., 1999; Simonton, 1991), independence (Patterson, 1999; West, 1987), proactivity (Seibert, Kraimer, & Crant, 2001), intrinsic attribution bias (Frese et al., 1999; West, 1987), determination to succeed (Amabile, 1983), personal initiative (Frese & Zapf, 1994), and managerial tolerance of change (Damanpour, 1991). On the group level –top management team (TMT)- these abilities include age and education (Bantel & Jackson, 1989; Hambrick & Mason, 1984), tenure (Bantel & Jackson, 1989; Finkelstein & Hambrick, 1990), diversity of background and experience (Bantel & Jackson, 1989), extra-industry ties (Geletkanycz & Hambrick, 1997), board occupational background (Goodstein, Gautam, & Boeker, 1994), institutional shareholding (Kochhar & David, 1996) and executive stock option (Sanders & Hambrick, 2007). Innovation leadership construct is interrelated with organizational and contextual factors through ‘Managerial Levers’ as leaders implement deductive innovation strategies through their decisions and actions (Polychroniou, 2008; Regner, 2003).

‘Managerial Levers’ concept (see Figure 6) has its roots on a dynamic stream of evolutionary economics (Nelson & Winter, 1982; Nelson & Winter, 2002), the resource-based view (Barney, 2001) and especially on dynamic capabilities (Eisenhardt & Martin, 2000; Prahalad...
& Hamel, 1990; Teece et al., 1997). Under conditions of hyper competition companies need to innovate by creating new capabilities and resources in order to create new advantages and/or achieve competitive advantage (D'Aveni, 1994; Dess & Picken, 2000; Teece et al., 1997; Tushman & O'Reilly, 1996). Hence, organizations seeking competitive advantage aim at exploiting current practices while exploring for new opportunities, thus consuming time, investments and managerial efforts (Dierickx & Cool, 1989; Rumelt, 1984). Those applying exploration and exploitation concurrently are called *ambidextrous* (Duncan, 1976). Some researchers have strongly supported that firms’ tendency to adopt or create innovations is a type of dynamic capability (Bottazzi, Dosi, Lippi, Pammolli, & Riccaboni, 2001; Helfat et al., 2007; Sinclair, Klepper, & Cohen, 2000) while others suggest that dynamic innovation capabilities stem from ‘managerial levers’ that enable innovation (Crossan & Apaydin, 2010; Elkins & Keller, 2003; Mumford et al., 2002). Specifically, ‘mission, goal and strategy’ refer to the route that an organization should follow (Adams et al., 2006), while explicit innovation strategy (Miller & Friesen, 1982; Tipping, Zeffren, & Fusfeld, 1995) and Miles and Snow (1978) prospector and organic strategic types are considered as important elements of innovation (Nicholson, Rees, & Brooks-Rooney, 2007). Regarding ‘resource allocation’, scholars have emphasized on R&D intensity (Parthasarthy & Hammond, 2002), commitment to differentiated funding (White, 2002), annual turnover of resources (Mohr, 1969) and slack resources (Kanter, 1983; O'Brien, 2003). In terms of the ‘structure and systems’ that affect innovation, research includes the appropriability of innovation for a specific organizational structure (Burns & Stalker, 1961), matrix principles (Staw, 1990), administrative complexity and intensity (Damanpour, 1991), formalization (Damanpour, 1991; West, Smith, Feng, & Lawthom, 1998), specialization and centralization (Damanpour, 1991; Zaltman, Duncan, & Holbek, 1973), stratification (Kanter, 1983) and the number of employees (Rogers, 1983). The ‘organizational learning and knowledge management’ highlights the characteristics that managers should possess in order to create a learning environment where employees could develop their skills and abilities (Crossan & Hulland, 2002). In that sense, leaders should be lenient to failed ideas (Madjar, Oldham, & Pratt, 2002), encourage experimentation (King, 1992; West & Anderson, 1992) and embrace risk-taking (King, Anderson, & West, 1991; West & Anderson, 1992). In the same vein knowledge management systems should enhance formal idea generation tools (Cebon & Newton, 1999) and information collection (Oliver, Dewberry, & Dostaler, 1999), external and of good quality linkages to universities (Atuahene-Gima, 1995; Cebon & Newton, 1999), and customer contact time and frequency (Lee, Son, & Lee, 1996). ‘Organizational culture’, on the other hand, stems from the leaders’ perception
Organizational Innovation: Basic Concepts and Theoretical Streams

towards shared vision (Pinto & Prescott, 1988; West, 1990), estimated risk taking (West, 1990), autonomy promotion (Amabile, 1998; Zien & Buckler, 1997) and motivation (Miller & Friesen, 1982). The aforementioned components of ‘Managerial Levers’ are considered as the factors that enable core innovation processes in firms (Crossan & Apaydin, 2010).

In terms of the ‘Business Processes’ (see Figure 6), Crossan and Apaydin (2010) confront them as a meta-construct based on the process theory (for more details see §2.3 Innovation Research Streams) indicating how processes transform inputs into outputs. Specifically, in the context of their innovation model, ‘initiation and decision making’ consists of the awareness and attitude towards new ideas (Ettlie, 1980; Harvey & Mills, 1970), concept generation or adoption (Chiesa, Coughlan, & Voss, 1996; Gopalakrishnan & Damanpour, 1997), decision making (Wolfe, 1994) and problem solving (Saren, 1984). ‘Portfolio management’, instead, refers to the appropriate strategic, technological and resource alternatives that affect project selection and the future firm’s shape (Cooper, Edgett, & Kleinschmidt, 1999). It entails deliberations on risk-return balance such as ROI (Bard, Balachandra, & Kaufmann, 1988), constraint optimization to maximize output (Schmidt & Freeland, 1992), and economic and benefit models (Hall & Nauda, 1990); and the usage of optimization tools (Cooper et al., 1999; Cooper, Edgett, & Kleinschmidt, 2001), formalized process (Cebon & Newton, 1999) and efficiency (Szakonyi, 1994) of project selection and assessment of anterior project results (Lee et al., 1996). ‘Development and implementation’ phase entails trials and production (Zaltman et al., 1973) while project management, problem solving and design and development take place in distinct organizational subunits. According to Adams et al. (2006) a successful innovation project management depends on project efficiency, tools, communication and collaboration. In specific it may include a problem finding solving cycle (Bessant, 2003); certified processes (Chiesa et al., 1996); post-launch evaluations (Atuahene-Gima, 1995); maintain internal and external communications (Cebon & Newton, 1999; Damanpour, 1991); and collaboration within the team (Jassawalla & Sashittal, 1999), with customers (Von Hippel, 1986) and with suppliers (Bessant, 2003). Project efficiency is assessed through appraising innovation speed (Chiesa & Masella, 1996; Hauser & Zettelmeyer, 1997) and project span (Cebon & Newton, 1999). To the end, innovation cycle is not complete without ‘marketing and commercialization’ which entails market research (Verhaeghe & Kfir, 2002), budget for market testing (Balachandra & Brockhoff, 1995), marketing (Yoon & Lilien, 1985) and launch proficiency (Song & Parry, 1996), personnel proficiency (Atuahene-Gima, 1995) and adherence to schedule (Griffin & Page, 1993). The
analytical measurement model of the determinants of organizational innovation according to Crossan and Apaydin (2010) is presented in Appendix 3.

2.6 Inconsistencies in Innovation Research

While innovation as a field of research has recently appealed broad academic and managerial interest the understanding of this scholarly young field still rests immature and ambiguous. Specifically, research findings are usually considered as inconclusive, inconsistent and of low-level of explanation. As Wolfe (1994, p.405) stresses “…the most consistent theme found in the organizational innovation literature is that its research results have been inconsistent”.

In contrast with other fields of organizational analysis such as contingency theory, organizational ecology, institutional theory etc., the absence of a dominant conceptual framework incorporating the multiple theoretical streams and levels of innovation research is also a fact that underlines the limited theoretical base that shapes organizational innovation as an academic field (Anderson et al., 2004; Drazin & Schoonhoven, 1996). Lack of focus on specific innovation stage, minimal consideration of innovation characteristics (e.g. adaptability, architectural impact, compatibility, complexity, duration) and types, studies limited to a single firm, industry or country comprise some of the reasons why innovation research remains undeveloped (Wolfe, 1994). Specifically, most of innovation studies are carried out in the U.S.A. while several scholars have outlined the need for cross-country and cross-cultural studies as innovation processes deploy differently in different contexts (Anderson et al., 2004; Lavie et al., 2010). Generalization of findings of industry-centric (such as manufacturing) and/or type of innovation (usually product innovations) studies also undermine the existence of, for instance, administrative innovation or service innovation studies (notable exceptions (Drazin & Schoonhoven, 1996; Quinn, 1992; Scott & Backman, 1990; Tushman & Smith, 2002)). Likewise, the characteristics and types of innovation should be considered when examining, for example, the elements of innovation adoption. Several researchers support that different innovation types lead to different alignments of the determining factors and/or innovation outcomes: a) organizational variables are noticeably better predictors of technological rather administrative innovations, b) team openness to change affects technical innovations more than administrative ones and c) distinct types of innovation advance different development processes (e.g. top-down or bottom-up) and performance outcomes (Damanpour & Gopalakrishnan, 2001; Henderson & Clark, 1990;
Kleinknecht, Van Montfort, & Brouwer (2002). Hence, the preposition of Evan & Black (1967, p.520) remains vivid today: “Without comparative research on the innovation process in various types of organizations, we can only speculate about the generalizability of elements in the innovation process”.

From a different point of view, Fiol (1996) emphasizes on the accumulation of knowledge that enables organizations to innovate, considering that most of the studies have provided results on the innovation ‘squeezing’ out of the organizations (e.g. papers examining the relationship between innovation and specialization, functional differentiation, professionalism, work environments etc.) and not on the what, how much and how organizations absorb knowledge in order to use it as the ‘fuel’ for innovation generation (see Figure 7).

This research approach is in line with Wolfe’s (1994) argument that scholars could overcome the complex, non-linear and often opportunistic nature of innovation by expanding their scope under which theoretical views use to examine innovation research. Further on, this PhD study will elaborate on Jim March’s (1991) exploration and exploitation framework, which stems from organizational learning literature, in order to extent the knowledge on organizational innovation and, specifically, on ambidextrous innovation orientation antecedents and outcomes.

Figure 7: A Map of Innovation Research
(Adopted from Fiol, 1996, p.1019)
CHAPTER THREE

EXPLORATION AND EXPLOITATION IN ORGANIZATION SCIENCE

3.1 Current State and Different Theoretical Lens

Organizational ambidexterity is widely recognized as a rudimentary yet important research model in organizational innovation theory (Simsek, Heavey, Veiga, & Souder, 2009). Whereas Duncan (1976) initially used this term, it is March’s (1991) influential article that has led to the concept’s recent growth. March proposed that there are two fundamentally incompatible learning processes, exploration that “includes things captured by terms such as search, variation, risk taking, experimentation, play, flexibility, discovery, innovation” and exploitation that encompasses “refinement, choice, production, efficiency, selection, implementation, execution” (March, 1991, p.71), which are the necessary yet conflicting activities that organizations must undertake in order to survive and being prosperous in the long-term (Andriopoulos & Lewis, 2010; Piao, 2010; Raisch et al., 2009; Tushman & O'Reilly, 1996). As Raisch and Birkinshaw point out (2008, p.377) “March’s argument that successful firms are ambidextrous contributed to a general shift in organizational research from trade-off to paradoxical thinking” because previous studies strongly argued about the organizations’ ability to simultaneously pursue competing or contrasting activities (Hannan & Freeman, 1977; McGill et al., 1992) emphasizing on following either exploration or exploitation (Burns & Stalker, 1961; Ghemawat & Ricart Costa, 1993). However, scholars have widely studied the exploration and exploitation framework to analyze phenomena in several literatures such as organizational learning (e.g. Levinthal & March, 1993; March, 1991), strategic management (e.g. Auh & Menguc, 2005; Boumgarden, Nickerson, & Zenger, 2012; Prahalad & Hamel, 1990; Siren, Kohtamaki, & Kuckertz, 2012), knowledge management (e.g. Brown & Duguid, 1991), leadership (e.g. Rosing et al., 2011); organizational theory and design etc. (e.g. Burgelman, 1991; Eisenhardt & Martin, 2000; Fang et al., 2010; Volberda, 1996); contexts such as technological and product innovation (e.g. Benner & Tushman, 2003; Danneels, 2002; Greve, 2007; He & Wong, 2004), strategic alliances (e.g. Lavie & Rosenkopf, 2006; Rotheaermel, 2001; Yamakawa, Yang, & Lin, 2011), marketing strategies (e.g. Kyriakopoulos & Moorman, 2004) and senior management teams (e.g. Cao et al., 2010; Probst et al., 2011); and levels of analysis such as at the individual (e.g.
Mom, Van Den Bosch, & Volberda, 2007; Mom et al., 2009), group (e.g. Beckman, 2006; Butler & Grahovac, 2012; McGrath, 2001), organizational (e.g. Harrell, O'Reilly III, & Tushman, 2007; Jansen et al., 2006), and industry levels (e.g. Gilsing & Nooteboom, 2006). Relevant research has also indicated that balancing these competing activities is a key issue in several literatures (Burgelman, 1991; Eisenhardt & Martin, 2000; Lavie et al., 2010; Volberda, 1996) as organizations face the dilemma of allocating scarce resources to the exploration of new competencies or to the exploitation of the existing ones (Vera & Crossan, 2004).

In specific, organizational learning literature initially focused on this concept to highlight firms’ competence to develop new knowledge against the refinement of the existing one (Levinthal & March, 1993). Scholars investigating the field have also recognized similar notions such as double-loop versus single-loop learning (Argyris & Schon, 1978), generative versus adaptive learning (Senge, 1990), local search versus long jump (Levinthal, 1997), product innovation versus production-oriented learning (McKee, 1992) and incremental versus step function learning (Helfat & Raubitschek, 2000). Over time, researchers have argued on whether and how exploration and exploitation should merely be associated with learning activities (Rosenkopf & Nerkar, 2001) and various debates have been risen on the presence or absence of learning in the notion (Gupta, Smith, & Shalley, 2006; He & Wong, 2004) or on the type and the degree of learning (Baum, Li, & Usher, 2000). However, while March (1991) initially focused on the incompatibility of these two different processes of learning, scholars have since operationalized exploration and exploitation as orthogonal variables that can be performed concurrently (Auh & Menguc, 2005; Katila & Ahuja, 2002). Lately, Lavie et al. (2010, p.112) have pointed out that “...scholars have applied this framework beyond the context of knowledge management, reverting to March’s original definition. Exploration has since been broadly associated with notions such as organizational diversity, diversification and variation, whereas exploitation has been used to generally describe organizational focus, experience and variance reduction”.

In terms of the technological innovation literature, researchers’ central distinction is between the refinement of an existing product and the creation of a new one, an incremental or radical innovation respectively (Abernathy & Clark, 1985; Christensen, 1997; Dewar & Dutton, 1986; Tushman & Anderson, 1986). Tushman and Smith (2002) have strongly supported that incremental innovations aim at the satisfaction of the existing customer and market needs.
(exploitative innovations) while radical innovations target to the evolving customer and market needs (explorative innovations). Following them, scholars have further advanced the types of exploratory and exploitative innovations in several studies (Atuahene-Gima, 2005; Benner & Tushman, 2003; Danneels, 2002) while others have emphasized on their effects in new markets creation, R&D project performance, organizational practices, alliances, innovation diffusion and structural arrangements in their adaptation (Ettlie et al., 1984; Hoang & Rothaermel, 2010; Lee, Smith, & Grimm, 2003; Moch & Morse, 1977; Nord & Tucker, 1987; Phene, Tallman, & Almeida, 2010; Rothaermel & Alexandre, 2009; Wang & Rafiq, 2012). However, the organizations’ ability to cope with the tensions created by the simultaneous pursuit of exploration and exploitation is also a critical research point (Abernathy, 1978; Dougherty, 1992b; Nadler, Tushman, & Nadler, 1997). In specific Tushman & O’Reilly (1996) stress the ability of pursuing incremental and discontinuous innovation concurrently, while Ancona, Goodman, Lawrence and Tushman (2001) propose that dynamic capabilities stem from explorative and exploitative innovations. In accordance, many researchers shape various organizational dimensions in order to indicate the appropriate balance between the two distinct types of innovation (Brown & Eisenhardt, 1997; Christensen & Overdorf, 2000; de Visser et al., 2010; O’Reilly & Tushman, 2004).

In technological change literature researchers support that technology is a determining factor in changing environmental conditions (Anderson & Tushman, 1990). In that sense, scholars argue that technological advancement creates an evolutionary system interspersed by discontinuous change. Consequently, there are periods of incremental change where exploitative innovations refine existing designs and further develop existing technology while increasing efficiency; until a new technology appears driving to a significant shift that makes old technologies uncompetitive (Tushman & Anderson, 1986). Notwithstanding, previous research by Stinchcombe (1965) has suggested that older firms are more competitive in terms of the number of innovations possessed than younger firms, Sorensen and Stuart’s (2000) research has revealed that older firms are less resilient to innovate as they heavily rely on improved but older procedures. Thus, firms that are capable of simultaneously developing existing designs while initiating radical innovations achieve significant advantages over their competitors.

In organizational change and organizational adaptation literature scholars have heavily supported that long-term organizational prosperity depends on the balance between continuity
and change (Brown & Eisenhardt, 1997; Leana & Barry, 2000; Probst & Raisch, 2005; Tushman & O’Reilly, 1996; Volberda, 1996). Tushman and Romanelli (1985) have proposed a model of organizational advancement, where organizations have long periods of convergence punctuated by short periods of discontinuous change. Previous research claimed that organizations and their environments are tightly interconnected proposing different organizational types (organic and mechanistic) (Burns & Stalker, 1961), different modes of strategy-making (Mintzberg, 1973) and a typology that classified business units in four distinct clusters: prospectors, analyzers, defenders and reactors (Miles & Snow, 1978). Under that scheme some researchers have further suggested that momentum is a crucial force in continuity and change (Miller & Friesen, 1980, 1984) and others have proposed the “pacing time” as a way of systematic and rhythmical organizational change (Brown & Eisenhardt, 1997). In turn, Tushman & O’Reilly (1996, p.11) believe that “long-term success is marked by increasing alignment among strategy, structure, people, and culture through incremental or evolutionary change punctuated by discontinuous or revolutionary change that requires the simultaneous shift in strategy, structure, people, and culture”. Nonetheless, Meyer and Stensaker (2006) have highlighted the importance of the balancing ability of organizations among the radical changes needed and the daily processes that organizations undergo while others have focused on the balance between continuity and change in similar paradigms such as organizational identity (Dutton & Dukerich, 1991; Gioia, Schultz, & Corley, 2000), absorptive capacity (Jansen, Van Den Bosch, & Volberda, 2005b; Zahra & George, 2002) and organizational routines (Feldman & Pentland, 2003). To sum up, the common element that underscores the importance of balancing in those concepts is that organizations must avoid the continuing radical changes activities as they could lead to organizational chaos whereas the opposite could lead to organizational inertia (Huy, 2002; Sastry, 1997).

