

SHIKO M. BEN-MENAHM

Strategic Timing and Proactiveness of Organizations



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A temporal perspective on strategic entrepreneurship in dynamic environments

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A temporal perspective on strategic entrepreneurship in dynamic environments

Strategische timing en proactiviteit van organisaties

Een temporeel perspectief op strategisch ondernemerschap
in dynamische omgevingen

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Preface

This dissertation is inspired by a personal fascination with time. Apart from having spent some years in the trade of timekeepers, I am captivated by philosophical problems of time as they surround us daily in a fundamental way. Besides the questions whether time exists or not—and if so in what form—our conception of time is as elusive as it is real. We conceive events in our lives *within* time and derive our sense of being from the memories we have of those events. Although I can't claim to have made large strides in the more fundamental, philosophical problems of time (luckily I find myself in the good company of greater minds), this dissertation should be seen as an effort to contribute to concrete applications of time in the strategy domain. This may be clear when discussing timing, which is in essence a question of *when* something is done. Yet another central topic in this dissertation, proactiveness, is also closely connected to time as it reflects self-initiated, anticipatory action that has the potential to enact change in the actor's environment. That both topics are of the essence in a field concerned with adaptation to change and competitive advantage will hopefully be elucidated by the studies included in this dissertation.

I wish to express my gratitude to all those involved directly and indirectly in the realization of this dissertation. I would first like to extend special thanks to my promoters Prof. dr. Henk Volberda and Prof. dr. Frans Van Den Bosch. Throughout my candidacy, Henk has always been supportive and intellectually stimulating. I thank him for sharing his expertise and experience while at the same time providing me with the academic freedom to explore my ideas. I am also grateful for his encouragement to participate in a workshop at Wharton, which proved to be tremendously stimulating and motivating. Frans introduced me to the world of academia and the fine skills of academic writing as early as in my Master theses. I much enjoyed our many conversations on management, as well as those talks that revolved more around religion than temporalities (yet always kept me down to earth). I'm sure to hear myself repeating to my students and myself the many typical expressions (kick it out; *schrijven is schrappen*; if the abstract is shaky, the paper is shaky), analogies (a paper is like a painting; a paper is like a house), and valuable lessons

regarding the structure of a good paper. I am also indebted to Prof. dr. Justin Jansen who not only is a much-valued co-author, but also an exemplar of scholarly achievement. Special thanks also to Prof. dr. Pursey Heugens for his support, belief, and nurturing words of wisdom. The beating hearts of the department, Carolien, Patricia, Miriam, and Janneke are also thankfully acknowledged. I have always greatly appreciated their willingness to help and fill in the gaps. I gratefully thank members of the ERIM management and staff, Tineke, Miho, Marisa, Natalija, Patrick, and Olga. I further acknowledge ERIM and the Erasmus Trust Fund for the generous support received during my candidacy.

I consider myself lucky with the many wonderful friends and colleagues who surrounded me at RSM and beyond over the past few years. Bernardo, not only were you my window to Internet memes, my PhD trajectory wouldn't have been the same without your friendship and humor. Our many absorbing discussions about work and all matters of life during our daily coffee breaks, travels, and many dinners and drinks have been truly delightful and I will miss your company profoundly. Ivana, sweet as you are powerful, the other cornerstone of the raving trinity. I cherish your friendship and the fun we shared. Pepijn, whom from the moment we formed the "statistics (not so) dream team" has become a dear friend and like-minded academic. I'm still waiting for a sequel to our adventures in Israel. Vareska, I keep fond memories of our trips to Antwerp and conferences, as well as co-teaching with you and our openhearted conversations. Thank you for your friendship. I look forward to hosting your Swiss snowboarding trips. Nathan and Inga, thank you for being such great friends and kind people. I'm glad to be moving closer and seeing more of you in the years to come. A heartfelt appreciation also goes out to my roommates and friends Oli and Lameez. Oli, I am very happy to have had you close all these years and treasure our discussions and co-authorship. Lameez, thank you for being a trusted crony (and for putting up with me). My co-author Zenlin, thank you for the pleasant cooperation, I look forward to future joint endeavors. I also warmly thank my other dear friends at RSM with whom I share good memories: Alex, Andreas, Dirk, Fourné, Gijs, Jane, Jochem, Julija, Jurriaan, Maria-Rita, Maya, Michiel, Murat, Mumtaz, Oguz, Patrick, Philip, Pitòsh (my very first co-author!), Sebastiaan, Suzanne, and the many other nice colleagues whom have made day to day life in and outside of university pleasurable and inspiring. I also thank Prof. Stuart Albert, who (without realizing) was a

major inspiration and helped me overcome what in retrospect was the toughest obstacle in my candidacy.