In strategic management literature, similar to exploration and exploitation notions, have appeared in the form of static and dynamic efficiency (Ghemawat & Ricart Costa, 1993), induced and autonomous processes (Burgelman, 1991), stretch and leverage (Hamel & Prahalad, 1993), building and controlling capabilities (Sanchez, Heene, & Thomas, 1996), explorative alliances versus exploitative alliances (Rothaermel & Deeds, 2004), pro-profit versus pro-growth strategies (Han, 2005) and open versus closed action strategies (Gebert, Boerner, & Kearney, 2010). In particular, Ghemawat & Ricart Costa’s (1993) research has distinguished among static efficiency, which is the organizations’ tendency to improve existing products, processes and capabilities in a given domain of conditions, and dynamic
efficiency, which refers to the organizations’ ability to reevaluate initial conditions and create new products, processes and capabilities. However, it is highlighted that organizations usually fail to change among the efficiency orientations as inertial drifts and resources’ complexity make each choice difficult. Similarly, Burgelman’s (1991) internal ecology model of strategy, separates strategic processes into variation-reducing, so, induced and variation-increasing, so, autonomous strategic processes. The first set of strategic processes is based on organizations’ previous experience and aims at capturing new organizational knowledge from existing practices while persevering a balance among operational and organizational level strategic initiatives. The later set of strategic processes targets on developing a firm’s domain and, thus, leads into actions that surpass current strategy. In his following article Burgelman (2002) has clearly connected induced processes to exploitation and autonomous processes to exploration. Furthermore, Hamel and Prahalad (1993) have suggested that the idea of “strategic fit” is quite static and, thus, underlined the tension between leverage and stretch. Particularly, they have pointed out that a firm could reach to a competitive advantage when it would leverage its resources by improving and using its capabilities at the time of the highest profits. Yet, a firm also needs stretch, which refers to the creation of a technical chasm between the firm’s environment and itself. In other words they have focused on the strategic decision that the firms should take in order to create a competitive advantage: the exploration of new capabilities or the exploitation of the existent ones. In turn, Sanchez et al. have (1996) claimed that successful organizations, in the long-run, should efficiently cope with the competences building as well as the processes leveraging. Specifically, competences building denote the procurement and expansion of qualitative diverse assets and capabilities while competences leveraging convey the usage of the existing competences to the market without altering firm’s assets or capabilities. Finally, Volberda, Baden-Fuller and Van den Bosch (2001) identify the selective and adaptive strategic actions which generate four “renewal journeys” by integrating different features of each one.

In *organization theory and design* literature researchers have long argued about the appropriate structures that lead to organizational efficiency and flexibility. Initially, Burns and Stalker (1961) supported that mechanistic organizational structures—which depend on standardization, centralization and hierarchy- are beneficial to established conditions while organic organizational structures—which depend on decentralization and autonomy- lead to flexibility. Following them, Thompson (1967) has distinguished among certainty and flexibility, defining this dual-search as the “administration paradox”. In turn, Duncan (1976)
Exploration and Exploitation in Organization Science

suggested that organizations need both structures in order to be ambidextrous and, thus, viable and prosperous in the long-run and Galbraith (1982) suggested that these two profoundly contradictory rationalities need the appropriate different structures to be applied. Even if many scholars have strongly supported that organizations usually fail to adapt to this dual structure (Ford & Ford, 1994; Lawrence & Lorsch, 1967; Lewis, 2000), recent studies reveal the need of combining both explorative and exploitative features in order paradox to be resolved (Adler et al., 1999; Csaszar, 2012; Jansen et al., 2005a; Kauppila, 2010; Sheremata, 2000; Tushman, Smith, Wood, Westerman, & O'Reilly, 2010).

Table 5: Manifestation of Exploration and Exploitation Notion and its Trade-offs in Various Literatures

<table>
<thead>
<tr>
<th>Stream of Research</th>
<th>Distinction between Exploration and Exploitation</th>
<th>Notable References</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organizational Learning</td>
<td>Exploration vs. exploitation</td>
<td>(Bierly &amp; Daly, 2007; Cegarra-Navarro, Sanchez-Vidal, &amp; Cegarra-Leiva, 2011; Grant, 1996; Gupta et al., 2006; Hanssen-Bauer &amp; Snow, 1996; Helfat &amp; Raubitschek, 2000; Im &amp; Rai, 2008; Kang &amp; Snell, 2009; Levinthal &amp; March, 1993; March, 1991; McKee, 1992; Swart &amp; Kinnie, 2007; Tiwana &amp; Keil, 2007)</td>
</tr>
<tr>
<td>Technological Innovation</td>
<td>Incremental vs. radical innovation</td>
<td>(Abernathy, 1978; Atuahene-Gima, 2005; Benner &amp; Tushman, 2003; Danneels, 2002; Dewar &amp; Dutton, 1986; He &amp; Wong, 2004; Jansen et al., 2006; Katila &amp; Ahuja, 2002; Lavie &amp; Rosenkopf, 2006; Phene et al., 2010; Rothaermel &amp; Alexandre, 2009; Tushman &amp; Smith, 2002; Wang &amp; Rafiq, 2012)</td>
</tr>
<tr>
<td>Technological Change</td>
<td>Incremental vs. discontinuous change</td>
<td>(Anderson &amp; Tushman, 1990)</td>
</tr>
<tr>
<td>Organizational Change</td>
<td>Continuity vs. change</td>
<td>(Miller &amp; Friesen, 1980; O'Reilly &amp; Tushman, 2004; Posen &amp; Levinthal, 2012; Tushman &amp; O'Reilly, 1996; Tushman &amp; Romanelli, 1985)</td>
</tr>
<tr>
<td>Organizational Adaptation</td>
<td>Momentum vs. revolution</td>
<td>(Miller &amp; Friesen, 1980; O'Reilly &amp; Tushman, 2004; Posen &amp; Levinthal, 2012; Tushman &amp; O'Reilly, 1996; Tushman &amp; Romanelli, 1985)</td>
</tr>
<tr>
<td></td>
<td>Evolutionary vs. revolutionary change</td>
<td>(Miller &amp; Friesen, 1980; O'Reilly &amp; Tushman, 2004; Posen &amp; Levinthal, 2012; Tushman &amp; O'Reilly, 1996; Tushman &amp; Romanelli, 1985)</td>
</tr>
<tr>
<td></td>
<td>Alignment vs. adaptability</td>
<td>(Miller &amp; Friesen, 1980; O'Reilly &amp; Tushman, 2004; Posen &amp; Levinthal, 2012; Tushman &amp; O'Reilly, 1996; Tushman &amp; Romanelli, 1985)</td>
</tr>
</tbody>
</table>
### Chapter Three

#### Strategic Management

<table>
<thead>
<tr>
<th>Comparison</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Static vs. dynamic efficiency</td>
<td>(Andriopoulos &amp; Lewis, 2010; Auh &amp; Menguc, 2005; Boumgarden et al., 2012; Burgelman, 1991; Ebben &amp; Johnson, 2005; Gebert et al., 2010; Ghemawat &amp; Ricart Costa, 1993; Han, 2005; Kyriakopoulos &amp; Moorman, 2004; Lubatkin, Simsek, Ling, &amp; Veiga, 2006; Menguc &amp; Auh, 2008; Prahalad &amp; Hamel, 1990; Rothaermel &amp; Deeds, 2004; Sanchez et al., 1996; Siren et al., 2012; Tarafdar &amp; Gordon, 2007; Tiwana, 2008; Yamakawa et al., 2011)</td>
</tr>
<tr>
<td>Induced vs. autonomous processes</td>
<td></td>
</tr>
<tr>
<td>Stretch vs. leverage</td>
<td></td>
</tr>
<tr>
<td>Building vs. controlling capabilities</td>
<td></td>
</tr>
<tr>
<td>Exploration vs. exploitation in marketing strategy</td>
<td></td>
</tr>
<tr>
<td>Explorative alliances vs. exploitative alliances</td>
<td></td>
</tr>
<tr>
<td>Pro-profit vs. pro-growth strategies</td>
<td></td>
</tr>
<tr>
<td>Open vs. closed action strategies</td>
<td></td>
</tr>
<tr>
<td>Strategic vision vs. operational excellence</td>
<td></td>
</tr>
</tbody>
</table>

#### Organizational Theory and Design

<table>
<thead>
<tr>
<th>Comparison</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mechanistic vs. organic structures</td>
<td>(Adler et al., 1999; Bradach, 1997; Burns &amp; Stalker, 1961; Csaszar, 2012; Duncan, 1976; Durisin &amp; Todorova, 2012; Fang et al., 2010; Galbraith, 1982; Gibson &amp; Birkinshaw, 2004; Jansen et al., 2005a; Kauppila, 2010; Rivkin &amp; Siggelkow, 2003; Shermata, 2000; Smith &amp; Tushman, 2005; Thompson, 1967; Volberda, 1996)</td>
</tr>
<tr>
<td>Initiation vs. implementation</td>
<td></td>
</tr>
<tr>
<td>Organizational efficiency vs. flexibility</td>
<td></td>
</tr>
<tr>
<td>Search vs. stability</td>
<td></td>
</tr>
<tr>
<td>Centrifugal vs. centripetal forces</td>
<td></td>
</tr>
<tr>
<td>Operating vs. innovating</td>
<td></td>
</tr>
<tr>
<td>Change vs. preservation</td>
<td></td>
</tr>
<tr>
<td>Cognitive differentiation vs. cognitive integration</td>
<td></td>
</tr>
</tbody>
</table>

### 3.2 Ambidexterity VS Balance: Two Competing Schools of Thought

In his seminal article March (1991) has denoted that organizations need to cope with inherent trade-offs created by exploration and exploitation, as they perform differently and, sometimes, competently for the same strategic acts and at the same time. Resource-allocation constraints, organizational inertia and anticipated organizational results are critical factors that facilitate the opposing nature of exploration and exploitation. In specific, organizations that mostly exploit nor explore usually “find themselves trapped in suboptimal stable equilibria” while the organizations “that engage exploration to the exclusion of exploitation…exhibit too many undeveloped new ideas and too little distinctive competence” (March, 1991, p.71).

Ambidexterity, on the other hand, directly affects the management of those trade-offs so that the appropriate level of exploration and exploitation to be applied in an organization (Ghemawat & Ricart Costa, 1993; Lavie et al., 2010). To that end, scholars view ambidexterity as a bi-polar paradigm, which operationalizes exploration and exploitation as the opposite ends of a continuum, as well as “two orthogonal activities that positively interact” (Gupta et al., 2006; Katila & Ahuja, 2002; Uotila et al., 2009, p.1).
Recently, scholars have proposed different theoretical structures in order to capture the positive impact of exploration and exploitation in organizational performance. Explicitly, Lavie et al. (2010) suggested the notion of transitivity—which indicates the natural cycle where exploration will follow exploitation in consecutive stages (Rothaermel & Deeds, 2004)- to elucidate that exploration and exploitation should be conceptualized along a continuum. Following them Boumgarden et al. (2012), compare and integrate organizational ambidexterity with organizational vacillation; which refers to the achievement of high levels of exploration and exploitation by changing organizational structures promoting each activity from time to time as a sequence (Gulati & Puranam, 2009; Nickerson & Zenger, 2002; Siggelkow & Levinthal, 2003). Specifically, they analyze case studies from both literatures and they find that vacillation might lead to better organizational performance in the long run while ambidexterity increases performance on the margin when applied within larger periods of vacillation. As Gupta et al. (2006 ,p.693) highlight “theories about the ease or difficulty with which an organization can pursue both exploration and exploitation depend crucially on whether these two tasks are treated as competing or complementary aspects of organizational decisions and actions”. In that sense, several studies have tried to resolve the dilemma of balancing exploration and exploitation by proposing different modes of balancing such as contextual ambidexterity (Gibson & Birkinshaw, 2004), organizational or structural separation (Cao et al., 2009; He & Wong, 2004; Jansen, Tempelaar, van den Bosch, & Volberda, 2009; Tushman & O'Reilly, 1996), domain separation (Lavie et al., 2011; Lavie &
Specifically, in terms of the *contextual ambidexterity*, Gibson and Birkinshaw (2004) support that exploration and exploitation can be balanced in those organizations that enhance a proper organizational context that includes stretch, discipline, trust and support. According to them such a context creates shared ambitions and collective identity (Ghoshal & Bartlett, 1994) and, thus, enables simultaneous alignment and adaptability which leads to better organizational performance. Other scholars have also suggested that cultural values such as creativity and quality that encourage innovation also play a crucial role in maintaining the balance between exploring and exploiting (Takeuchi, Osono, & Shimizu, 2008; Wang & Rafiq, 2012). However, while contextual ambidexterity enables micro-level focus on exploration or exploitation in specific settings (Adler et al., 1999), Lavie et al. (2010, p.131) highlight that “...At the individual and team levels, goal conflict and bounded rationality lead to sequential allocation of attention to divergent goals, so that a particular task environment draws attention to either exploration or exploitation”. Cao et al. (2009), on the other hand, propose a dual perspective of ambidexterity, the balanced and combined ambidexterity, whereas the first enables organizations to equally pursue both activities and the later suggests that firms should explore and exploit at different degrees. Nonetheless, while recent studies reveal that organizations can effectively create and manage the organizational context needed in order to balance exploration and exploitation in an appropriate manner (Kauppila, 2010), others focus on the importance of examining new types of ambidexterity involving the alignment of internal and external knowledge processes management and technology (Rothaermel & Alexandre, 2009).

In vein of *organizational or structural separation* scholars have proposed that organizations should create those organizational systems that strongly tie with their activities and processes in the continuing changing environment (Duncan, 1976). In specific, Tushman and O’Reilly (1996) have suggested that structural ambidextrous organizations should create separated units to explore and exploit in a specialized manner in order to generate “pragmatic boundaries” which will keep a unit’s exploratory actions away from another one’s exploitative actions (Carlile, 2004). In organizations that enhance organizational separation
exploitative units are larger, more centralized and with tight culture so that efficiency and control are increased (Benner & Tushman, 2003), while explorative units are small and decentralized with flexible processes and rules in order various spillovers to be prevented (Christensen, 1997). However, recent studies demonstrate the crucial role of top management teams in structural ambidextrous organizations as they are responsible of the decision making in allocating resources and resolving the exploration and exploitation trade-offs in the separated units (Andriopoulos & Lewis, 2009; Cao et al., 2010; Jansen et al., 2009; O’Reilly & Tushman, 2011; Probst et al., 2011; Westerman, McFarlan, & Iansiti, 2006). Furthermore, the ambidexterity performance measurement is still underdeveloped as scholars usually abstruse the balance among exploration and exploitation in favor of ambidexterity, which is incorrectly viewed as balance and not as a mode of balancing (He & Wong, 2004; Lin et al., 2007). Nevertheless Jansen, Simsek and Cao (2012) in their latest study found that “structural differentiation of the organization does not condition the unit ambidexterity-performance relationship” while de Visser et al. (2010) suggest that firms should adopt structural ambidexterity in order to organize differently the appropriate units so that they gain optimum performance from their incremental or radical innovations. To that end, some studies emphasize on the effects of organizational separation across hierarchical levels in order to reveal the importance of organizational design in ambidexterity research (Butler & Grahovac, 2012; Fang et al., 2010; Tushman et al., 2010), while others highlight a totally different type of organizational separation –where exploration activities are enhanced in external independent units- which is based on spinouts, corporate venture capital investments and skunk-works (Ahuja, Lampert, & Tandon, 2008).

The temporal separation approach has its roots in evolutionary theory and the model of punctuated equilibrium in particular (Lant & Mezias, 1992; Nelson & Winter, 1982; Romanelli & Tushman, 1994). It involves cycling between exploration and exploitation over time, where organizations aim at exploring or exploiting at a given time (Duncan, 1976; Gupta et al., 2006) regardless environmental conditions (Siggelkow & Levinthal, 2003). Putting it differently, it portrays organizational transformation where long periods of stability are followed by short periods of fundamental change (Gersick, 1991; Tushman & Romanelli, 1985). Applying temporal separation leads to temporal shifts but it presumes the appropriate management of the conflicting demands during transition time, as path dependence towards exploration or exploitation may create various problems such as delays and high cost implementation (Brown & Eisenhardt, 1997; Kang & Snell, 2009). However, through
temporal separation organizations are more vulnerable to avoid the inherent trade-offs created by the concurrent pursuit of exploration and exploitation (Lavie et al., 2010), explicitly when the shift from one activity to another proceeds gradually and in a slower manner (Lavie & Rosenkopf, 2006; Rothaermel & Deeds, 2004).

In balancing through domain separation scholars suggest that exploration and exploitation can be carried out in multiple domains (Gupta et al., 2006; Lavie et al., 2011). In accordance with this view Lavie et al. (2010) highlight the importance of balancing across domains in order organizations to maintain an overall balance by pursuing both types of activities. Specifically as the ambidexterity and punctuated equilibrium operationalizations present different behaviors in organizations’ life, scholars suggest that -in a single domain- exploration and exploitation activities may overcome each other and, thus, should be theorized as two ends of a continuum. In that case, the punctuated equilibrium view should mainly focus on managing the balance of exploration and exploitation. On the other hand, when organizations perform in multiple internally connected domains exploration and exploitation should be conceptualized as orthogonal activities and, thus, ambidexterity should be managed. Recently, Lavie et al. (2011) studied the alliance portfolios of software firms and proposed that organizations enhancing domain separation are able to overcome various complications -created by the opposing nature of exploration and exploitation- and increase their performance. Specifically, they argue that “increases in firm size that exacerbate resource allocation trade-offs and routine rigidity reinforce the benefits of balance across domains and the costs of balance within domains” (Lavie et al., 2011, p.1517). Despite the increasing efforts in uncovering the various effects of domain separation further research is needed to reveal its implications within, across and outside organizational frontiers (Hoang & Rothaermel, 2010).

To sum up, while ambidexterity research has expanded to different modes of balancing and means to achieve ambidexterity in organizations it still remains unclear what exactly ambidexterity and, what balancing exploration and exploitation in an ambidextrous way, means (Durisin & Todorova, 2012). As discussed earlier, scholars have made strong efforts to integrate or insinuate different modes of balancing in order to clarify the exact nature of ambidexterity (see Table 6). For instance, (Simsek et al., 2009, p.864) have proposed “four archetypes of ambidexterity using two primary dimensions underlying previous conceptualizations of this construct”. Similarly, empirical research in exploration and
exploitation still reports diverse results on the association among these activities such as positive (Katila & Ahuja, 2002; Knott, 2002), negative (Park, Chen, & Gallagher, 2002; Van Deusen & Mueller, 1999), or no correlation (Jansen et al., 2006). To that end, recent studies have proposed that the interpretation of the exact nature of exploration, exploitation and, thus, ambidexterity will be only be possible if researchers draw back to March’s (1991) original definition and conceptualize their ideas accordingly (Lavie et al., 2010).

Table 6: Alternative Modes of Balancing Exploration and Exploitation
(Adopted from Lavie et al., 2010, p.130)

<table>
<thead>
<tr>
<th>Modes of Balancing</th>
<th>Contextual Ambidexterity</th>
<th>Organizational or Structural Separation</th>
<th>Temporal Separation</th>
<th>Domain Separation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Locus of balance</td>
<td>Individual and group levels</td>
<td>Organizational level</td>
<td>Organizational level</td>
<td>Organizational level</td>
</tr>
<tr>
<td>Mechanism of balance</td>
<td>No buffers between concurrent exploration and exploitation</td>
<td>Separate units dedicated to either exploration or exploitation, simultaneously coordinated at the corporate level</td>
<td>Sequential shifts over time from exploration and exploitation vice versa</td>
<td>Exploring in one domain while simultaneously exploiting in another</td>
</tr>
<tr>
<td>Management role</td>
<td>Management provides a supportive infrastructure</td>
<td>Proactive management is essential</td>
<td>Proactive management is essential</td>
<td>Proactive management is not a necessary condition</td>
</tr>
<tr>
<td>Challenges</td>
<td>Managing contradictions within organizational units</td>
<td>Coordinating across units and managing contradictions at the senior management team</td>
<td>Managing transitions between exploration and exploitation and dislodging from inertial pressures</td>
<td>Identifying applicable domains and deciding whether to exploit in any given domain</td>
</tr>
</tbody>
</table>

3.3 Antecedents of Exploration and Exploitation

As discussed earlier a primitive key question is how organizations can balance exploration and exploitation in order to achieve long-term performance and, thus, prosperity. As long as researchers have merely focused on balancing or simultaneously pursuing these distinct
activities, still little is known about the causes of exploration and exploitation. Explicitly, scholars have identified various antecedents, which affect an organization’s ability to explore, exploit or balance these activities, including environmental factors, such as dynamism, shocks, competition and appropriability regimes, and organizational factors such as absorptive capacity, resources, structure, identity, age and size. Figure 9 presents an innovative and comprehensive framework of exploration and exploitation according to the recent literature developments.

![Figure 9: A Framework of Exploration – Exploitation](Adopted from Lavie et al., 2010, p.111)

In terms of the *environmental antecedents*, *environmental dynamism* refers to the degree of changes and variability to the environment (Dess & Beard, 1984). While in static environments organizations usually exploit in order to survive, in dynamic environments products and services usually become out-dated and organizations are ought to explore (Sorensen & Stuart, 2000), so that they enhance opportunity seeking (Hannan & Freeman, 1984; Sidhu, Volberda, & Commandeur, 2004). Nevertheless, various simulation studies report that exploration activities are negatively affected when environmental turbulence is continuous -as previous knowledge is being vanished while new possibilities are not yet fully developed- and highlight the importance of the degree of exploration activities applied in...
order to support organizations’ adaptation in these environments (Kim & Rhee, 2009; Posen & Levinthal, 2012).

On the other hand, *exogenous shocks* differ from environmental dynamism because they are boosted by unpredicted factors such as technological revolutions or deregulation (Meyer, Brooks, & Goes, 1990) and surpass existing technologies and skills (Romanelli & Tushman, 1994; Tushman & Anderson, 1986), forcing organizations to immediately adapt to the new environmental conditions (Mumman & Tushman, 1997). Under these circumstances, exploration activities are applied to foster new products and services—in response to incremental eras—and exploitation activities to rescue organizations’ existing assets.

In light of *competitive intensity*, it denotes organizations’ effort to keep exploration-exploitation relations unvarnished, while these distinct set of activities strive for scarce resources (Barnett, 1997). Specifically, in environments where the number of competitors rises leading to decrease in product prices, profit margins and organizational resources (Porter, 2008), organizations’ exploitative activities are not enough to confront competition. In this vein, some scholars suggest that, during eras of competitive rivalry, exploration should be applied in order firms to strengthen their position in existing markets and open new markets while, in times of low competition, exploitation should be applied to ensure the profitability of the organizations as they would not suffer the costs of experimentation in new products, services and technologies (Park et al., 2002; Voss, Sirdeshmukh, & Voss, 2008).

Finally, *appropriability regimes* refer to the degree that environmental conditions allow an organization to earn its innovation profits. For instance, Teece (1986) reported the case of Merck in order to highlight the effects of inadequate governmental legal protection over the imitation of its streptomycin drug. To that end, if legal modes of protection are tight the exploration effects should be stronger but if appropriability regimes are loose, exploitation should be applied. However, more empirical research is needed in order to reveal how appropriability regimes affect exploration and exploitation.

In terms of the *organizational antecedents*, researchers have attempted to highlight the tendencies related to organizations’ resources such as knowledge, structures, culture, age and size that foster either exploration or exploitation.
Regarding knowledge as an antecedent of exploration and exploitation and, thus ambidexterity, research is still ambiguous. Cohen and Levinthal (1990) were the first to identify an organization’s *absorptive capacity*, which refers to a firm’s ability to recognize, assimilate and apply the value of external knowledge. An organization’s absorptive capacity shapes its relationship with external environment and boosts learning so that exploration activities proactively foster new technologies or new markets (Cohen & Levinthal, 1990; Hoang & Rothaermel, 2010; Lavie, 2006). However, limited empirical evidence suggest that future research should focus on the definition and measurement of the association between exploration and absorptive capacity in order to prove the causality among them (Lavie et al., 2010; Lewin, Massini, & Peeters, 2011). Nevertheless, the knowledge provided by external knowledge flows is necessary to organizations in order to assimilate and utilize it for commercial ends as “the importance of knowledge generated outside a firm’s boundaries has increased dramatically over the last few years” (Escribano, Fosfuri, & Tribo, 2009, p.97). In specific, *external knowledge flows* refer to the part of knowledge possessed from an organization, which comes from external sources (Cassiman & Veugelers, 2002) and boosts innovation activity (Rosenberg, 1982). In the same vein, *intellectual capital*, which denotes an organization’s ability to utilize its knowledge resources (Subramaniam & Youndt, 2005), plays an important role towards the implementation of new knowledge in an organization for innovation (Ahuja, 2000; Dougherty, 1992a; Subramaniam & Venkatraman, 2001; Tsai & Ghoshal, 1998). Intellectual capital consists of *human capital* –defined as the knowledge, skills and abilities residing within and utilized by individuals (Schultz, 1961)-, *organizational capital* –defined as the institutionalized knowledge and codified experience residing within and utilized through databases, patents, manuals, structures, systems, and processes (Youndt, Subramaniam, & Snell, 2004)- and *social capital* –defined as the knowledge embedded within, available through and utilized in interactions among individuals and their networks of interrelationships (Nahapiet & Ghoshal, 1998). As Subramaniam & Youndt state (2005, p.452) “…Since innovations draw upon such deployed knowledge finding an association between various aspects of intellectual capital and an organization’s generic capability to innovate would hardly been surprising”. Hence, realizing the importance of knowledge configurations in innovation research, this PhD thesis will cope with the two firm level dimensions of intellectual capital –the organizational and social capital- as well as with external knowledge flows and their association with firms’ ambidextrous orientation (for more details see §4.2.2 Ambidextrous Orientation and the Characteristics of the Organizational Context).
Slack resources, on the other hand, are defined as the extra resources that an organization possesses, which are not necessary for its routine operations (Nohria & Gulati, 1996). Scholars have long argued about the impact of slack resources in organizations as different paradigms have been reported. In specific, some researchers support that slack resources accelerate innovation, and thus exploration, as organizations do not suffer from environmental instability and risk as the excess of their resources allows them to operate normally and avoid failure effects (Levinthal & March, 1993; Nohria & Gulati, 1996; Sharfman, Wolf, Chase, & Tansik, 1988; Sidhu et al., 2004). Adversely, others highlight that even organizations maintain these operations and escape competition and environmental uncertainties, they have no incentive to innovate and they just consume their resources (Bourgeois, 1981). To that end, Voss et al. (2008) stimulate the effect of unabsorbed slack to exploration when organizations come against threats and the same effect to exploitation during periods of low competitive intensity.

In view of organizational structure scholars support that different structures can accelerate even exploration or exploitation. As discussed earlier, mechanistic structures refer to standardization, centralization and hierarchy while organic structures focus on decentralization and autonomy (Burns & Stalker, 1961; Burns & Wholey, 1993). In that sense, exploration is expected to lead organizations to search for new knowledge and, thus, make centralization in decision making inadequate, while formalization should be associated with exploitation through the incremental development of products and services. In the same vein, Jansen’s et al. (2006) study illustrates the negative effect of centralized decision making in exploratory innovation and the positive impact of formalization in exploitative innovation in a large European financial-services firm. However, more empirical research is needed to fully deploy the extent of organizational structure effects in exploration and exploitation as simulation studies uncover, for instance, different implications of organizational forms and centralization towards March’s framework (Butler & Grahovac, 2012).

Regarding organizational culture or organizational climate, some scholars suggest that they are similar notions describing employees’ experiences of their organizations (Patterson et al., 2005) while others focus on the behavioral orientation of climate (Schneider, 2000). Based on the later line of reasoning, Svyantek & Bott (2004) define organizational culture as the set of shared values and norms held by employees that guide their interactions with peers management and clients and organizational climate as the surface manifestation of culture
(Schein, 1985; Schneider, 1990). Prior research results are contradictory either associating organizational culture with established organizational routines and processes and, thus, exploitation (Andrews, Basler, & Coller, 1999; Sorensen, 2002), or supporting that firms dedicated to innovate have already enhanced exploration in their culture (Ravasi & Schultz, 2006; Sidhu et al., 2004). Organizational identity, is also a parameter that directly affects organizational culture as shared values, goals and dominant logic of the members of an organization create strong rules that could lead to either exploration or exploitation (Albert & Whetten, 2004; Alvesson, 2002; Tripsas, 2009). Through a different theoretical perspective, Wang and Rafiq (2012), examining a large sample of UK and Chinese high-tech firms, indicate that “contextual ambidexterity mediates the relationship between ambidextrous culture –defined as organizational diversity and shared vision- and new product innovation outcomes”. On the other hand, researchers have denoted that the dimensions of organizational climate differ depending on the purpose of the investigation and the criterion of interest (Patterson et al., 2005; Schneider, 1975, 1990, 2000), thus, leading to different measures for each context (e.g. innovation, services etc.) (Anderson & West, 1998; Schneider, 1990; West, 1990). This PhD thesis, will focus on how flexibility –defined as the orientation towards change (Garrahan & Stewart, 1992; King & Anderson, 1995)- and innovation –defined as the extent of encouragement and support for new ideas and innovative approaches (West & Farr, 1990)- dimensions of organizational climate affect firms’ ambidextrous orientation (for more details see §4.2.2 Ambidextrous Orientation and the Characteristics of the Organizational Context).

Age is also considered as a critical antecedent of exploration and exploitation. According to scholars while young firms are vulnerable to failure due to lack of financial and organizational resources, large firms usually fail to innovate as they become dependent on established processes and routines leading to inertia (Hannan & Freeman, 1984; Stinchcombe, 1965). Hence, young firms are keener to explore in order to survive while mature firms usually exploit by leveraging their resources and knowledge (Penrose, 1959; Sorensen & Stuart, 2000).

In terms of organizational size, literature presents quite different views regarding its impact on exploring or exploiting. In specific, Hannan and Freeman (1984) support that size is positively related to inertia preventing organizations from discovering new opportunities while operating within established processes. On the other hand, Beckman, Haunschild and
Phillips (2004), in their study of interorganizational network change, have pointed out that larger firms can easier participate in exploration alliances as they have access to more internal resources, while other studies have found no significant relationship between size and exploration (Andriopoulos & Lewis, 2010; Sidhu et al., 2004). Finally, from the ambidexterity perspective, Lavie et al. (2011, p.1517) support that “increases in firm size that exacerbate resource allocation trade-offs and routine rigidity reinforce the benefits of balance across domains and the costs of balance within domains”.

Building on a different line of reasoning, current research has overlooked the association between some characteristics of the organizational context and their impact on firms’ ambidexterity. In particular, business strategy explores how organizations compete in an industry or market (Varadarajan & Clark, 1994; Walker & Ruckert, 1987). According to Hambrick (2003) there are two basic models that describe strategy: Miles and Snow (1978) four archetypes (prospectors, defenders, analyzers and reactors) and Porter’s (1980) generic strategies (differentiation, cost leadership and focus). The basic distinction between these theories is that Miles and Snow (1978) typology emphasizes on the anticipated rate of product-market change while Porter’s (1980) model mainly focuses on customers and competitors (Olson et al., 2005). However, researchers have identified similarities in Porter’s (1980) differentiation strategy and Miles and Snow’s (1978) prospector strategy and between Porter’s (1980) low-cost strategy and Miles and Snow’s (1978) defender strategy (Homburg, Krohmer, & Workman, 1999; Miller & Friesen, 1986; Ruckert & Walker, 1987). Explicitly, differentiation strategy leads to the creation of somehow unique products and/or services in order to create brand loyalty and, thus, price inelasticity in terms of the buyers (Porter, 1980). Low-Cost or Cost Leadership strategy, on the other hand, leads firms to be the lowest cost producers in an industry in order to provide them with above average returns in comparison to their competitors (Porter, 1980). Porter (1985, pp.17-18) supports that each of these strategies is “a fundamentally different approach to creating and sustaining a competitive advantage…Usually a firm must make a choice between them or it will become stuck in the middle” and “achieving cost leadership and differentiation are usually inconsistent, because differentiation is usually costly”. However, later research signifies that these strategies can be complementary to each other in order a firm to achieve competitive advantage. As Hill (1988, p.411) highlights “managers need to recognize that differentiation can be a way of achieving low-cost and that a sustainable competitive advantage frequently involves the simultaneous pursuit of differentiation and low-cost strategies”. Based on that theoretical gap this PhD
thesis will later investigate the effect of the complementarity between differentiation and low-cost strategy to a firm’s ambidextrous orientation (for more details see §4.2.3 Ambidextrous Orientation and the Complementarity of Business Strategies).

Research on managerial antecedents that lead to exploration and exploitation is also critical as managers’ characteristics directly influence an organization’s activities. At the individual level, risk, for instance, comprises an important factor of managers’ perception towards exploration or exploitation. Particularly, risk-avoided managers are more likely to lead to exploitation as they prefer certainty and immediate results (Lewin, Long, & Carroll, 1999). Risk-prone managers, on the other hand, are led by the desire to achieve superior performance or survival and, thus, are more likely to mostly explore (March & Shapira, 1992). However, the level in which managers should explore or exploit is also a key issue in ambidexterity research as biases towards mostly exploring or exploiting can cause inertial and success traps. In this vein, scholars have strongly supported that top management teams (TMT) play a crucial role in balancing the contrasting activities in an organization. Specifically, Gibson and Birkinshaw (2004) highlight that TMT should create the ‘supportive context’ in contextual ambidexterity. In temporal separation, instead, TMT should proactively manage the temporal shifts of procedures associated with exploratory or exploitative activities in order to avoid the costs of transition from the one situation to another (Brown & Eisenhardt, 1997). In structural separation TMT’s primitive role is to understand, evaluate, systematize and apply the appropriate changes across and within units in order to attain organizational separation (Andriopoulos & Lewis, 2009; O’Reilly & Tushman, 2008; Smith & Tushman, 2009). Recently, scholars have merely focused in uncovering various aspects of leadership in different ambidexterity configurations. In specific, Cao et al. (2010, p.1272) find that CEO’s network positively affects ambidexterity while the “CEO-TMT interactional interface, including communication richness, functional complementarity, and power decentralization enable the entire TMT to process disparate information demands essential to attaining ambidexterity”. Furthermore, Probst et al. (2011) have analyzed ambidextrous leadership paradigm of GE Money Bank in Switzerland and suggest that business and HR leaders in various levels should deal with the tensions created from the exploration and exploitation configurations in their strategic innovative environment. Through the same lens, O’Reilly and Tushman (2011) have focused on the practical application of ambidexterity leadership in organizations connecting it with actions, choices and behaviors of the CEOs while Rosing et al. (2011, p.956) have proposed “an ambidexterity theory of leadership for
innovation that specifies two complementary sets of leadership behavior that foster exploration and exploitation in individuals and teams – opening and closing leadership behaviors, respectively”.

In sum, while in temporal and organizational separation management’s role is to proactively balance exploration and exploitation, in domain and contextual ambidexterity researchers are now trying to reveal the actual management’s effect. However, as scholars indicate, more empirical evidence is needed to deploy the contribution of management in different hierarchical levels and in ambidextrous configurations. Nonetheless, it is a common belief that managers should create the appropriate supportive systems and decide the extent of exploring and exploiting in each organizational unit or in the organization as a whole.

Based on this line of reasoning and despite the extended research on top managers’ characteristics that boost innovation performance (for more details see §2.5 Determinants of Innovation) many of those antecedents are still under examined in ambidextrous configurations. Specifically, important, to our interest, constructs such as creative self-efficacy, which refers to the necessary condition for creative productivity and the discovery of new knowledge (Bandura, 1997), are considered as primitive factors that affect the motivation and ability of individuals to participate in specific behaviors and the pursuit of certain tasks (Bandura, 1977, 1986). In that sense top managers’ creative self efficacy influences their ability to be creative and innovative (Tierney & Farmer, 2002) and is expected to have a certain impact on an organization’s ambidextrous orientation. Furthermore, top managers’ personality assessed through their goal orientation could also be a key antecedent of exploration and/or exploitation as prominent research suggests the flourishing effects of goal orientation in management literature (Chadwick & Raver, 2012; Che-Ha, Mavondo, & Mohd-Said, 2012; Sujan, Weitz, & Kumar, 1994; VandeWalle & Cummings, 1997). Explicitly, goal setting literature (Locke & Latham, 1990) refers to goals as standards of performance that must be achieved. The two main types of goals identified refer to a) the learning goal orientation, which entails the competence development through acquiring new skills and mastering new situations and b) the performance goal orientation that seeks to demonstrate and validate the adequacy of one’s competence (Dweck, 1986; Dweck & Leggett, 1988).

Through a different perspective in organizational research, participative decision making is also of paramount importance to employee creativity and performance (Lam, Chen, & Schaubroeck, 2002). Participative decision making refers to the joint decision making (Locke
& Schweiger, 1979) or the influence sharing between hierarchical superiors and their subordinates (Mitchell, 1973). Recent research reveals that its direct and indirect effect in TMTs enhance decision effectiveness and improves firms’ performance (Carmeli, Sheaffer, & Halevi, 2009). Later on, this PhD thesis will shed light to top managers’ creative self-efficacy and goal orientation (performance and learning) as well as in the role of participative decision-making in relation to firms’ ambidextrous orientation (for more details see §4.2.1 Ambidextrous Orientation and the Characteristics of the Top Management Team).

3.4 Performance Outcomes of Exploration and Exploitation

Another core question in exploration and exploitation research is the performance outcomes associated with each activity separately or their synchronous application. As discussed earlier, March (1991) early recognized that organizations that would solely focus in exploration would suffer the costs of experimentation and, thus, great risk leading to failure, as the benefits of exploitation would eclipse (Volberda & Lewin, 2003). In turn, firms allocating resources to increase efficiency and short-term performance, through engaging on exploitation, could be trapped to organizational inertia and become obsolete in the long-term as they would not be able to respond to environmental changes (Ahuja & Lampert, 2001; Levitt & March, 1988). In their subsequent work Levinthal and March (1993, p.105) highlighted that “an organization that engages exclusively in exploitation will ordinarily suffer from the fact that it never gains the returns of knowledge”, while Leonard-Barton (1992) supported that core capabilities, such as experimentation and learning, may lead to core rigidities when their scope is narrowed. However, since March’s (1991) publication, little is known about the actual performance implications of engaging mainly on exploration or exploitation and scholars’ arguments have been contradictory. Auh and Menguc (2005), in their study of 260 Australian manufacturing firms, have reported that exploration is positively related to efficient firm performance and exploitation is negatively related to effective firm performance while competition increases. Furthermore, Jansen et al. (2006), in their examination of the branches of a large European financial institution, have indicated that environmental dynamism and competition moderate the relationship between explorative and exploitative innovation, while formalization is positively associated with exploitation and centralization negatively affects exploration. In their agent-based simulation study, Siggelkow and Rivkin (2006) find that performance is negatively affected by low-level managers in interconnected departments applying exploration at a large scale, while performance is
boosted when low-level exploration is applied to departments with no independencies. However, besides the scarce empirical research concerning the performance outcomes of fostering exploration and exploitation, evidence suggest that organizational and environmental factors strongly affect the gains of applying each activity.