I am without doubt mostly indebted to my family: My parents for their wisdom, relentless love, support, and admiration, and my dearest sisters and their families whom I consider my closest friends. Alma, Alvit, and Shirat, thank you for always being there for me, one couldn't be luckier. I also want to thank Yael and Thirza and the rest of my extended family and friends in Israel who have welcomed me during my conference visits and holidays, and of course Amit for your warmth and backing. Last, but not least, I would like to extend my gratitude to friends outside of the university whom have been very supportive during my doctoral studies, in particular Céline, DJ, Floor, the Groninger crowd, Heidi, Jan Sebastian, Maarja, Merel, Nazanin, Nick, Ralph, Stoffel, and my other fine friends in Amsterdam and abroad, whom I hope to keep seeing around the globe for as long as I'll be in academia and longer.

Shiko Ben-Menahem

Rotterdam,
December 2012.

Table of Contents

Chapter 1. General Introduction	1
1.1 Research Topic: The Temporal Dimension of the Organization-Environment Relationship	1
1.2 Previous Research, Research Gaps, and Problem Definition	3
1.2.1 <i>Timing as synchronicity: Temporal fit</i>	3
1.2.2 <i>Timing as sequencing: Proactive vs. reactive strategic behavior</i>	5
1.3 Dissertation Overview	7
1.3.1 <i>Study one: Temporal fit: Aligning internal and external rates of change</i>	7
1.3.2 <i>Study two: Leveraging exploratory and exploitative innovation in dynamic environments: The role of proactive strategic behavior</i>	8
1.3.3 <i>Study three: Determinants of proactive strategic behavior</i>	10
1.3.4 <i>Study four: Strategic timing and cost reduction from offshoring</i>	11
Chapter 2. Strategic Renewal Over Time: The Enabling Role of Potential Absorptive Capacity in Aligning Internal and External Rates of Change	15
2.1 Introduction	16
2.2 Literature Review	18
2.2.1 <i>Strategic renewal over time: Aligning internal and external rates of change</i>	18
2.2.2 <i>Absorptive capacity</i>	19
2.3 Research Framework.....	21
2.4 Empirical Analysis: Strategic Renewal Actions at Royal Dutch Shell (1980-2007).	22
2.4.1 <i>Data and measurement</i>	24
2.4.2 <i>Analysis and results</i>	28
2.5 Discussion	33
2.5.1 <i>Managerial implications</i>	34
2.5.2 <i>Implications for research</i>	36
Appendix A. Data collection method	38
Appendix B. Coding Rules for Content Analysis	40
Chapter 3. Leveraging Exploratory and Exploitative Innovation in Dynamic Environments: Performance Implications of Proactive Strategic Behavior	43
3.1 Introduction	44
3.2 Literature Review and Hypotheses	46

3.2.1	<i>Firm proactiveness</i>	47
3.2.2	<i>Exploratory innovation, environmental dynamism and proactiveness</i>	50
3.2.3	<i>Exploitative innovation, environmental dynamism and proactiveness</i>	52
3.3	Method	54
3.3.1	<i>Data collection, response pattern, and respondents</i>	54
3.3.2	<i>Measurement of constructs</i>	55
3.3.3	<i>Measurement reliability and validity</i>	59
3.3.4	<i>Analytical approach</i>	60
3.4	Results	61
3.5	Discussion and Conclusion	67
3.5.1	<i>Limitations and implications for future research</i>	71
3.5.2	<i>Conclusion</i>	73
	Appendix A.: Measures and items	74
Chapter 4. Determinants of Firm Proactive Strategic Behavior: A Configurational Approach to Employee Job Autonomy, Internal Cooperation and Environmental Dynamism		75
4.1	Introduction	75
4.2	Theoretical Foundation and Hypotheses	78
4.2.1	<i>The conceptualization of proactiveness in organization studies</i>	78
4.2.2	<i>Firm level proactiveness in strategic entrepreneurship literature</i>	78
4.2.3	<i>Individual-level proactive behavior: The role of employee job autonomy</i>	81
4.2.4	<i>The impact of employee job autonomy on firm proactive strategic behavior</i>	82
4.2.5	<i>The moderating role of internal cooperation</i>	84
4.2.6	<i>The moderating role of environmental dynamism</i>	86
4.2.7	<i>A configurational perspective on employee job autonomy, internal cooperation, and environmental dynamism</i>	87
4.3	Methods	88
4.3.1	<i>Sample and data</i>	88
4.3.2	<i>Analytical approach</i>	91
4.3.3	<i>Measurement of constructs</i>	91
4.3.4	<i>Measurement reliability and validity</i>	92
4.4	Results	93
4.5	Discussion and Conclusion	99
4.5.1	<i>Implications for theory and research</i>	100
Chapter 5. Strategic Timing in International Sourcing: A Multilevel Analysis of Cost Reduction in Offshore Operations		105
5.1	Introduction	106