In light of the performance outcomes of balancing or simultaneously pursuing exploration and exploitation, March (1991) was the first to acknowledge the “ambidexterity premise”, which refers to the simultaneous pursuing of both activities. While some researchers have supported that organizations should favor an activity over the other for superior performance (Barney, 1991; Ghemawat & Ricart Costa, 1993; Porter, 1980; Wernerfelt & Montgomery, 1988), others state that the engagement in both activities is the key to sustainable competitive advantage considering exploration and exploitation as inseparable (Floyd & Lane, 2000; Tushman & O'Reilly, 1996). Similarly, several scholars posit the ability to be ambidextrous as the key point of an organization’s dynamic capabilities (Eisenhardt & Martin, 2000; Teece et al., 1997). However, while researchers have used different research methods –such as simulations or surveys- to enhance the consequences of exploration and exploitation, little is known about their short and long-term performance outcomes (Fang et al., 2010; Lavie et al., 2011; Posen & Levinthal, 2012; Uotila et al., 2009). In specific, based on the empirical evidence about the ambidexterity-performance relationship, scholars support that exploration and exploitation coexisted in Toyota’s product development processes (Adler et al., 1999; Knott, 2002), while He & Wong’s (2004) study uncovers a positive relationship between the interaction of explorative and exploitative strategies and the sales growth rate in 206 manufacturing firms. Moreover, Gibson & Birkinshaw’s (Gibson & Birkinshaw, 2004) research, on a different level of analysis, illustrates that a firm’s business unit capacity to achieve ambidexterity –stated as “alignment and adaptability”- is positively related to this unit’s performance. Likewise, Lubatkin et al. (2006) in their 139 SME’s survey reveal that the simultaneous pursuit of explorative and exploitative orientations has a significant effect to organizational performance. Through the lens of their simulation study, Siggelkow & Levinthal (2003) support that when interactions of organizational activities are persistent neither explorative or exploitative structures lead to superior performance. Even though, they find sufficient evidence indicating that temporal shifts –temporal separation of explorative and exploitative actions- from decentralized to integrated structures positively affect performance. Along the same lines, Venkatraman et al. (2007) elucidate the positive effect of temporal separation on sales growth, while organizations concurrently balance exploration
and exploitation, and the negative effect of organizational separation under the same instances. However, they don’t find substantial support for the ambidexterity hypothesis. Piao’s (2010) research, on the other hand, reveals that too long or too short temporal exploration overlaps negatively affect an organization’s longevity, thus, moderate level of temporal overlapping is proposed for organizational longevity extension. Nevertheless, Lin et al. (2007, p.1645), in their longitudinal study of US firms covering five different industries, state that “although an ambidextrous formation of alliances benefits large firms, a focused formation of either exploratory or exploitative alliances benefits small firms. In an uncertain environment an ambidextrous formation enhances firm performance but so does a focused formation in a stable environment”. Following them, Uotila et al. (2009), in their longitudinal study of 279 manufacturing S&P 500 firms, find that the ideal exploration-exploitation balance is heavily dependent to environmental conditions and Lavie et al. (2011) indicate that the balance across domains in alliance formation leads to significant raise in earnings and market value. Yet, in contrast with Lin et al. (2007), they support that organizational size negatively affects balancing within alliance domains and, thus, balancing across domains should be applied in order organizations to achieve superior performance. Siren et al. (2012) on the other hand, suggest that strategic learning is a mediating factor between explorative and exploitative strategies and profit performance. From a different point of view, Hoang & Rothaermel (2010), in their longitudinal study of biotechnology R&D projects, find that alliance exploitation experience has positive impact on R&D performance in contrast to exploration alliance experience. Finally, Fang’s et al. (2010) simulation, reports that optimum balance is achieved when moderate levels of cross-group linking exist helping the dissemination of superior ideas across groups without quickly reducing organizational diversity.

In sum, while various contradictory results shape the ambidexterity and performance relationship, various scholars call for multidimensional research to the reveal the underlying factors affecting this relationship. For instance, Yamakawa et al. (2011) support that researchers should employ a “holistic approach” in order to explain the role that organizational characteristics, strategic orientations and environmental factors play in exploration and exploitation alliances leading to superior performance. Posen & Levinthal (2012) simulate environmental changes in order to understand how and when exploration and exploitation make organizational adaptation valuable while Rosenkopf and McGrath (2011, p.1297) highlight that current exploration and exploitation research “tend to conceptualize and
operationalize novelty quite narrowly”. Hence, future research should focus on developing a contingency approach of the effects of balancing exploration and exploitation and on creating a stronger theoretical basis in the examination of their antecedents and outcomes.
CHAPTER FOUR

CONCEPTUAL FRAMEWORK AND RESEARCH HYPOTHESES

4.1 Theoretical Foundations of the Conceptual Framework

In recent years there has been a burgeoning interest in the exploration and exploitation research expanding from the understanding of its nature to its antecedents and its implications in organizations’ performance (Lavie et al., 2010; March, 1991; Raisch & Birkinshaw, 2008; Raisch et al., 2009; Simsek et al., 2009). In specific, various scholars have drawn attention to distinctive environmental, organizational and top management team antecedents, to the tensions created by the two contradictory activities and to the different modes of balancing (see Figure 5 and Chapter 3). Various researchers have also tried to cope with the trade offs that create the tension among exploration and exploitation while others have focused on the performance outcomes of balancing or simultaneously pursuing both activities (Auh & Menguc, 2005; Beckman et al., 2004; He & Wong, 2004; Helfat & Peteraf, 2009; Koza & Lewin, 1998).

Building on this line of theorizing, several authors have also concentrated on developing fine-grained models of exploration and exploitation (for more details see §3.2 Ambidexterity VS Balance: Two Competing Schools of Thought). For instance, Gupta et al. (2006) argue about the definition of exploration and exploitation, the orthogonality versus continuum perspective, the duality versus speciality issue and the punctuated equilibrium versus ambidexterity balance. In turn, some scholars have proposed that organizational ambidexterity refers to the equally dexterous management of the balance between exploration and exploitation (Lubatkin et al., 2006; Simsek et al., 2009). However, it is recently suggested that the future research directions should be focused on the original definitions provided by March (1991), while causality and issues concerning the framework’s nature –such as operationalization and conceptualization- should be studied more precisely and more widely (Lavie et al., 2010; Rosenkopf & McGrath, 2011).

Hence, it is evident that various organizational, contextual and environmental factors are still undetermined or not fully understandable in the organizational ambidexterity literature (Yamakawa et al., 2011). This calls for further academic work in order to explicitly explain
the factors leading to ambidexterity as well as its performance implications. In accordance with these research gaps the main objectives of this thesis is twofold. Firstly, to reveal strategic, contextual and top managers’ characteristics that enable ambidexterity and, secondly, to investigate the ambidexterity-performance relationship. These objectives become even more challenging since the selected research sample comprises of firms operating in a turbulent and quickly changing environment. These organizations are in search for exploration in order to be prosperous, while exploitation expands over their daily processes. Inevitably, wrong strategic choices or stability towards their external environment could potentially lead to failure (Lant & Mezias, 1992; Posen & Levinthal, 2012; Sorensen & Stuart, 2000).

Based on this line of reasoning, Figure 10 presents the conceptual framework of this thesis. This model primarily attempts to clarify how organizational ambidexterity is influenced by three distinct antecedents’ categories and how it is related to firm performance. More specifically, the three categories of factors include: top managers’ characteristics (creative self-efficacy, learning and performance goal orientation), factors of the organizational context (external knowledge flows, innovation & flexibility climate within firm, social and organizational capital, participative decision making) and the complementarity of the business strategies applied (differentiation and low cost). In what follows, the research hypotheses are analytically explained and developed.
4.2 Firms’ Ambidextrous Orientation and its Antecedents

4.2.1 Ambidextrous Orientation and the Characteristics of the Top Management Team

As discussed earlier, scholars have recently drawn attention on the leadership characteristics that shape exploration and exploitation, while prominent research views top management teams, as inevitable means for achieving and/or implementing ambidexterity (Lubatkin et al., 2006; Mom et al., 2009; O’Reilly & Tushman, 2011; Probst et al., 2011). Especially, top management teams, in order to lead an organization to ambidexterity, should resolve conflicts and contradictions (O’Reilly & Tushman, 2004) as well as to take important resource allocation decisions (Mom et al., 2009; O’Reilly & Tushman, 2011) (for more see §3.3 Antecedents of Exploration and Exploitation).

Creative self-efficacy is a key enabling factor (Bandura, 1997) and is positively related to creative (Tierney & Farmer, 2002) and managerial performance (Stajkovic & Luthans, 1998; Wood, Bandura, & Bailey, 1990). We assume that top managers’ creative self-efficacy consists an enabling characteristic of their creative managerial performance, which directly affects their decisions and actions towards the firms’ ambidextrous orientation. Previous research, in the context of ambidexterity, has indicated that top managers must implement creative and collective activities (Sheremata, 2000), to execute routine and non routine actions (Adler et al., 1999) and to be multitaskers in a way that they adapt to various roles and competences (Floyd & Lane, 2000). In that sense, top managers with high levels of creative self-efficacy are more capable to execute the above conflicting actions through the development of multiple creative activities and skills, leading an organization towards ambidexterity.

Furthermore, creative self-efficacy is considered as critical to the pursuit of ‘new knowledge’ (Tierney & Farmer, 2002). Top managers that assimilate and apply new knowledge are more likely to engage in paradoxical thinking and more capable of understanding new concepts and meanings while reinforcing existing product market positions (Gibson & Birkinshaw, 2004; Mom et al., 2009). Moreover, prior research indicates that top managers should constantly refine and renew their knowledge, skills and expertise (Floyd & Lane, 2000; Hansen, Podolny, & Pfeffer, 2001; Mom et al., 2009) through searching, acquiring and/or creating new knowledge (Lubatkin et al., 2006; Nonaka & Konno, 1998). Hence, top managers with
high levels of creative self-efficacy are likely to adopt various management approaches and conflicting orientations (Mom et al., 2007), which is a prerequisite for achieving ambidexterity (Raisch et al., 2009). Therefore, it is likely that top managers’ creative self-efficacy is an antecedent of firms’ ambidextrous orientation and we posit that:

**Hypothesis 1:** Top managers’ creative self-efficacy positively affects firms’ ambidextrous innovation orientation.

In the same line of reasoning, top managers enhancing a learning goal orientation are expected to develop new skills and competences in order to cope with ambidexterity paradox. Prior research has shown that individuals possessing a learning goal orientation are ought to “develop competence by acquiring new skills and mastering new situations” (VandeWalle, 1997, p.997). Still, ambidextrous managers must be multitaskers and capable to adapt to various conflicting roles and competences (Floyd & Lane, 2000; Mom et al., 2009). Hence, it is more likely a goal oriented top manager to better enhance and manage the contradictions and inadequacies of the simultaneous pursuit of exploration and exploitation, thus, leading an organization towards ambidexterity.

Furthermore, learning goal oriented individuals are expected to use complex learning strategies in order to persist in failure, increase or maintain self-efficacy and pursue difficult and challenging tasks, leading to positive outcomes (Bell & Kozlowski, 2002; Button, Mathieu, & Zajac, 1996; Phillips & Gully, 1997). In that sense, learning goal oriented top managers will use their knowledge to take difficult tasks leading to exploration, while also employing in paradoxical thinking and reinforcing existing product market positions (Gibson & Birkinshaw, 2004; Mom et al., 2009). Hence, we assume that they are likely to better cope with the simultaneous pursuit of exploration and exploitation, leading to ambidexterity and we hypothesize:

**Hypothesis 2:** Top managers’ learning goal orientation positively affects firms’ ambidextrous innovation orientation.

On the other hand, individuals that engage in performance goal orientation are expected to withdraw from tasks (especially in the face of failure), to avoid pursuing difficult tasks, and to choose activities where success is more easily achieved (Bell & Kozlowski, 2002). Top managers with performance goal orientation, will, thus, probably negatively impact the
ambidextrous orientation of an organization because they will fail to adapt to continuous contradictions that ambidexterity activities entail. As prior research has shown, ambidexterity entails opposing actions that are difficult to handle and divergent processes that must be managed (Raisch & Birkinshaw, 2008). Also, performance goal oriented individuals put less effort on tasks, as they believe that they do not need to try hard to accomplish them, hence, resulting in low individual performance (Bell & Kozlowski, 2002; Bell, Mullins, Toney, & Kozlowski, 1999). Based on that theoretical grounding, we assume that goal oriented top managers are expected to have a poor performance on their multiple roles and different tasks that they must undertake in order to lead an organization to ambidexterity (Floyd & Lane, 2000; Gibson & Birkinshaw, 2004).

Moreover, performance goal oriented individuals “will take a more shallow approach to learning” (Ford, Smith, Weissbein, Gully, & Salas, 1998, p.223). However, ambidextrous top managers must engage in both reliability enhancing and variety increasing learning activities (Floyd & Lane, 2000; Sheremata, 2000). In this line of reasoning, we suppose that managers with a performance goal orientation are going to underestimate the learning processes within an organization, thus, negatively affecting its ambidextrous orientation. Based on the above arguments, we anticipate:

**Hypothesis 3:** _Top managers’ performance goal orientation has a negative effect on firms’ ambidextrous innovation orientation._

In the next section the hypotheses regarding organizational context characteristics and firms’ ambidextrous orientation are being developed.

### 4.2.2 Ambidextrous Orientation and the Characteristics of the Organizational Context

In terms of the unobserved contextual characteristics that affect ambidexterity this PhD thesis will focus on external knowledge flows, innovation & flexibility climate within firm, social and organizational capital of the firm and participative decision-making (for more see §3.3 Antecedents of Exploration and Exploitation).

As discussed earlier, except for the intra-firm knowledge efforts, organizations must also turn to the external sources of knowledge in order to maintain their innovative processes (Almeida, Phene, & Grant, 2003). In that sense, external knowledge flows are expected to positively
influence ambidexterity, as scholars have already underlined the importance and the greater impact of exploring beyond organizational boundaries (Rosenkopf & Nerkar, 2001) as well as the risk of obsolescence, when knowledge acquisition occurs only through internal sourcing (Eisenhardt & Martin, 2000). External knowledge flows are, thus, expected to positively influence firms’ exploratory activities, as organizations will be able to access large amount of external knowledge in respect to their ability to assimilate and apply it. Hence, the external knowledge flows could consist those valuable resources leading to competitive advantage – when organizations explore- since the relevant knowledge could be far removed from their existing knowledge stock (Van Den Bosch, Volberda, & De Boer, 1999).

Furthermore, prior research has shown that externally acquired knowledge also contributes to the reconfiguration of existing knowledge bases (Henderson & Cockburn, 1994; Kogut & Zander, 1992; Raisch et al., 2009). In this line of reasoning, external knowledge flows are expected to be of paramount importance to the exploitative activities of an organization, as firms’ will be able to exploit through their evaluated and reconfigured knowledge stocks. Hence, we posit that external knowledge flows positively influence organizations’ explorative and exploitative activities and, thus, their ambidextrous orientation and we hypothesize:

**Hypothesis 4**: *Firms’ external knowledge flows positively affect firms’ ambidextrous innovation orientation.*

Innovation and flexibility dimension of organizational climate signifies the orientation towards change and the extent of encouragement and support of newness in an organization (Patterson et al., 2005). We posit that this dimension of organizational climate positively affects firms’ ambidextrous orientation; as organizations that accept and support new ideas and concurrently develop new ways of confronting problems are more capable of managing the tensions that ambidexterity paradox enhances. Prior research –at a different level- further supports that flexible managers and supportive leaders are also key sources of ambidexterity (Adler et al., 1999; Tushman & O'Reilly, 1997). In that sense, an organization, which is open to change and flexibility, quickly develops the appropriate responses to the complications created by the simultaneous pursuit of exploration and exploitation and, thus, becomes able to successfully manage the inherent ambidexterity dilemma.
Additionally, we suggest that an organization that engages in innovation and flexibility climate will also create a supportive context for organizational ambidexterity. This is expected as organization’s members will lend assistance and countenance to each other and available resources will deploy throughout the organization (Gibson & Birkinshaw, 2004). Based on that theoretical grounding, we expect that organizations, in which innovation and flexibility climate flourishes, will also be positively oriented to ambidexterity. Hence, we anticipate:

**Hypothesis 5:** *Firms’ innovation & flexibility climate positively affects firms’ ambidextrous innovation orientation.*

Still, social capital is regarded as a prime source of organizational learning (Adler & Kwon, 2002; Nahapiet & Ghoshal, 1998). For instance, Tiwana (2008) argued that strong ties are necessary to achieve exploitation learning and spanning ties lead to exploration learning. In line with that theoretical grounding, we argue that high levels of social capital have a positive effect on firms’ ambidextrous orientation.

Social capital enhances strong communication ties between firm employees and it engages them to agree on what should be done or in what manner (Beckman, 2006); leading to firms with strong social ties based on shared understanding and trust (Atuahene-Gima & Murray, 2007). The firms with high levels of social capital consist of employees who are able to manage the tensions that the simultaneous pursuit of exploration and exploitation activities create, by reconciling their knowledge with newly assimilated knowledge provided by their colleagues (Ambos, Mäkelä, Birkinshaw, & D'Este, 2008; Kogut & Zander, 1993). Therefore, firms’ social capital may create synergies between firm members and lead to concurrent exploratory and exploitative actions.

The combination of this intra-firm shared understanding -initiated by strong ties- with firms’ bridging ties, also leads them to ambidexterity. Specifically, firms that continuously flourish and spread their knowledge base by accessing and controlling distinct sources of specialized knowledge (Tiwana, 2008), create links with contacts engaging in financial, professional, and social circles not otherwise accessible to them (McEvily & Zaheer, 1999). Still, Brass, Galaskiewicz, Greve, & Tsai (2004) support that actors -in our case, firms- that present high levels of control over scarce organizational resources, are those with high levels of social
capital. Hence, the access to those resources enables firms to simultaneously cope with and between exploratory and exploitative activities (Perry-Smith, 2006; Tortoriello, Reagans, & McEvily, 2012). Therefore, we hypothesize that:

**Hypothesis 6:** Firms’ social capital positively affects firms’ ambidextrous innovation orientation.

Adversely, scholars suggest that organizational capital is associated with effectiveness and productivity (Kang & Snell, 2009; Subramaniam & Youndt, 2005) and leads to the establishment of the proper procedures that categorize knowledge and build knowledge depositories (Reed, Lubatkin, & Srinivasan, 2006). We propose that firms’ organizational capital creates a trajectory of reconciled knowledge (Cohen & Levinthal, 1990; Subramaniam & Youndt, 2005), that enables organizations to appropriately react when facing the dilemma to allocate resources for the activities that facilitate either exploration or exploitation. This knowledge is codified and persevered in organizational capital through patents, manuals, databases and licenses as well as routine structures and operations (Hansen, Nohria, & Tierney, 1999). Consequently, firms’ organizational capital may consist of the unabsorbed slack of the firm, which will be deployed in eras of resource munificence, thus, enabling firms towards ambidexterity.

**Hypothesis 7:** Firms’ organizational capital positively affects firms’ ambidextrous innovation orientation.

Participative decision making refers to the shared decision making or the influence sharing between hierarchical superiors and their subordinates (Lam et al., 2002). We suggest that participative decision-making has a positive influence to firms’ ambidextrous orientation as it benefits both exploration and exploitation activities.

In turn of exploration, scholars have previously underlined the importance of aspiration for improvement as a critical source for its enhancement (Cohen & Levinthal, 1990). The involvement of employees in decision-making is the opportunity of leaders to increase their subordinates commitment in exploring new ways of doing things as well as to encourage them on accepting change (Nemanich & Vera, 2009). Hence, the interaction that participative decision-making creates may lead to new intuition and fresh interpretation (West & Anderson, 1996). Also people build connections between what and why they are doing it,
making them to appreciate in depth the expected outcomes and mechanisms to achieve them (Nemanich & Vera, 2009). This behavior, however, is, by default, a facilitator of exploration processes.

On the other hand, participative decision-making is crucial to exploitation as it accelerates employees’ understanding of the appropriate manners that best practices need to be applied. Specifically, participative decision-making enables knowledge transfer between team members, which is a prerequisite for the creation of a common memory system that overrides individuals’ cognitive limitations (Hannah & Lester, 2009). To that end, previous research, in a different context, has found that employee involvement programs boost both creativity (exploration) and continuous improvement (exploitation) (Lawer, 1994). Based on the above line of reasoning we anticipate:

**Hypothesis 8:** Firms’ participative decision making positively affects firms’ ambidextrous innovation orientation.

In the next section the hypotheses regarding competitive business strategies and firms’ ambidextrous orientation are being developed.

### 4.2.3 Ambidextrous Orientation and the Complementarity of Business Strategies

Our hypothesis is associated with the complementarity of the competitive business strategies (low-cost and differentiation) to the firms’ ambidextrous orientation. In specific, an ambidextrous oriented firm is reluctant when pursuing only a distinct type of strategy (differentiation or low-cost) (for more see §3.3 Antecedents of Exploration and Exploitation). For instance, following low-cost strategy usually involves cost minimization in R&D expenditures, service, employees and so on (Porter, 1980, p.35). However, this directly affects the explorative orientation of an organization and it may lead to “suboptimal stable equilibria” (March, 1991, p.71). Similarly, pursuing only differentiation strategy usually involves costly activities such as extensive research, product design and marketing expenditures (Miller & Friesen, 1986, p.38), which directly affects a firm’s exploitative orientation and may lead it to “exhibit too many undeveloped new ideas and too little distinctive competence” (March, 1991, p.71). Accordingly, because of various resource constraints in following two business strategies, high levels of pursuing one often imply low levels in the implementation of the other. As Hill (1988, p.401) suggests “differentiation can be a means for firms to establish an
Conceptual Framework and Research Hypotheses

overall low-cost position and a combination of differentiation and low-cost may be necessary for firms to establish a sustainable competitive advantage”. In order to investigate this argument we suppose that the firms following both business strategies are likely to be complementary and positively impact ambidexterity as the coexistence of the different functions of the two business strategies are, possibly, leading to super-additive value of resource combinations (Tanriverdi & Venkatraman, 2005).

The theory of complementarities suggests that the sets of strategies are complementary when more of any of them increases the returns to doing more of the others (Cassiman & Veugelers, 2006; Lichtenthaler, 2009; Milgrom & Roberts, 1995). Hence, complementary business strategies are distinct but independent strategies that mutually support each other and indicate a positive correlation between their variables (Arora, 1996; Cassiman & Veugelers, 2006). Furthermore, the gains from the concurrent implementation of the business strategies are greater than the sum of the distinct implementation of a single strategy (Milgrom & Roberts, 1995; Song, Droge, Hanvanich, & Calantone, 2005). The synergies from the simultaneous pursuit of both strategies can be examined through “an analysis that enhances a simultaneously aggregated and disaggregated approach that compares the contributions of individual practices with the performance payoffs of them altogether“ (Whittington et al., 1999, p.585). Consequently, a simultaneous implementation of a low-cost and differentiation strategy positively affects firms’ ambidextrous orientation. Therefore, we assume that the complementarity of the two business strategies has additional explanatory power and we hypothesize:

**Hypothesis 9**: *The complementarity of differentiation and low-cost strategies has a positive effect on firms’ ambidextrous innovation orientation.*

In the next section the hypotheses regarding the association between firm-level ambidexterity and financial performance are being developed.

**4.3 Firms’ Ambidextrous Orientation, Financial Performance and the Moderating role of Slack Resources**

As discussed earlier, ambidexterity is widely regarded as a key driver of sustained performance (Raisch et al., 2009). In line with previous research (He & Wong, 2004; Lubatkin et al., 2006; Uotila et al., 2009), we suggest that firms simultaneously engaging in
both explorative and exploitative innovation orientation present a positive impact on their financial performance. For instance, firms engaging solely on exploitation oriented activities, which include efficiency, reduced variation and increased adaptability are likely to boost their short-term performance (March, 1991). However, in the long run, those organizations become obsolete and confront impediments (Holmqvist, 2004), as they cannot sufficiently adapt to various environmental changes (Hannan & Freeman, 1977, 1984), thus reducing their long-term performance. As March (1991, p.71) states, those firms “…are likely to find themselves trapped in suboptimal stable equilibria”.

In the same line of reasoning, organizations are in need of exploration-oriented activities in order to reduce the risk of obsolesce and to improve their flexibility so that they adapt to the continuously changing external environment (Uotila et al., 2009). Hence, exploration oriented firms are expected to develop new knowledge and create new capabilities that will lead them to outstanding long-term performance (Lavie et al., 2010). Though, in the short term, those firms are not able to gain the benefits of exploration as they are likely to suffer the costs of experimentation because of “too many undeveloped new ideas and too little distinctive competence” (March, 1991, p.71). Based on the above arguments we anticipate:

**Hypothesis 10:** Firms’ ambidextrous innovation orientation is positively related to firms’ financial performance.

Furthermore, scholars suggest that the scarcity of resources limits the ability of ambidextrous organizations to effectively control their exploratory and exploitative activities (Jansen et al., 2012; Levinthal & March, 1993; March, 1991). As previous research highlights, firm size is an indicator of the available organizational resources at their immediate disposal (Cao et al., 2009). We posit larger firms confront risks with larger resource bases and, in that way, overcome the ambidexterity dilemma. In that sense, larger firms are likely to have more available resources than smaller firms (Chen & Hambrick, 1995; Penrose, 1959) -such as technology and financial capital- and are expected to be more capable of managing the risks and shocks that the simultaneous pursuit of exploratory and exploitative orientation enhances. This is likely to happen as larger firms will have the ability to dedicate resources to e.g. specialized departments in order to handle some of the ambidexterity trade-offs (Bourgeois, 1981; Cao et al., 2009; Thompson, 1967). Still, as Jansen et al. (2012) -in the unit level-
highlight “…the availability of slack resources within the organization may thus help unit managers to increase the perceived controllability of uncertain and complex behaviors”.

On the other hand, with less resources available, smaller firms, are getting downside risks when simultaneously exploring and exploiting, thus leading to weakening financial performance (Ebben & Johnson, 2005; Jansen et al., 2012; Lin et al., 2007). As Cao et al. (2009, p.786) state “…smaller firms will be more susceptible to these risks because of their fewer resources to cushion these risks, for instance, with specialized departments to help their core departments deal with the risks effectively”. Based on the above theoretical arguments we hypothesize:

**Hypothesis 11**: Firm size moderates the relationship between firms’ ambidextrous innovation orientation and its subsequent financial performance in such a way that this positive effect is increased as size increases.

In the next chapter the research methodology of this PhD thesis is analytically presented.
CHAPTER FIVE

RESEARCH METHODOLOGY

5.1 Sample and Data Collection

The empirical research was conducted at a sample of the 300 top performing Greek companies. The selection of those firms (both domestic and multinational) was based on two sources: a) on Hoovers database, one of the most well known databases of global enterprises and b) on ICAP (2010) database, which is regarded as the most reliable Greek business guide and database. Specifically, we searched through these databases relied on the same criterion; the companies with the highest total revenues for the year 2010 operating in the Greek region. Both databases appeared analogous results to each other and included companies operating in several industries. We selected the top performing firms of the Greek economy as they operate in an environment with high degree of economical, technological and institutional uncertainty, which inevitably leads them to make strategic and organizational choices that affect their overall performance.

In the next stage, a member of the top management team of each company was contacted. Specifically, the invitation letter was sent to the company’s CEO explaining the nature and the objectives of the study. The letter also included an explicit statement that the research targeted only at a single member of the firm’s top management team (CEO, Financial manager or Marketing manager) and encouraged CEO or this member to participate. Among the 300 members of top management teams contacted 148 agreed to participate, for a response rate of 49,3%. This response rate was achieved after two rounds of mailings (physical and electronic) and a final round of phone calls.

The questionnaires were developed both in English and Greek and contained six categories of constructs (institutional background, financial status and performance, human resources, innovation, firm strategy environment and orientation, and respondent’s background and characteristics) and a total of seventy-four questions in five pages length. All of the variables used in this study are measured using already established instruments. However, regarding the Greek edition of the questionnaire we used the well-known back-translation method to ensure
its validity (Li & Atuahene-Gima, 2001). In that sense, we first asked a co-researcher, who was competent both in Greek and English to translate the questionnaire in Greek. Then, we carefully compared the translated and the original version and refined some wording in Greek in order to clarify the appropriate meanings, avoid ambiguities and miscomprehension. At the end, we further improved our questionnaire to ensure that the instruments’ questions were accurate, relevant, and interpreted as expected (Cao et al., 2009).

To deal with potential problems associated with single-informant bias and common method bias, we initially collected our measures of our dependent and mediator variables from the middle of 2011 (so that they refer to the 2010 year end). In a second phase, we collected our measures of independent variables through the first two quarters of 2012 with a minimum of one year time lag for each company (Jansen et al., 2012). Thus, we are in line with previous research recommendations that the time lag should correspond to the process of examination and allow enough time to reflect the performance implications of ambidextrous orientation (Lubatkin et al., 2006; Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). However, from the 148 top managers who initially agreed to participate in the survey, 15 of them decided not to answer certain questions (e.g. for company's strategy) due to confidentiality or other reasons and were, finally, dropped from the sample. Hence, survey’s final sample -with complete data- consisted of 133 companies, for a response rate of 44.3%, with mean size of 336.3268 (standard deviation [s.d.] = 72.34192). Top managers who responded to this firm level survey (n=133) had an average tenure of 19.75 years ([s.d.] = 9.956) and an average age of 45.782 years ([s.d.] = 10.5997). Finally, to check for non-response bias a t-test, based on total sales and full-time employees data (obtained from ICAP), was conducted in both groups of responding and non-responding enterprises indicating no significant differences (p<0.05) among them and, thus, no response bias in the sample (Jansen et al., 2005a).

Table 7: Distribution of the Companies of Final Sample Based on Core Naics (2007)

<table>
<thead>
<tr>
<th>Core NAICS(2007) Category</th>
<th>Number of Firms</th>
<th>Percentage of the Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>10.00.00</td>
<td>2</td>
<td>1.50</td>
</tr>
<tr>
<td>20.00.00</td>
<td>4</td>
<td>3.07</td>
</tr>
<tr>
<td>30.00.00</td>
<td>42</td>
<td>31.57</td>
</tr>
<tr>
<td>40.00.00</td>
<td>53</td>
<td>39.85</td>
</tr>
<tr>
<td>50.00.00</td>
<td>25</td>
<td>18.79</td>
</tr>
<tr>
<td>60.00.00</td>
<td>2</td>
<td>1.50</td>
</tr>
<tr>
<td>70.00.00</td>
<td>5</td>
<td>3.76</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>133</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>
5.2 Measures

5.2.1 Dependent Variables

Financial Performance

Firm’s financial performance was measured through the 9-items modified Gupta & Govindarajan’s (1984) scale presented by Covin, Prescott & Slevin (1990). Specifically, top managers were asked to indicate their level of satisfaction concerning the following financial performance criteria in comparison to their competitors: sales level, sales growth rate, cash flow, return on shareholder equity, gross profit margin, net profit from operations, profit to sales ratio, return on investment, ability to fund business growth from profits (1= strongly dissatisfied, 2= dissatisfied, 3= dissatisfied somewhat, 4= undecided, 5= satisfied somewhat, 6= satisfied, 7= strongly satisfied). Cronbach alpha (α) for this scale was 0.949.

Ambidextrous Innovation Orientation

Following prior studies, we used a two-step approach to develop a measure for firm’s ambidextrous innovation orientation (He & Wong, 2004; Jansen et al., 2012). Initially, each top manager provided information for his firm’s exploratory and exploitative innovation orientation. The six-item scale for exploratory innovation orientation was adapted from Lubatkin et al. (2006) and captured the extent to which a firm: looks for novel technological ideas by thinking “outside of the box”, bases its success on its ability to explore new technologies, creates products or services that are innovative to the firm, looks for creative ways to satisfy its customers’ needs, aggressively ventures into new market segments and actively targets new customer groups (α= 0.916). A six-item scale (α= 0.915) measured the exploitative innovation orientation (adapted from Lubatkin et al. (2006)) and captured the extent to which a firm: commits to improve quality and lower cost, continuously improves the reliability of its products and services, increases the levels of automation in its operations, constantly surveys existing customers’ satisfaction, fine-tunes what it offers to keep its current customers satisfied and penetrates more deeply into its existing customer base. Then,

1 Recall that all dependent variables were calculated based on the top managers (n=133) responses. All factors were computed by adopting published multi-item scales and questionnaire items were assessed using 7-point Likert-type scales (1= strongly disagree, 7= strongly agree) - unless otherwise stated.
we developed a measure for firm’s *ambidextrous innovation orientation*, based on previous studies, by conceptualizing it as a multi-dimensional construct comprising the non-substitutable combination of exploratory and exploitative innovation orientation (Gibson & Birkinshaw, 2004; Jansen et al., 2012). High levels of exploratory and exploitative innovation orientation complement and augment the performance-enhancing effect of its other, such that we measure firm’s ambidextrous orientation as the sum of both (Lubatkin et al., 2006).

5.2.2 Independent Variables

*Creative Self-Efficacy*

Top manager’s creative self-efficacy was measured through the Tierney & Farmer’s (2002) 3-items scale ($\alpha=0.925$). Specifically, top managers were asked to indicate their level of satisfaction concerning their creativity capabilities: I have confidence in my ability to solve problems creatively, I feel that I am good at generating novel ideas, I have a knack for further developing the ideas of others.

*Goal Orientation*

Top manager’s goal orientation was measured through the VandeWalle’s (1997) 8-items scale. Especially, in terms of *learning goal orientation* top managers were asked to indicate their level of argument concerning the following statements: I am willing to select a challenging work assignment that I can learn a lot from, I often look for opportunities to develop new skills and knowledge, I enjoy challenging and difficult tasks at work where I’ll learn new skills, For me, further development of my work ability is important enough to take risks ($\alpha=0.896$). Still in light of *performance goal orientation* top managers were asked to indicate their level of argument concerning the following statements: I like to show that I can perform better than my colleagues, I try to figure out what it takes to prove my ability to others at work, I enjoy it when others at work are aware of how well I am doing, I prefer to work on projects where I can prove my ability to others ($\alpha=0.945$).

Recall that all independent variables were calculated based on the top managers (n=133) responses, except for the control variables that were drawn from secondary data (ICAP database). All factors were computed by adopting published multi-item scales and questionnaire items were assessed using 7-point Likert-type scales (1= strongly disagree, 7= strongly agree) - unless otherwise stated.
External Knowledge Flows

Firm’s external knowledge flows were measured through the Escribano’s et al. (2009) 7-items scale. Especially, top managers were asked to rate the importance of the following different sources of information as a catalyst for (their firm’s) innovation: suppliers, clients, competitors, universities, other research institutions, specialized journals and, conferences and meetings (1= strongly non-important, 2= non-important, 3= non-important somewhat, 4= Neither important or non-important, 5= important somewhat, 6= important, 7= very important). Cronbach alpha (α) for this scale was 0.955.

Innovation & Flexibility Climate within Firm

Firm’s internal innovation and flexibility climate was measured through the Patterson’s et al. (2005) 7-items scale. Especially, top managers were asked to express their level of agreement concerning the following statements describing their firm’s innovation and flexibility: new ideas are readily accepted here, this firm is quick to respond when changes need to be made, management here are quick to spot the need to do things differently, this firm is very flexible; it can quickly change procedures to meet new conditions and solve problems as they arise, assistance in developing new ideas is readily available, people in this firm are always searching for new ways of looking at problems (α=0.943).

Social & Organizational Capital of the Firm

Firm’s social and organizational capital was measured through the Subramaniam & Youndt’s (2005) 9-item scale. Initially, top managers were asked to express their level of agreement concerning the following five statements describing their firm’s social capital activities: our employees are skilled at collaborating with each other to diagnose and solve problems, our employees share information and learn from one another, our employees interact and exchange ideas with people from different areas of the company, our employees partner with customers, suppliers alliance partners, etc. to develop solutions, our employees apply knowledge from one area of the company to problems and opportunities that arise in another (α=0.829). Then, top managers were asked to express their level of agreement concerning the following four statements describing their firm’s organizational capital: our firm uses patents and licenses as a way to store knowledge, much of our firm’s knowledge is contained in manuals, databases etc., our firm’s culture (stories, rituals) contains valuable ideas, ways of
doing business etc., our firm embeds much of its knowledge and information in structures, systems and processes (\(\alpha=0.870\)).

**Participative Decision Making**

Participative decision making was measured through the Lam’s et al. (2002) 5-item scale. Top managers were asked to express their level of agreement concerning the following statements describing their firm’s decision making processes: employees have high degree of influence in company decisions, employees often participate in decisions regarding my job, employees have high degree of influence in the decisions affecting me, employees can participate in setting new company policies, employees’ views have a real influence in firm’s decisions (\(\alpha=0.948\)).

**Differentiation and Low-Cost Strategies**

Competitive business strategies were measured through the Homburg’s et al. (1999) 7-item scale. At first, top managers were asked to express their level of agreement concerning the four following statements describing the differentiation strategy of their firm: (Our firm aims at:) creating superior customer value through services accompanying the products, building up a premium product or brand image, obtaining high prices from the market, advertising (\(\alpha=0.882\)). Then, they were asked to express their level of agreement concerning the three following statements describing the low-cost strategy of their firm: (Our firm aims at:) pursuing operating efficiencies, pursuing cost advantages in raw material procurement, pursuing economies of scale (\(\alpha=0.892\)).