5.2	Theory and Hypothesis Development	109
5.2.1	<i>Theoretical perspectives on cost reduction in offshoring: Strategic choice and path dependence</i>	110
5.2.2	<i>Offshoring and cost reduction</i>	112
5.2.3	<i>Strategic timing and cost reduction</i>	113
5.2.4	<i>Activity-level contingencies: The moderating role of knowledge intensity</i>	116
5.2.5	<i>Firm level contingencies: Depth and breadth of offshoring experience</i>	118
5.3	Methods	121
5.3.1	<i>Sample</i>	121
5.3.2	<i>Measures</i>	122
5.3.3	<i>Analyses</i>	124
5.4	Results	125
5.4.1	<i>Test of hypotheses</i>	128
5.5	Discussion	130
5.5.1	<i>Theoretical implications</i>	131
5.5.2	<i>Managerial implications</i>	133
5.5.3	<i>Limitations and future research</i>	134
5.6	Conclusion	135
Chapter 6. Discussion and Conclusion		137
6.1	Introduction	137
6.2	Summary of the Main Findings	138
6.2.1	<i>Study one</i>	138
6.2.2	<i>Study two</i>	139
6.2.3	<i>Study three</i>	141
6.2.4	<i>Study four</i>	143
6.3	Implications for Theory, Future Research, and Practice	145
6.3.1	<i>Implications for research on outcomes of strategic timing and adaptation</i>	145
6.3.2	<i>Implications for research on determinants of proactive strategic behavior</i>	148
6.3.3	<i>Managerial implications</i>	150
6.4	Conclusion	152
References		155
Summary		177
Samenvatting (Dutch summary)		178
About the Author		179
ERIM PhD Series		181

List of Tables

Table 1.1 Theoretical and methodological underpinnings of study one.....	8
Table 1.2 Theoretical and methodological underpinnings of study two	9
Table 1.3 Theoretical and methodological underpinnings of study three	11
Table 1.4 Theoretical and methodological underpinnings of study four.....	12
Table 1.5 Gaps addressed in this dissertation and intended contributions	13
Table 2.1 Dimensions, knowledge processes, roles in alignment of internal rates of change (IRC) and external rates of change (ERC), and operationalization of potential and realized absorptive capacity	22
Table 2.2 Descriptive statistics on Shell’s strategic renewal actions (SRAs) 1980-2007 ...	25
Table 2.3 Overview of results by period.....	30
Table 2.4 Implications for managers.....	34
Table A1 Examples of annual report segments for each of the five categories of strategic renewal actions.....	39
Table 3.1 Key conceptualizations of the proactiveness construct.....	49
Table 3.2 Study variables, descriptions, and measures	56
Table 3.3 Descriptive statistics and inter-correlations	62
Table 3.4 Results of hierarchical regression analysis: Effects on firm performance	63
Table 4.1 Descriptive statistics and inter-correlations	95
Table 5.1 Descriptive statistics and inter-correlations	126
Table 5.2 Results of HLM regression for offshoring activity cost savings	127
Table 6.1 Hypothesis tested in study one.....	138
Table 6.2 Focus, research question, main findings and conclusion of study one.....	139
Table 6.3 Hypotheses tested in study two.....	140
Table 6.4 Focus, research question, main findings and conclusion of study two.....	141
Table 6.5 Hypotheses tested in study three.....	142
Table 6.6 Focus, research question, main findings and conclusion of study three.....	143
Table 6.7 Hypotheses tested in study four	144
Table 6.8 Focus, research question, main findings and conclusion of study four	145
Table 6.9 Extracts from FMA literature.....	147
Table 6.10 Overview of managerial implications	152

List of Figures

Figure 2.1 Internal and external rates of change, potential absorptive capacity and market share	30
Figure 3.1 Interaction effects between exploratory innovation, environmental dynamism and proactiveness	65
Figure 3.2 Interaction effects between exploitative innovation, environmental dynamism and proactiveness	66
Figure 4.1 Interactions effect of employee job autonomy and internal cooperation on proactive strategic behavior for high environmental dynamism	98
Figure 4.2 Interactions effect of employee job autonomy and internal cooperation on proactive strategic behavior for low environmental dynamism	98
Figure 5.1 Activity level contingencies: the moderating effect of knowledge intensity	129
Figure 5.2 Cross level interactions: the moderating effect of offshoring geographical experience depth	129

Chapter 1. General Introduction

How did it get so late so soon?

Dr. Seuss

1.1 Research Topic: The Temporal Dimension of the Organization-Environment Relationship

Why do some organizations succeed and survive over time while others fail and cease to exist? A well-accepted and enduring perspective in strategy and organization theory literature is that firms succeed and survive as long as a strategic fit (also known as alignment, co-alignment, congruence, or match) exists among strategy, structure, processes, competencies, and resources on the one hand and opportunities and threats arising in the external environment on the other hand (Chandler & Hikino, 1990; Hannan & Freeman, 1984; Nelson & Winter, 1982; Thompson, 1967; Tushman & Romanelli, 1985; Venkatraman & Camillus, 1984, 1990). Maintaining strategic fit over time – i.e. dynamic strategic fit (Zajac, Kraatz & Bresser, 2000) – requires that firms undertake appropriate change to reflect changing environmental conditions (Bourgeois, 1980; Eisenhardt & Martin, 2000; Lawrence & Lorsch, 1967; Miller & Friesen, 1983; O'Reilly & Tushman, 2008).

The feasibility of this challenge – that is, organizational adaptation to changing environments – has been a major source of inquiry in the literature. Two seemingly opposing perspectives have been dominant. Advocates of the environmental selection perspective suggest that firm survival is dependent on a natural selection process taking place at the population level. This selection process eliminates unadjusted organizations and gives rise to new organizational forms that better fit the new context (Hannan &

Freeman, 1989; Barnett & Carroll, 1995). As organizations are inert relative to the rate of environmental change, the very factors that may determine organizational success at one point in time can become core sources of failure as the environment changes. Advocates of the adaptation view, in contrast, have focused on understanding the conditions that enable organizations to stay aligned with their environments in the face of change (Gersick, 1994; O'Reilly & Tushman, 2008), and suggest that individual firms are indeed capable of purposeful, adaptive change (Huff, Huff, & Thomas, 1992; Nelson & Winter, 1982; Miller & Friesen, 1980; Tushman & Romanelli, 1985).

Notwithstanding recent developments in our understanding of the drivers of successful adaptations (e.g. Agarwal & Helfat, 2009; Helfat & Peteraf, 2003; Zollo & Winter, 2002), maintaining fit with the business environment remains a serious challenge. In addition to deciding the right thing to do and how to do it (the content and process of change), dynamic strategic fit involves doing the right thing at the right time (i.e. deciding on the strategic timing of change, such as when activities should be performed and at what rate) (Jurkovic, 1974). Although environmental change is ubiquitous and strategic timing has long been identified as an important potential source of competitive advantage (Stalk, 1988; Thompson, 1967), successfully managing this temporal dimension of alignment seems to be increasingly critical and difficult.

The relevance of strategic timing has truly soared with the increasing pace of change in the business environment over the past few decades (D'Aveni, Dagnino, & Smith, 2010). Rapid developments in technology, globalization of markets, shortening product life cycles, and intensified competition have become major challenges for today's business leaders. More and more, survival requires firms to "be faster" under conditions of fortuitous and unpredictable change (Mendelson & Pillai, 1999; Volberda, 1998). In the words of Teece et al. (1997: 515), "Winners in the global market place have been firms that can demonstrate timely responsiveness and rapid flexible product innovation, coupled with the management capability to effectively coordinate and deploy internal and external competencies." Indeed, both scholarly research and popular management literature have stressed the "need for speed" proposition, suggesting that speed and timing are of the essence in present day organizations. Jack Welch, former Chairman and CEO of General Electric from 1981 to 2001, is often credited with recognizing that increasing industry rates

of change require radically different business processes:

“While restructuring our Company in the 1980s, we spent much of our time talking about the accelerating pace of change: in world politics, in technology, in product introductions and in the increasing demands of customers. We don't have to do that anymore. Change is in the air. Newspapers and networks hammer it home daily. GE people today understand the pace of change, the need for speed, and the absolute necessity of moving more quickly in everything we do, from inventory turnover, to product development cycles, to a faster response to customer needs. They understand that slow-and-steady is a ticket to the bone yard in the 1990s.” (Jack Welch, 1990 Annual Report).