**5.2.3 Control Variables**

Finally, we controlled for possible different explanations by including the appropriate control variables. In specific, we calculated the natural logarithm of the number of the firms’ full-time employees in order to indicate firm size, creating the variable \(\text{LogSize}\). Firm’s age, \(\text{AgeFinal}\), was also measured by the number of years from its founding. Finally, to account for environmental dynamics like market concentration and competitiveness, a dummy variable named \(\text{Industry}\), was created in order to indicate if the subsequent firm belongs to manufacturing (0) or services (1) sector.
Table 8: Summary of the Survey Measures

<table>
<thead>
<tr>
<th>Construct</th>
<th>Operationalization</th>
<th>Variable Scope</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dependent Variables</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Financial Performance</td>
<td>9-items Scale</td>
<td>Used in H10, H11</td>
<td>(Covin et al., 1990; Gupta &amp; Govindarajan, 1984)</td>
</tr>
<tr>
<td>Ambidextrous Innovation Orientation</td>
<td>12-items Scale</td>
<td>Used in H1 to H11</td>
<td>(Lubatkin et al., 2006)</td>
</tr>
<tr>
<td><strong>Independent Variables</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Creative Self-Efficacy</td>
<td>3-items Scale</td>
<td>Used in H1</td>
<td>(Tierney &amp; Farmer, 2002)</td>
</tr>
<tr>
<td>Learning Goal-Orientation</td>
<td>4-items Scale</td>
<td>Used in H2</td>
<td>(VandeWalle, 1997)</td>
</tr>
<tr>
<td>Performance Goal-Orientation</td>
<td>4-items Scale</td>
<td>Used in H3</td>
<td>(VandeWalle, 1997)</td>
</tr>
<tr>
<td><strong>Organizational Context</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>External Knowledge Flows</td>
<td>7-items Scale</td>
<td>Used in H4</td>
<td>(Escribano et al., 2009)</td>
</tr>
<tr>
<td>Innovation and Flexibility within Firm</td>
<td>7-items Scale</td>
<td>Used in H5</td>
<td>(Patterson et al., 2005)</td>
</tr>
<tr>
<td>Social Capital</td>
<td>5-items Scale</td>
<td>Used in H6</td>
<td>(Subramaniam &amp; Youndt, 2005)</td>
</tr>
<tr>
<td>Organizational Capital</td>
<td>4-items Scale</td>
<td>Used in H7</td>
<td>(Subramaniam &amp; Youndt, 2005)</td>
</tr>
<tr>
<td>Participative Decision Making</td>
<td>5-items Scale</td>
<td>Used in H8</td>
<td>(Lam et al., 2002)</td>
</tr>
<tr>
<td><strong>Competitive Business Strategies</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Differentiation Strategy</td>
<td>4-items Scale</td>
<td>Used in H9</td>
<td>(Homburg et al., 1999)</td>
</tr>
<tr>
<td>Low-cost Strategy</td>
<td>3-items Scale</td>
<td>Used in H9</td>
<td>(Homburg et al., 1999)</td>
</tr>
<tr>
<td><strong>Control Variables</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Size</td>
<td>Natural Logarithm of firms employees</td>
<td>Used as a control in H1 to H10 and as a moderator in H11</td>
<td>(Cao et al., 2009)</td>
</tr>
<tr>
<td>Age</td>
<td>Number of Years since foundation</td>
<td>Used as a control in H1 to H11</td>
<td>(Lubatkin et al., 2006)</td>
</tr>
<tr>
<td>Industry</td>
<td>(0) Manufacturing (1) Services</td>
<td>Used as a control in H1 to H11</td>
<td>(Arbussa &amp; Coenders, 2007)</td>
</tr>
</tbody>
</table>

3 All items were assessed with 7-point Likert type scale - unless otherwise stated
5.3 Validation of Constructs using Confirmatory Factor Analysis (CFA)

In the final survey sample (n=133) a confirmatory factor analysis (CFA) was performed – using Maximum Likelihood estimates with EQS Program- in order to test whether the new data support the three factor structure proposed model (for more details see Figure 10: Thesis Conceptual Framework). This preliminary analysis is strongly proposed by the majority of the researchers in the field and was used to validate the adopted scales used in our questionnaire and their subsequent fit to our conceptual model (Cao et al., 2009; He & Wong, 2004; Jansen et al., 2012; Jansen et al., 2006; Lubatkin et al., 2006)

5.3.2 Dependent Variables

Through the use of the CFA, the convergent and discriminant validity of the dependent variables was assessed. Specifically, two theoretical categories were created: Financial Performance and Explorative and Exploitative Innovation Orientation. For each of these two, a CFA model was estimated in order to provide complete evidence on model’s fit, convergent and discriminant validity (Gibson & Birkinshaw, 2004; Kline, 1998; Van Der V & Bunderson, 2005). All CFA measurement models were computed with EQS Program, using the maximum likelihood method (robust solution), and by estimating all the error variances and covariances of the latent factors.

Financial Performance

In terms of firms’ financial performance the expected model yielded very adequate overall fit to the data (n=133). All error variances as well as the covariances among the three factors were estimated. The total number of parameters estimated in this measurement model was, initially, 9. The sample size of 133 far exceeds the minimum recommended ratio of 5 observations per parameter to be estimated (Bentler & Chou, 1988; Kline, 1998). Most of the factor loadings were high (ranging from 0.719 to 0.950) and statistically significant (t-test, p<0.001), thus verifying the convergent validity of the constructs (Hair, Black, Babin, & Anderson, 1998, p.653). However, one factor presented high cross-loadings and was dropped from analysis (Kline, 1998). Furthermore, standardized residuals were symmetrically distributed around zero and contained no large residuals. In order to fix large case contributions to Mardia’s normalized kurtosis (normalized Mardia’s coefficient=8.823),
robust corrections were performed (Bentler, 2004). Hence, based on the robust method goodness-of-fit results, provided by the EQS package, the measurement model chi-square (Satorra-Bentler scaled chi-square) was 41.399 (degrees of freedom [d.f.]=20, p-value=0.0033), presenting significant improvement over the independence model (chi-square=612.799, d.f.=28). Also, the measurement model values of Akaike’s Information Criterion (AIC) and Bozdogan’s consistent version of this statistic (CAIC) were noticeably lower from those of the independence model (model AIC=1.399, independence model AIC=556.799; model CAIC=−76.40, independence model CAIC=447.869), thus, further indicating satisfactory model fit (Bentler, 2004). As a complement to these basic tests, a number of other incremental and parsimonious fit indices were also examined. In specific, Bentler’s Comparative Fit Index (CFI) presented a value of 0.963, Bentler and Bonnet’s Non-Normed Fit Index was 0.949, and a Root Mean-Square Error of Approximation (RMSEA) was 0.08. Those results prove the high levels of reliability and fit of the single factor measurement model to the data, while verifying the unidimensionality and discriminant validity of the constructs (Kline, 1998).

**Ambidextrous Innovation Orientation**

In terms of firms’ ambidextrous innovation orientation -including two factors: the explorative and exploitative orientation- the expected model yielded very adequate overall fit to the data (n=133). All error variances as well as the covariances among the three factors were estimated. The total number of parameters estimated in this measurement model was, initially, 12. The sample size of 133 far exceeds the minimum recommended ratio of 5 observations per parameter to be estimated (Bentler & Chou, 1988; Kline, 1998). Most of the factor loadings were high (ranging from 0.685 to 0.986) and statistically significant (t-test, p<0.001), thus verifying the convergent validity of the constructs (Hair et al., 1998, p.653). However, two factors presented high cross-loadings and were dropped from analysis (Kline, 1998). Furthermore, standardized residuals were symmetrically distributed around zero and contained no large residuals. In order to fix large case contributions to Mardia’s normalized kurtosis (normalized Mardia’s coefficient=5.333), robust corrections were performed (Bentler, 2004). Hence, based on the robust method goodness-of-fit results, provided by the EQS package, the measurement model chi-square (Satorra-Bentler scaled chi-square) was 57.2062 ([d.f.] =34, p-value=0.0076), presenting significant improvement over the independence model (chi-square=819.191, d.f.=45). Also, the measurement model values of
Akaike’s Information Criterion (AIC) and Bozdogan’s consistent version of this statistic (CAIC) were noticeably lower from those of the independence model (model AIC=-10.79378, independence model AIC=729.190; model CAIC=-143.066, independence model CAIC=554.125), thus, further indicating satisfactory model fit (Bentler, 2004). As a complement to these basic tests, a number of other incremental and parsimonious fit indices were also examined. In specific, Bentler’s Comparative Fit Index (CFI) presented a value of 0.970, Bentler and Bonnet’s Non-Normed Fit Index was 0.960, and a Root Mean-Square Error of Approximation (RMSEA) was 0.072. Those results prove the high levels of reliability and fit of the two factor measurement model to the data, while verifying the unidimensionality and discriminant validity of the constructs (Kline, 1998).

5.3.3 Independent Variables

The convergent and discriminant validity of the independent variables was assessed through CFA. Specifically, three theoretical categories were created: Top Management Team Characteristics, Organizational Context and Competitive Business Strategy. For each of those categories, a CFA model was estimated in order to provide complete evidence on model’s fit, convergent and discriminant validity (Gibson & Birkinshaw, 2004; Kline, 1998; Van Der V & Bunderson, 2005). All CFA measurement models were computed with EQS Program, using the maximum likelihood method (robust solution), and by estimating all the error variances and covariances of the latent factors.

*Top Management Team Characteristics*

In terms of top management team characteristics -including three factors: creative self-efficacy, learning and performance goal orientation- the expected model yielded very adequate overall fit to the data (n=133). All error variances as well as the covariances among the three factors were estimated. The total number of parameters estimated in this measurement model was, initially, 11. The sample size of 133 far exceeds the minimum recommended ratio of 5 observations per parameter to be estimated (Bentler & Chou, 1988; Kline, 1998). Most of the factor loadings were high (ranging from 0.787 to 0.982) and statistically significant (t-test, p<0.001), thus verifying the convergent validity of the constructs (Hair et al., 1998, p.653). However, two factors presented high cross-loadings and were dropped from analysis (Kline, 1998). Furthermore, standardized residuals were
Chapter Five

symmetrically distributed around zero and contained no large residuals. In order to fix large case contributions to Mardia’s normalized kurtosis (normalized Mardia’s coefficient=1.617), robust corrections were performed (Bentler, 2004). Hence, based on the robust method goodness-of-fit results, provided by the EQS package, the measurement model chi-square (Satorra-Bentler scaled chi-square) was 41.5567 ([d.f.]=24, p-value=0.0145), presenting significant improvement over the independence model (chi-square=870.107, d.f.=36). Also, the measurement model values of Akaike’s Information Criterion (AIC) and Bozdogan’s consistent version of this statistic (CAIC) were noticeably lower from those of the independence model (model AIC=-6.443, independence model AIC=798.107; model CAIC=-99.812, independence model CAIC=658.055), thus, further indicating satisfactory model fit (Bentler, 2004). As a complement to these basic tests, a number of other incremental and parsimonious fit indices were also examined. In specific, Bentler’s Comparative Fit Index (CFI) presented a value of 0.979, Bentler and Bonnet’s Non-Normed Fit Index was 0.968, and a Root Mean-Square Error of Approximation (RMSEA) was 0.074. Those results prove the high levels of reliability and fit of the three factor measurement model to the data, while verifying the unidimensionality and discriminant validity of the constructs (Kline, 1998).

Organizational Context

In terms of the firms organizational context -including five factors: external knowledge acquisition, innovation and flexibility climate, social capital, organizational capital and participative decision making- the expected model yielded very adequate overall fit to the data (n=133). All error variances as well as the covariances among the three factors were estimated. The total number of parameters estimated in this measurement model was, initially, 27. The sample size of 133 is almost equal to the minimum recommended ratio of 5 observations per parameter to be estimated (Bentler & Chou, 1988; Kline, 1998). Most of the factor loadings were high (ranging from 0.742 to 0.987) and statistically significant (t-test, p<0.001)), thus verifying the convergent validity of the constructs (Hair et al., 1998, p.653). However, five factors presented high cross-loadings or very low factor loadings and were dropped from analysis (Kline, 1998). Furthermore, standardized residuals were symmetrically distributed around zero and contained no large residuals. In order to fix large case contributions to Mardia’s normalized kurtosis (normalized Mardia’s coefficient=5.8207), robust corrections were performed (Bentler, 2004). Hence, based on the robust method goodness-of-fit results, provided by the EQS package, the measurement model chi-square
Research Methodology

(Satorra-Bentler scaled chi-square) was 338.0124 ([d.f.]=199, $p$-value=0.00), presenting significant improvement over the independence model (chi-square=2079.519, d.f.=231). Also, the measurement model values of Akaike’s Information Criterion (AIC) and Bozdogan’s consistent version of this statistic (CAIC) were noticeably lower from those of the independence model (model AIC=-59.98764, independence model AIC=1617.51887; model CAIC=-834.167, independence model CAIC=718.848), thus, further indicating satisfactory model fit (Bentler, 2004). As a complement to these basic tests, a number of other incremental and parsimonious fit indices were also examined. In specific, Bentler’s Comparative Fit Index (CFI) presented a value of 0.955, Bentler and Bonnet’s Non-Normed Fit Index was 0.913, and a Root Mean-Square Error of Approximation (RMSEA) was 0.073. Those results prove the high levels of reliability and fit of the five factor measurement model to the data, while verifying the unidimensionality and discriminant validity of the constructs (Kline, 1998).

Competitive Business Strategies

In terms of competitive business strategy -including two factors: differentiation and low-cost strategies- the expected model yielded very adequate overall fit to the data (n=133). All error variances as well as the covariances among the three factors were estimated. The total number of parameters estimated in this measurement model was 7. The sample size of 133 far exceeds the minimum recommended ratio of 5 observations per parameter to be estimated (Bentler & Chou, 1988; Kline, 1998). All factor loadings were high (ranging from 0.704 to 0.961) and statistically significant (t-test, $p$<0.001), thus verifying the convergent validity of the constructs (Hair et al., 1998, p.653). Furthermore, standardized residuals were symmetrically distributed around zero and contained no large residuals. In order to fix large case contributions to Mardia’s normalized kurtosis (normalized Mardia’s coefficient=13.154), robust corrections were performed (Bentler, 2004). Hence, based on the robust method goodness-of-fit results, provided by the EQS package, the measurement model chi-square (Satorra-Bentler scaled chi-square) was 7.63 ([d.f.]=13, $p$-value=0.08668), presenting significant improvement over the independence model (chi-square=215.498, d.f.=21). Also, the measurement model values of Akaike’s Information Criterion (AIC) and Bozdogan’s consistent version of this statistic (CAIC) were noticeably lower from those of the independence model (model AIC=-18.369, independence model AIC=173.498; model CAIC=-68.944, independence model CAIC=91.800), thus, further indicating satisfactory
model fit (Bentler, 2004). As a complement to these basic tests, a number of other incremental and parsimonious fit indices were also examined. In specific, Bentler’s Comparative Fit Index (CFI) presented a value of 0.962, Bentler and Bonnet’s Non-Normed Fit Index was 0.945, and a Root Mean-Square Error of Approximation (RMSEA) was 0.045. Those results prove the high levels of reliability and fit of the two factor measurement model to the data, while verifying the unidimensionality and discriminant validity of the constructs (Kline, 1998).

### Table 9: Summary Results of the Confirmatory Factor Analysis (CFA)

<table>
<thead>
<tr>
<th>Theoretical Categories</th>
<th>Factor Loadings Range</th>
<th>CFI</th>
<th>RMSEA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Financial Performance</td>
<td>0.719 – 0.950</td>
<td>0.963</td>
<td>0.080</td>
</tr>
<tr>
<td>Ambidextrous Innovation Orientation</td>
<td>0.685 – 0.986</td>
<td>0.970</td>
<td>0.072</td>
</tr>
<tr>
<td>Top Management Team Characteristics</td>
<td>0.787 – 0.982</td>
<td>0.979</td>
<td>0.074</td>
</tr>
<tr>
<td>Organizational Context Characteristics</td>
<td>0.742 – 0.987</td>
<td>0.955</td>
<td>0.073</td>
</tr>
<tr>
<td>Competitive Business Strategies</td>
<td>0.704 – 0.961</td>
<td>0.962</td>
<td>0.045</td>
</tr>
</tbody>
</table>

In the next chapter the results of this PhD thesis are analytically presented.

---

4 All results presented in this table are standardized and robust.
CHAPTER SIX

RESULTS

6.1 Statistical Analysis and Hypotheses Testing

Hierarchical Regression Modeling was the principal analytic technique employed to test the hypothesized conceptual model in the study’s final sample (IBM SPSS v.20 package was used). As indicated by previous research hierarchical regression modeling is the appropriate technique for analyzing the relationships between controls, ambidextrous orientation, antecedents and firms’ financial performance (He & Wong, 2004; Jansen et al., 2006; Mom et al., 2009). Specifically, two different regressions (Figure 11) were computed in order to capture the extent of our conceptual model.

Figure 11: Regressions & Hypothesized Relationships Based on Thesis Conceptual Framework
6.1.1 Firms’ Ambidextrous Orientation and its Antecedents

However, before proceeding to the regressions of the aforementioned hypothesized model some basic assumptions are being examined. In particular - regarding Regression 1 - the most fundamental assumption is normality, referring to “the shape of the data distribution of a given variable and its correspondence to the normal distribution, the benchmark for statistical methods” (Hair et al., 1998, p.70). If there are large variations from the normal distribution, then all resulting statistical tests are invalid, as normality is required to use the $F$ and $t$ statistics. A simple diagnostic test for normality is the examination of normal probability plots, which compare the cumulative distribution of actual data against a normal distribution. Specifically, two characteristics of probability plots are essential for such an investigation: kurtosis (the ‘peakedness’ or ‘flatness’ of the distribution compared with the normal distribution) and skewness (the symmetry of the distribution; e.g., a simple are either below or above the normal distribution). In addition to these features of the probability plots, normality can also be assessed through statistical tests. The most widely used test is the Kolmogorov-Smirnov test, which calculates the level of significance for the differences from a normal distribution (Field, 2000; Hair et al., 1998). Table 10 presents the values of kurtosis, skewness, and Kolmogorov-Smirnov test for the (independent and dependent) variables of the study.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Kurtosis</th>
<th>Skewness</th>
<th>Kolmogorov-Smirnov significance level</th>
</tr>
</thead>
<tbody>
<tr>
<td>AgeFinal</td>
<td>.803</td>
<td>.225</td>
<td>.000</td>
</tr>
<tr>
<td>Size</td>
<td>1.145</td>
<td>1.800</td>
<td>.000</td>
</tr>
<tr>
<td>Industry</td>
<td>-.919</td>
<td>-.174</td>
<td>.000</td>
</tr>
<tr>
<td>Ambidextrous OR</td>
<td>-.309</td>
<td>-.478</td>
<td>.016</td>
</tr>
<tr>
<td>Creative Self-Efficacy</td>
<td>.009</td>
<td>-.412</td>
<td>.000</td>
</tr>
<tr>
<td>Learning Goal Orientation</td>
<td>-.759</td>
<td>.734</td>
<td>.000</td>
</tr>
<tr>
<td>Performance Goal Orientation</td>
<td>-.570</td>
<td>-.390</td>
<td>.000</td>
</tr>
<tr>
<td>External Knowledge Flows</td>
<td>-.860</td>
<td>-.005</td>
<td>.000</td>
</tr>
<tr>
<td>Innovation &amp; Flexibility</td>
<td>-.188</td>
<td>.941</td>
<td>.000</td>
</tr>
</tbody>
</table>
Results

<table>
<thead>
<tr>
<th>Climate</th>
<th>Social Capital</th>
<th>Organizational Capital</th>
<th>Participative Decision Making</th>
<th>Differentiation Strategy</th>
<th>Low-Cost Strategy</th>
<th>Complementary Strategies</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-.951</td>
<td>.523</td>
<td>-.707</td>
<td>.598</td>
<td>.707</td>
<td>.598</td>
</tr>
<tr>
<td></td>
<td>-.278</td>
<td>-.707</td>
<td>.354</td>
<td>.598</td>
<td>.707</td>
<td>.598</td>
</tr>
<tr>
<td></td>
<td>-.105</td>
<td>-.707</td>
<td>.354</td>
<td>.598</td>
<td>.707</td>
<td>.598</td>
</tr>
<tr>
<td></td>
<td>-.737</td>
<td>.598</td>
<td>.598</td>
<td>.707</td>
<td>.598</td>
<td>.707</td>
</tr>
<tr>
<td></td>
<td>-.790</td>
<td>.652</td>
<td>.652</td>
<td>.598</td>
<td>.652</td>
<td>.598</td>
</tr>
<tr>
<td></td>
<td>-.715</td>
<td>.598</td>
<td>.598</td>
<td>.598</td>
<td>.598</td>
<td>.598</td>
</tr>
</tbody>
</table>

In the aforementioned table the values of ‘Size’ indicate violations in normality (kurtosis and skewness above ±1). In order to accommodate non-normal distributions (Hair et al., 1998) we applied a logarithmic computation to size (prior to regression analysis) and normality was generally achieved, as illustrated in the histogram and the normal probability plot of residuals (Figure 12). The histogram is close to a normal distribution (the bell-shaped curve), while the probability plot indicates observed residuals’ values that fall along the diagonal (representing a normal distribution) with no substantial or systematic deviations. Therefore, the residuals are considered to follow a normal distribution and the regression line is found to meet the assumption of normality (Field, 2000).

Figure 12: Regression 1: Histogram and Normal Probability Plot

The second assumption, homoscedasticity, refers to the proposition that the dependent variable exhibits equal levels of variance across the range of independent variables. Homoscedasticity is desirable because the “variance of the dependent variable, being
explained in the dependence relationship, should not be concentrated in only a limited range of the independent values” (Hair et al., 1998, p.73). The presence of homoscedasticity is best examined graphically through the scatterplot of residuals (Figure 13). As depicted, residuals are randomly and evenly dispersed throughout the plot, thus indicating that homoscedasticity has been achieved (Field, 2000).

![Figure 13: Scatterplot of Residuals (Dependent Variable: Amdibextrous Orientation)](image)

Finally, the third basic assumption, linearity, is also explained by the residuals’ analysis. As shown in Figure 13, residuals do not exhibit any nonlinear pattern, hence, ensuring that the regression analysis will be linear⁵ (Field, 2000; Hair et al., 1998).

The first regression analysis—Regression 1—was performed when ambidextrous innovation orientation was regressed on the control variables, top management team characteristics and the complementary effect of the two competitive business strategies. Each set of variables was entered sequentially, beginning with the control variables in Step 1, top management team characteristics in Step 2, organizational context characteristics in Step 3, mean-centered competitive business strategies in Step 4 and the multiplication of the mean-centered business strategies terms⁶ in Step 5. To examine the issue of multicollinearity, we calculated the Variance Inflation Factors (VIF) in each of the regression equations. The maximum VIF within the models was 1.820, which is quite below the rule-of-thumb cut-off of 10

---

⁵ An examination of Table 13 reveals that there is no multicollinearity within the data. All VIF values (Variance Inflation Factors) were clearly below the recommended threshold of 10 (Myers, 1990; Bowerman & O’Connel, 1990)

⁶ Recall that the multiplied, mean-centered terms are computed here in order to show that the gains from the concurrent implementation of the business strategies are greater than the sum of the distinct implementation of a single strategy (Milgrom and Roberts, 1995)
(Bowerman & O’Connell, 1990; Neter, Wasserman, & Kutner, 1990). Table 11 presents the results of the first multivariate regression analysis with ambidextrous innovation orientation as the dependent variable. Table 12 presents the descriptive statistics and correlations for Regression 1 variables regarding the antecedents of ambidextrous innovation orientation.

Table 11: Hierarchical Regression 1: Ambidextrous Innovation Orientation as Dependent Variable

<table>
<thead>
<tr>
<th>Model</th>
<th>R²</th>
<th>Adjusted R²</th>
<th>d.f.</th>
<th>Std. Error</th>
<th>F-test</th>
<th>ΔR²</th>
<th>Durbin-Watson</th>
</tr>
</thead>
<tbody>
<tr>
<td>1a</td>
<td>.083</td>
<td>.062</td>
<td>3</td>
<td>1.695</td>
<td>3.896**</td>
<td>.083**</td>
<td></td>
</tr>
<tr>
<td>2b</td>
<td>.311</td>
<td>.278</td>
<td>3</td>
<td>1.487</td>
<td>13.872***</td>
<td>.228***</td>
<td></td>
</tr>
<tr>
<td>3c</td>
<td>.550</td>
<td>.509</td>
<td>5</td>
<td>1.226</td>
<td>12.861***</td>
<td>.239***</td>
<td></td>
</tr>
<tr>
<td>4d</td>
<td>.568</td>
<td>.521</td>
<td>2</td>
<td>1.211</td>
<td>2.520*</td>
<td>.018***</td>
<td></td>
</tr>
<tr>
<td>5e</td>
<td>.579</td>
<td>.529</td>
<td>1</td>
<td>1.201</td>
<td>2.917*</td>
<td>.010*</td>
<td>2.055</td>
</tr>
</tbody>
</table>

n=133; *p<0.1 **p<0.05 ***p<0.01

a. Predictors (Constant), Industry, LogSize, AgeFinal
b. Predictors (Constant), Industry, LogSize, AgeFinal, CreativeSelfEffic, PerfGoalOrien, LearnGoalOrien
c. Predictors (Constant), Industry, LogSize, AgeFinal, CreativeSelfEffic, PerfGoalOrien, LearnGoalOrien ExtKnowledgeFlows, InnovationFlexibilityClimate, SocialCapital, OrganCapital, ParticDecisionMak,
d. Predictors (Constant), Industry, LogSize, AgeFinal, CreativeSelfEffic, PerfGoalOrien, LearnGoalOrien ExtKnowledgeFlows, InnovationFlexibilityClimate, SocialCapital, OrganCapital, ParticDecisionMak, LowCostStrMeanCent, DiffStrMeanCent
e. Predictors (Constant), Industry, LogSize, AgeFinal, CreativeSelfEffic, PerfGoalOrien, LearnGoalOrien ExtKnowledgeFlows, InnovationFlexibilityClimate, SocialCapital, OrganCapital, ParticDecisionMak, LowCostStrMeanCent, DiffStrMeanCent, ComplementaryStra

As shown (Table 11), the control variables account for a limited and insignificant percentage of the variance in firm’s ambidextrous orientation ($R^2=8.3\%$, $p$-value<0.01). When top management team antecedents were entered to the regression model, they significantly increased the variance explained ($\Delta R^2=22.8\%$, $p$-value<0.001), while similar effects were also found for the introduction of the organizational context characteristics ($\Delta R^2=23.9\%$, $p$-value<0.001), the competitive business strategies ($\Delta R^2=1.8\%$, $p$-value<0.001), and the complementarity among them ($\Delta R^2=1\%$, $p$-value<0.1). Overall the regression model presented very satisfactory fit to the data (Model 5), with the total variance explained in firm’s ambidexterity reaching 52.9\%, an $F$-test of 2.917 ($p$-value<0.1), and a Durbin-Watson statistic value of 2.0557 (Field, 2000; Myers, 1990).

7 Durbin-Watson statistic informs us about whether the assumption of independent errors is tenable. As suggested, values less than 1 or greater than 3 should indicate serious doubts for the independence of model’s errors. Thus, the value 2.055 evidenced for this regression model is acceptable (Field, 2000).
Table 12: Correlations, Means and Std. Deviations of Regression Variables

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
<th>(7)</th>
<th>(8)</th>
<th>(9)</th>
<th>(10)</th>
<th>(11)</th>
<th>(12)</th>
<th>(13)</th>
<th>(14)</th>
<th>(15)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>1.00</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>(2)</td>
<td>0.20</td>
<td>1.00</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>(3)</td>
<td>0.15</td>
<td>0.23</td>
<td>1.00</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>(4)</td>
<td>0.17</td>
<td>0.24</td>
<td>0.43</td>
<td>1.00</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>(5)</td>
<td>0.27</td>
<td>0.22</td>
<td>0.45</td>
<td>0.23</td>
<td>1.00</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>(6)</td>
<td>0.56</td>
<td>0.44</td>
<td>0.69</td>
<td>0.54</td>
<td>0.70</td>
<td>1.00</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>(7)</td>
<td>0.12</td>
<td>0.15</td>
<td>0.21</td>
<td>0.19</td>
<td>0.17</td>
<td>0.26</td>
<td>1.00</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>(8)</td>
<td>0.04</td>
<td>0.03</td>
<td>0.06</td>
<td>0.04</td>
<td>0.05</td>
<td>0.05</td>
<td>0.26</td>
<td>1.00</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>(9)</td>
<td>0.34</td>
<td>0.32</td>
<td>0.30</td>
<td>0.29</td>
<td>0.28</td>
<td>0.28</td>
<td>0.50</td>
<td>0.45</td>
<td>1.00</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>(10)</td>
<td>0.37</td>
<td>0.34</td>
<td>0.30</td>
<td>0.28</td>
<td>0.28</td>
<td>0.28</td>
<td>0.41</td>
<td>0.37</td>
<td>0.45</td>
<td>1.00</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>(11)</td>
<td>0.29</td>
<td>0.27</td>
<td>0.25</td>
<td>0.23</td>
<td>0.22</td>
<td>0.22</td>
<td>0.27</td>
<td>0.24</td>
<td>0.28</td>
<td>0.26</td>
<td>1.00</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>(12)</td>
<td>0.23</td>
<td>0.21</td>
<td>0.19</td>
<td>0.17</td>
<td>0.16</td>
<td>0.16</td>
<td>0.24</td>
<td>0.21</td>
<td>0.26</td>
<td>0.24</td>
<td>0.26</td>
<td>1.00</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>(13)</td>
<td>0.30</td>
<td>0.28</td>
<td>0.25</td>
<td>0.23</td>
<td>0.22</td>
<td>0.22</td>
<td>0.28</td>
<td>0.25</td>
<td>0.28</td>
<td>0.26</td>
<td>0.24</td>
<td>0.26</td>
<td>1.00</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>(14)</td>
<td>0.34</td>
<td>0.32</td>
<td>0.30</td>
<td>0.29</td>
<td>0.28</td>
<td>0.28</td>
<td>0.34</td>
<td>0.32</td>
<td>0.30</td>
<td>0.29</td>
<td>0.28</td>
<td>0.28</td>
<td>0.28</td>
<td>1.00</td>
<td>-</td>
</tr>
<tr>
<td>(15)</td>
<td>0.29</td>
<td>0.27</td>
<td>0.25</td>
<td>0.23</td>
<td>0.22</td>
<td>0.22</td>
<td>0.29</td>
<td>0.27</td>
<td>0.25</td>
<td>0.23</td>
<td>0.22</td>
<td>0.22</td>
<td>0.22</td>
<td>0.22</td>
<td>1.00</td>
</tr>
</tbody>
</table>

Chapter Six
Table 13: Hierarchical Regression 1 Results: Ambidextrous Innovation Orientation Antecedents - Coefficients

<table>
<thead>
<tr>
<th>Model</th>
<th>Standardized Coefficients (Beta)</th>
<th>Std. Error</th>
<th>Collinearity Statistics (VIF)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AgeFinal</td>
<td>-0.186**</td>
<td>0.005</td>
<td>1.066</td>
</tr>
<tr>
<td>LogSize</td>
<td>0.171**</td>
<td>0.077</td>
<td>1.048</td>
</tr>
<tr>
<td>Industry</td>
<td>0.075</td>
<td>0.341</td>
<td>1.115</td>
</tr>
<tr>
<td>Creative Self-Efficacy</td>
<td>0.212**</td>
<td>0.178</td>
<td>1.090</td>
</tr>
<tr>
<td>Learning Goal Orientation</td>
<td>0.383***</td>
<td>0.191</td>
<td>1.110</td>
</tr>
<tr>
<td>Performance Goal Orientation</td>
<td>-0.149**</td>
<td>0.086</td>
<td>1.056</td>
</tr>
<tr>
<td>External Knowledge Flows</td>
<td>0.184**</td>
<td>0.081</td>
<td>1.243</td>
</tr>
<tr>
<td>Innovation &amp; Flexibility Climate</td>
<td>0.328***</td>
<td>0.118</td>
<td>1.662</td>
</tr>
<tr>
<td>Social Capital</td>
<td>-0.44</td>
<td>0.154</td>
<td>1.820</td>
</tr>
<tr>
<td>Organizational Capital</td>
<td>0.189**</td>
<td>0.099</td>
<td>1.316</td>
</tr>
<tr>
<td>Participative Decision Making</td>
<td>0.151**</td>
<td>0.097</td>
<td>1.292</td>
</tr>
<tr>
<td>Differentiation Strategy</td>
<td>0.006</td>
<td>0.122</td>
<td>1.610</td>
</tr>
<tr>
<td>Low-Cost Strategy</td>
<td>0.165**</td>
<td>0.107</td>
<td>1.506</td>
</tr>
<tr>
<td>Complementary Strategies</td>
<td>-0.124*</td>
<td>0.095</td>
<td>1.474</td>
</tr>
</tbody>
</table>

n=133; *p<0.1 **p<0.05 ***p<0.01

Moreover, concerning the hypothesis testing, an examination of the standardized coefficients (beta\(^6\)) was the principal analytic technique employed to test the hypothesized conceptual model in the study’s final sample (Table 13). Specifically, in terms of TMT characteristics, top managers creative self-efficacy was positively and significantly related to firms’ ambidextrous orientation (\(\beta=0.212, p<0.05\)) as well as top managers learning goal orientation (\(\beta=0.383, p<0.01\)), supporting Hypothesis 1 and 2 respectively. In terms of top managers performance goal orientation the analysis showed a negative and significant association with firms’ ambidextrous orientation (\(\beta=-0.149, p<0.05\)), confirming Hypothesis 3. Regarding Organizational Context Characteristics, statistical significance was found for external

---

\(^6\) Beta Coefficients specify the degree of influence of its predictor (independent variable) on the dependent variable, irrespective of the measurement scales of the variables.
knowledge flows ($\beta=0.184$, $p<0.05$), innovation & flexibility climate ($\beta=0.328$, $p<0.01$), organizational capital ($\beta=0.189$, $p<0.05$) and participative decision making ($\beta=0.151$, $p<0.05$), indicating positive and significant effects on firms’ ambidextrous orientation, thus, supporting Hypotheses 4, 5, 7 and 8 respectively. Adversely, no association was found between firms’ social capital and firms’ ambidextrous orientation (insignificant beta coefficients for Hypothesis 6). Finally, there is clear evidence that the complementary effect of differentiation and low-cost strategies in a firm negatively and significantly affects firms’ ambidextrous orientation ($\beta=-0.124$, $p<0.1$), thus, rejecting Hypothesis 9.

6.1.2 Firms’ Ambidextrous Orientation, Slack Resources and Financial Performance

In terms of the Regression 2 assumptions, we performed the aforementioned tests (see § 6.1.1 Firms’ Ambidextrous Orientation and its Antecedents) regarding normality, homoscedasticity, and linearity. Table 14 presents the values of kurtosis, skewness, and Kolmogorov-Smirnov test for the (independent and dependent) variables of the study.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Kurtosis</th>
<th>Skewness</th>
<th>Kolmogorov-Smirnov significance level</th>
</tr>
</thead>
<tbody>
<tr>
<td>AgeFinal</td>
<td>.803</td>
<td>.225</td>
<td>.000</td>
</tr>
<tr>
<td>Size</td>
<td>1.145</td>
<td>1.800</td>
<td>.000</td>
</tr>
<tr>
<td>Industry</td>
<td>-.919</td>
<td>-.174</td>
<td>.000</td>
</tr>
<tr>
<td>Ambidextrous OR</td>
<td>-.309</td>
<td>-.478</td>
<td>.016</td>
</tr>
<tr>
<td>Financial Performance</td>
<td>-.648</td>
<td>.422</td>
<td>.003</td>
</tr>
<tr>
<td>Moderation</td>
<td>.197</td>
<td>.564</td>
<td>.004</td>
</tr>
</tbody>
</table>

However, the values of ‘Size’ indicate violations in normality (kurtosis and skewness above $+1$). In order to accommodate non-normal distributions (Hair et al., 1998) we applied a logarithmic computation to size (prior to regression analysis) and normality was generally achieved, as illustrated in the histogram and the normal probability plot of residuals (Figure 14). The histogram is close to a normal distribution (the bell-shaped curve), while the probability plot indicates observed residuals’ values that fall along the diagonal (representing a normal distribution) with no substantial or systematic deviations. Therefore, the residuals are considered to follow a normal distribution and the regression line is found to meet the assumption of normality (Field, 2000).
The second assumption, homoscedasticity, refers to the proposition that the dependent variable exhibits equal levels of variance across the range of independent variables. The presence of homoscedasticity is best examined graphically through the scatterplot of residuals (Figure 15). As depicted, residuals are randomly and evenly dispersed throughout the plot, thus indicating that homoscedasticity has been achieved (Field, 2000).

Finally, the third basic assumption, linearity, is also explained by the residuals’ analysis. As shown in Figure 15, residuals do not exhibit any nonlinear pattern, hence, ensuring that the regression analysis is generally linear.

Thus, the second regression analysis was performed when financial performance was regressed on ambidextrous innovation orientation. Each set of variables was entered sequentially, beginning with the control variables in Step 1, firms’ ambidextrous innovation
orientation (mean-centered) in Step 2 and the multiplication of the mean-centered ambidextrous innovation orientation and log size terms\(^9\) in Step 3. Table 15 presents the descriptive statistics and correlations for Regression 2 variables regarding the effects of ambidextrous innovation orientation and firm size on financial performance.

Table 15: Correlations, Means and Std. Deviations of Regression 2 Variables

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Financial Perf.</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(2) AgeFinal</td>
<td>.183**</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(3) LogSize</td>
<td>.250***</td>
<td>-.023</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(4) Industry</td>
<td>.015</td>
<td>-.246***</td>
<td>.212***</td>
<td>1.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(5) Ambidext. Orient.</td>
<td>.263***</td>
<td>-.208***</td>
<td>.191***</td>
<td>.157**</td>
<td>1.000</td>
<td></td>
</tr>
<tr>
<td>(6) Moderation</td>
<td>.343***</td>
<td>-.172**</td>
<td>.162**</td>
<td>.210***</td>
<td>.874***</td>
<td>1.000</td>
</tr>
</tbody>
</table>

Mean: 4.67 37.80 3.46 .707 .000 0.65
Std. Deviation: 1.22 31.28 1.96 .457 1.75 7.12

To examine the issue of multicollinearity, we calculated the Variance Inflation Factors (VIF) in each of the regression equations. The maximum VIF within the models was 4.363, which is quite below the rule-of-thumb cut-off of 10 (Bowerman & O'Connell, 1990; Neter et al., 1990). Table 16 presents the results of the second multivariate regression analysis with firms’ financial performance as the dependent variable.

\(^9\) Recall that the multiplied, mean-centered terms are computed here in order to show that firm size positively moderates the relationship between ambidextrous innovation orientation and firm performance.
Table 16: Hierarchical Regression 2: Firms’ Financial Performance as Dependent Variable

<table>
<thead>
<tr>
<th>Model</th>
<th>R²</th>
<th>Adjusted R²</th>
<th>d.f.</th>
<th>Std. Error</th>
<th>F-test</th>
<th>ΔR²</th>
<th>Durbin-Watson</th>
</tr>
</thead>
<tbody>
<tr>
<td>1ᵃ</td>
<td>.098</td>
<td>.077</td>
<td>3</td>
<td>1.176</td>
<td>4.661**</td>
<td>.098**</td>
<td></td>
</tr>
<tr>
<td>2ᵇ</td>
<td>.167</td>
<td>.141</td>
<td>4</td>
<td>1.134</td>
<td>10.709***</td>
<td>.070***</td>
<td></td>
</tr>
<tr>
<td>3ᶜ</td>
<td>.223</td>
<td>.193</td>
<td>5</td>
<td>1.100</td>
<td>9.131**</td>
<td>.056***</td>
<td>2.304</td>
</tr>
</tbody>
</table>

n=133; *p<0.1 **p<0.05 ***p<0.01

a. Predictors: (Constant), Industry, LogSize, AgeFinal
b. Predictors: (Constant), Industry, LogSize, AgeFinal, AmbidexterityPlusORMeanCent
c. Predictors: (Constant), Industry, LogSize, AgeFinal, AmbidexterityPlusORMeanCent, Moderation

As shown (Table 16), the control variables account for a limited and insignificant percentage of the variance in firm’s ambidextrous orientation (R²=9.8%, p-value<0.05). When firms ambidextrous innovation orientation was entered to the regression model, it increased the variance explained (ΔR²=7%, p-value<0.001), while similar effects were also found for the entering of the moderation terms (ΔR²=5.6%, p-value<0.001). Overall the regression model presented very satisfactory fit to the data (Model 3), with the total variance explained in firm’s ambidexterity reaching 22.3%, an F-test of 9.131 (p-value<0.005), and a Durbin-Watson statistic value of 2.304¹⁰ (Field, 2000; Myers, 1990).

Moreover, concerning the hypothesis testing, an examination of the standardized coefficients (beta¹¹) was the principal analytic technique employed to test the hypothesized conceptual model in the study’s final sample (Table 17). Specifically, firms’ ambidextrous orientation was positively and significantly related to financial performance (β=0.276, p<0.001) and size positively moderated their relationship (β=0.494, p<0.001), thus, supporting Hypothesis 10 and 11 respectively.

¹⁰ Durbin-Watson statistic informs us about whether the assumption of independent errors is tenable. As suggested, values less than 1 or greater than 3 should indicate serious doubts for the independence of model’s errors. Thus, the value 2.304 evidenced for this regression model is acceptable (Field, 2000).

¹¹ Beta Coefficients specify the degree of influence of its predictor (independent variable) on the dependent variable, irrespective of the measurement scales of the variables.
### Chapter Six

Table 17: Hierarchical Regression 2 Results: Coefficients of Ambidextrous Innovation Orientation on Financial Performance

<table>
<thead>
<tr>
<th>Model</th>
<th>Standardized Coefficients (Beta)</th>
<th>Std. Error</th>
<th>Collinearity Statistics (VIF)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AgeFinal</td>
<td>.190**</td>
<td>.003</td>
<td>1.066</td>
</tr>
<tr>
<td>LogSize</td>
<td>.252***</td>
<td>.053</td>
<td>1.048</td>
</tr>
<tr>
<td>Industry</td>
<td>.009</td>
<td>.237</td>
<td>1.115</td>
</tr>
<tr>
<td>Ambidextrous Inn. Orientation</td>
<td>.276***</td>
<td>.059</td>
<td>1.091</td>
</tr>
<tr>
<td>Moderation</td>
<td>.494***</td>
<td>.028</td>
<td>4.363</td>
</tr>
</tbody>
</table>

n=133; *p<0.1 **p<0.05 ***p<0.01

In the next chapter the discussion, limitations and conclusions of this PhD thesis are analytically presented.
CHAPTER SEVEN

DISCUSSION, LIMITATIONS & CONCLUSION

7.1 Discussion of Results & Theoretical Implications

Theorists have long argued about the antecedents of organizational ambidexterity and the impact of ambidexterity on firms’ prosperity and long-term survival (March, 1991; Raisch & Birkinshaw, 2008; Raisch et al., 2009; Simsek et al., 2009). Still, the interest on the antecedents of ambidexterity has drawn burgeoning significance as even more scholars in a variety of literatures examine different conceptualizations of exploration and exploitation antecedents and their configurations (Lavie et al., 2010; Mom et al., 2007). This PhD thesis, based on a survey of the top performing Greek companies, has been able to collect significant firm level data in one-year time span in order to measure antecedents and performance implications of organizational ambidexterity.

7.1.1 Firms’ Ambidextrous Orientation and its Antecedents

Specifically, scholars have merely focused on the leadership or top management team characteristics that shape exploration and exploitation, while noticeable research views TMTs as prerequisites for achieving and/or implementing ambidexterity (Lubatkin et al., 2006; Mom et al., 2009; O'Reilly & Tushman, 2011; Probst et al., 2011). In literature, TMTs have a crucial role in resolving conflicts and contradictions (O'Reilly & Tushman, 2004) and take important resource allocation decisions that lead to ambidexterity (Mom et al., 2009; O'Reilly & Tushman, 2011). Top managers, on the other hand, are obliged to implement creative and collective activities (Sheremata, 2000), to execute routine and non routine actions (Adler et al., 1999) and to be multitaskers in a way that they adapt to various roles and competences (Floyd & Lane, 2000). Creative self-efficacy was the first characteristic of the top managers that was examined, as it is viewed as a key enabler factor of creative and managerial performance (Stajkovic & Luthans, 1998; Tierney & Farmer, 2002). Furthermore, it positively affects the pursuit of ‘new knowledge’ (Tierney & Farmer, 2002) and top managers that assimilate and apply new knowledge are more likely to engage in paradoxical thinking (Gibson & Birkinshaw, 2004; Mom et al., 2009). Results indicate that top managers creative
self-efficacy positively impacts firms’ ambidextrous orientation, thus, confirming the arguments above (see Table 18).

Table 18: Hypotheses Results of the Antecedents of Ambidextrous Orientation

<table>
<thead>
<tr>
<th>Number</th>
<th>Hypothesized</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><em>Top Management Team Characteristics</em></td>
<td></td>
</tr>
<tr>
<td>H1</td>
<td>Top managers’ creative self-efficacy positively affects firms’ ambidextrous innovation orientation.</td>
<td>Accepted</td>
</tr>
<tr>
<td>H2</td>
<td>Top managers’ learning goal orientation positively affects firms’ ambidextrous innovation orientation.</td>
<td>Accepted</td>
</tr>
<tr>
<td>H3</td>
<td>Top managers’ performance goal orientation has a negative effect on firms’ ambidextrous innovation orientation.</td>
<td>Accepted</td>
</tr>
<tr>
<td></td>
<td><em>Organizational Context Characteristics</em></td>
<td></td>
</tr>
<tr>
<td>H4</td>
<td>Firms’ external knowledge flows positively affect firms’ ambidextrous innovation orientation.</td>
<td>Accepted</td>
</tr>
<tr>
<td>H5</td>
<td>Firms’ innovation &amp; flexibility climate positively affects firms’ ambidextrous innovation orientation.</td>
<td>Accepted</td>
</tr>
<tr>
<td>H6</td>
<td>Firms’ social capital positively affects firms’ ambidextrous innovation orientation.</td>
<td>Not associated</td>
</tr>
<tr>
<td>H7</td>
<td>Firms’ organizational capital positively affects firms’ ambidextrous innovation orientation.</td>
<td>Accepted</td>
</tr>
<tr>
<td>H8</td>
<td>Firms’ participative decision making positively affects firms’ ambidextrous innovation orientation.</td>
<td>Accepted</td>
</tr>
<tr>
<td>H9</td>
<td>The complementarity of the differentiation and low-cost strategies has a positive effect on firm’s ambidextrous innovation orientation.</td>
<td>Rejected</td>
</tr>
</tbody>
</table>

In the same line of reasoning, literature suggests that top managers enhancing a learning goal orientation are expected to develop new skills and competences in order to cope with ambidexterity paradox as well as to use complex learning strategies in order to persist in failure, increase or maintain self-efficacy and pursue difficult and challenging tasks (Bell & Kozlowski, 2002; Button et al., 1996; Phillips & Gully, 1997). Results indicate that goal oriented top managers lead organizations towards ambidexterity while those engaging in
performance goal orientation negatively impact firms’ ambidextrous orientation. The later argument was also hypothesized as goal-oriented top managers were expected to withdraw from tasks (especially in the face of failure), to avoid pursuing difficult tasks, and to choose activities where success is more easily achieved (Bell & Kozlowski, 2002). As prior research has signified, ambidexterity entails opposing actions that are difficult to handle and divergent processes that must be managed (Raisch & Birkinshaw, 2008), thus contrasting the characteristics of goal-oriented top managers that are not capable of leading a firm towards ambidexterity. This argument was strongly supported in our empirical research based as shown in Table 18.

In terms of the organizational context characteristics that influence firms’ ambidextrous orientation this PhD thesis focused on external knowledge flows, innovation & flexibility climate within firm, social and organizational capital of the firm and participative decision-making (see §4.2.2 Ambidextrous Orientation and the Characteristics of the Organizational Context). External knowledge flows were expected to positively influence ambidexterity, as scholars had previously underscored the importance and the severe impact of exploring beyond organizational boundaries (Rosenkopf & Nerkar, 2001) and the greater risk of obsolescence when knowledge acquisition occurs only through internal sourcing (Eisenhardt & Martin, 2000). Results indicate that external knowledge acquisition positively impacts firms’ ambidextrous orientation, thus, confirming the arguments above (see Table 18). Innovation and flexibility dimension of organizational climate was appraised to boost ambidexterity, as organizations develop the appropriate responses to the complications created by the turbulent environmental conditions that shape today’s business environment and become more capable of managing the inherent ambidexterity dilemma. Our analysis indicates that innovation and flexibility climate positively influences firms’ ambidextrous orientation, hence, confirming the arguments above (see Table 18). Furthermore, while social capital is widely viewed as a key antecedent of organizational learning (Adler & Kwon, 2002; Nahapiet & Ghoshal, 1998) and enhances strong communication ties between firm employees (Beckman, 2006), leading to firms with strong social ties (Atuahene-Gima & Murray, 2007), we hypothesized that the creation of this supportive context (Gibson & Birkinshaw, 2004) would lead to firms’ ambidexterity. However, we didn’t find significant empirical evidence to support this argument as shown in Table 18. Adversely, organizational capital is associated with effectiveness and productivity (Kang & Snell, 2009; Subramaniam & Youndt, 2005) and it could create a trajectory of reconciled knowledge (Cohen & Levinthal, 1990; Subramaniam
& Youndt, 2005), thus, enabling firms to achieve ambidexterity. Our results denote that organizational capital has a strong and positive impact on firms’ ambidextrous orientation, hence, confirming our seventh hypothesis (see Table 18). Regarding participative decision making, scholars have previously noticed –in a different context- that employee involvement programs boost both creativity (exploration) and continuous improvement (exploitation) (Lawer, 1994). The involvement of employees in decision-making is regarded as the opportunity of leaders to increase their subordinates commitment in exploring new ways of doing things as well as to encourage them on accepting change (Nemanich & Vera, 2009). Still, it is considered as crucial to exploitation as it accelerates employees’ understanding of the appropriate manners that best practices need to be applied and enables knowledge transfer between team members (Hannah & Lester, 2009). To that end, we hypothesized that participative decision-making positively impacts firms’ ambidextrous orientation and our empirical analysis provided significant evidence over this statement (see Table 18).

In light of the positive complementary effect of competitive business strategies (low-cost and differentiation) on firms’ ambidextrous orientation, empirical evidence does not support our assumption. Through this hypothesis we tried to investigate whether Hill’s (1988) argument on the compatibility of differentiation and low-cost strategies under certain conditions, has an impact in firms’ ambidextrous orientation. Specifically, drawing on the underdeveloped literature concerning the influence of business strategies on ambidexterity, we developed a hypothesis based on the complementary effect of the simultaneous pursuit of both business strategies in ambidextrous orientation. While Porter (1980) was the first to denote that firms should pursue only a distinct type of strategy (differentiation or low-cost), Hill (1988, p.411) later developed a contingency framework signifying that “differentiation can be a way of achieving low-cost and because there often is no unique low-cost position, a firm may have to base its sustainable competitive advantage to on the simultaneous and continuous pursuit of both low-cost and differentiation”. However, based on the results of the analysis of the empirical evidence, we found that the complementary effect of both business strategies significantly and negatively impacts firms’ ambidexterity (see Table 18). This outcome can be further explained by the fact that the low-cost strategy usually involves cost minimization in R&D expenditures, service and employees, thus, delimitating the available resources for the pursuit of differentiation strategy. Accordingly, because of various resource constraints in the concurrent following of the two business strategies, high levels of pursuing one often implies low levels in the implementation of the other. Our evidence is in line with Porter’s argument
and further indicates that the complementary effect of the simultaneous pursuit of both business strategies is stronger and negatively influences firms’ ambidextrous orientation.

7.1.2 Firms’ Ambidextrous Orientation, Slack Resources and Firms’ Financial Performance

As discussed earlier, ambidexterity is considered as a crucial element of firms’ sustained performance (Raisch et al., 2009). In accordance with other scholars (He & Wong, 2004), we hypothesized that firms simultaneously engaging in both explorative and exploitative innovation orientation present a positive impact on their financial performance. Our results severely confirmed this hypothesis as shown in Table 19.

Moreover, we argued that larger firms confront risks with larger resource bases and, in that way, overcome the ambidexterity dilemma, through dedicating resources to e.g. specialized departments in order to handle some of the ambidexterity trade-offs (Bourgeois, 1981; Cao et al., 2009; Thompson, 1967). On the other hand, with less resources available, smaller firms, are getting downside risks when simultaneously exploring and exploiting, thus leading to weakening financial performance (Ebben & Johnson, 2005; Jansen et al., 2012; Lin et al., 2007). Previous research has also suggested that the scarcity of resources limits the ability of ambidextrous organizations to effectively control their exploratory and exploitative activities (Jansen et al., 2012; Levinthal & March, 1993; March, 1991) and firm size is an indicator of the available organizational resources at their immediate disposal (Cao et al., 2009). Based on this theoretical grounding, we hypothesized that firm size moderates the relationship between firms’ ambidextrous innovation orientation and its subsequent financial performance in such a way that this positive effect is increased as size increases. This hypothesis was also confirmed as empirical evidence provided strong support on our argument (see Table 19).

Table 19: Hypotheses Results of Ambidextrous Orientation, Slack Resources and Firms’ Financial Performance

<table>
<thead>
<tr>
<th>Number</th>
<th>Hypothesized</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>H10</td>
<td>Firms’ ambidextrous innovation orientation is positively related to firms’ financial performance.</td>
<td>Accepted</td>
</tr>
<tr>
<td>H11</td>
<td>Firm size moderates the relationship between firms’ ambidextrous innovation orientation and its subsequent financial performance in such a way that this positive effect is increased as size increases.</td>
<td>Accepted</td>
</tr>
</tbody>
</table>
Chapter Seven

7.2 Managerial Implications

This PhD thesis informs practitioners on important issues regarding achieving ambidexterity and high levels of financial performance in their organizations. In specific, the first part of this PhD reveals how firms’ ambidextrous orientation is associated with the characteristics of their top management teams, their organizational context and the business strategies followed. Particularly, organizations need to focus both on exploration and exploitation in order to achieve ambidexterity and overcome the challenges faced in modern business environments (O'Reilly & Tushman, 2004). Accordingly, top managers are confronted with several strategic role conflicts as they face “…inconsistent behavioural expectations based on the need to efficiently deploy existing competences and the need to experiment with new ones” (Floyd & Lane, 2000, p.154). Our research fills some gaps on the characteristics that top managers should possess in order to efficiently cope with this dilemma. Specifically, organizations managed by executives that enhance learning goal orientation and creative self-efficacy engage in ambidextrous orientation, while top managers’ performance goal orientation negatively impacts ambidexterity. In that vein, firms should employ top managers that act as an arbiter for new ideas and have confidence, thus, possessing high levels of creative self-efficacy and stress on learning. Furthermore, top managers need to build their organizations in such a way that they give emphasis to several contextual characteristics. Results of our research confirm background theory and indicate that knowledge is quite important to achieve ambidexterity. Explicitly, knowledge provided by external knowledge flows significantly effects ambidexterity as well as the stored knowledge associated with firms’ organizational capital (databases, manuals, patents etc.). Likewise, organizations that quickly response to changes, generate novel ideas, provide an open-mindness climate and involve employees in decision making are keener to achieve ambidexterity. Lastly, top managers’ should be aware of the effect of following both competitive strategies in their firms. As results indicate the complementarity between low-cost and differentiation strategy negatively affects ambidexterity. Thus, top managers must rely on a single strategy for achieving ambidexterity, hence, following Porter’s (1980) recommendation.

In the second part of this thesis, we found empirical support for the ambidexterity-financial performance relationship. As shown by results, firms that simultaneously explore and exploit obtain high levels of financial performance in terms of profitability, return on investment and
return on shareholders equity etc. However, slack resources moderate this relationship in a manner that as firm size increases, it boosts profitability.

7.3 Limitations and Future Research Directions

This PhD study has several limitations that merit discussion and, thus, opens avenues for future research. First, because this thesis focuses on the differential relationship of top management team antecedents on firms’ ambidextrous orientation, the interaction effects of those conditions have not been examined. However, the significant correlations observed between several top managers’ variables (e.g. creative self-efficacy, performance goal orientation and learning goal orientation) may imply that such interactions effects could also exist. Hence, further research could examine whether these interaction relationships would differentiate the pattern of effects on firms’ ambidextrous orientation indicated by this study. Second, in the same line of reasoning, various interrelationships between organizational context characteristics may also present various interaction effects that could be further studied.

Moreover, even the percentage of the variance explained in firms’ ambidextrous orientation (i.e. 52.9%) was quite reasonable for a firm level survey it disregards a substantial amount of unexplained variation. For instance, it could be that other top management team characteristics (such as structure, variation, efficiency, and integration) or organizational context factors (such as firm structure, formalization, and absorptive capacity) significantly influence firms’ ambidexterity. An organization that has an efficient top management team or several sub-units that handle the contradictory activities that ambidexterity entails, might also engage in ambidexterity faster and more effectively. In terms of the ambidexterity-performance relationship further research is needed in order to further deploy the effects of various factors (such as environmental dynamism, competitive intensity and industry structure) on this issue, as current results are contradictory (Cao et al., 2009; Jansen et al., 2006; Lavie et al., 2010).

Still, while we took several precautions in designing the questionnaire and interviewing the top managers that limit single informant and common method bias, we cannot ignore that bias cannot be ruled out totally. Also, this research concludes only associative, not causal, inferences about the relationships among the constructs and future studies may benefit from
gathering data that span longitudinally. In a similar vein, our study is cross-sectional and merely focuses on the top-performing Greek companies, thus, mainly emphasizing on large companies in a specific territory. Future research could be cross-country, industry-specific or concentrated on the effect of ambidexterity in small and medium enterprises.

### 7.4 Conclusion

In conclusion, studying the relationship between ambidexterity and its antecedents as well as the ambidexterity-performance relationship, in terms of the explorative and exploitative innovations, offers fascinating insights for both researchers and practitioners. We recognize that organizational ambidexterity is a multifaceted notion that provides new insights of how organizations may create new ways to achieve sustainable competitive advantages.
REFERENCES


Bell, B. S., Mullins, M. E., Toney, R. J., & Kozlowski, S. W. J. 1999. Goal orientation: Elaborating the effects of state and trait conceptualization, *Fourteenth Annual Conference of the Society for Industrial and Organizational Psychology*. Atlanta, GA.


References


References


References


References


References


References


References


References


Appendices

Appendix 1: Dimensions of Innovation

References
Appendix 2: Determinants of Organizational Innovation in the Existing Research

(Applied from Crossan, and Apaydin, 2010, p.1182)
Appendix 3: Measurement Model of the Determinants of Organizational Innovation

(Adopted from Crossan and Apaydin, 2010, p. 1175)