Ten years later, Welch (2000 Annual Report) argues that “when the rate of change inside an institution becomes slower than the change outside, the end is in sight.”

1.2 Previous Research, Research Gaps, and Problem Definition

In the field of strategic management, scholarly interest in temporalities has developed in various domains, including fast strategic decision-making (e.g. Baum & Wally, 1994, 2003; Bourgeois & Eisenhardt, 1988; Eisenhardt, 1989; Judge & Miller, 1991), rapid innovation and product development (Chen, Reilly & Lynn, 2005; Eisenhardt & Tabrizi, 1995; Kessler & Chakrabarti, 1996; Kessler & Bierly, 2002; Smith, Collins & Clark, 2005), speed of knowledge transfer (Zander & Kogut, 1995), and time-based strategies related to timing of domestic and foreign market entry and early-mover advantages (e.g. Lieberman & Montgomery, 1988, 1998; Suarez & Lanzolla, 2007). Two related rationales implicitly underlie this literature: (1) The timing of strategic renewal actions is important because firms need to *keep up* with change in their environment in order to survive (stay in the game); (2) Timing is important because outpacing rivals can give rise to temporal (and temporary) competitive advantage (getting ahead in the game). I briefly discuss both rationales.

1.2.1 *Timing as synchronicity: Temporal fit*

Consistent with Welch's observation, previous literature has argued that firms should match their internal rate of change to the rate of change in their particular

environment (Gersick, 1994; Volberda & Lewin, 2003). This notion is consistent with the concept of entrainment (McGrath & Rotchford, 1983). Adopted from physics and biology, entrainment refers to the synchronization of the pace or cycle of one stimulus with that of another stimulus called *zeitgeber* (time giver) (Ancona & Chong, 1996). A common example is the circadian cycle (24-hours, from *circa dies*), to which many life processes are synchronized, as is the case with fatigue (even in the absence of daylight). Applied to organizations, entrainment theory suggests that adjustment of an organization's activities to the rhythms in the environment positively influences organizational performance whereas a misfit leads to inefficiencies, lower performance, and potential organizational failure (Bluedorn, 1993; Gersick, 1994; Pérez-Nordtvedt et al., 2008). Viewing the organization-environment relationship from the perspective of organizational entrainment – that is, as a system of two interacting cycles – is useful for conceiving how organizations may cope with temporal change. Pérez-Nordtvedt et al. (2008) conceptualize entrainment as a form of organizational adaptation specifically relating to the timing of adaptive activities. They differentiate between two types of organizational entrainment: (1) *Phase entrainment* relates to matching the point-moment when specific organizational activities or activity cycles are performed, and (2) *tempo entrainment* relates to matching the speed or rates of change of the endogenous and exogenous cycles.

The aim to regulate an organization's internal rate of change in such a way that it matches or exceeds the rate of change of the external environment is also consistent with Ashby's Law of Requisite Variety (Ashby, 1958; 1964). Originating in open systems theories (Scott, 2003), this evolutionary principle states that in order to achieve stability (fit), the variety in a control system (cf. the internal rate of change) needs to be equal to or greater than the variety of the environmental disturbances (cf. the external rate of change) (Ashby, 1958). The greater the variety of a system, the more likely it will be able to cope with external change or reduce variety in its environment through regulation. Similarly, March (1991: 72) noted that

[b]ecause of the links among environmental turbulence, organizational diversity, and competitive advantage, the evolutionary dominance of an organizational practice is sensitive to the relation between the rate of exploratory variation reflected by the practice and the rate of change in the environment.

Volberda and Lewin (2003) claimed that matching relevant internal and external rates of change requires the development of routines, capabilities, and measures that monitor and track rates of change in all aspects of their environment (e.g. rate of new product improvements made by competitors, technological advancements, and changes in customer expectations) and adjust the applicable internal processes to match or exceed these rates (Volberda & Lewin, 2003: 2126).

1.2.2 Timing as sequencing: Proactive vs. reactive strategic behavior

Complementing the tempo and phase synchrony discussed above, a related line of research focuses on what may be viewed as the sequencing dimension of strategic timing. Sequencing refers to the course of events that unfold over time and the relative position of each action on the event timeline. Thus, whereas synchrony focuses on temporal alignment, strategic sequencing can be thought of as temporary asynchronicities.

Notable examples of sequencing studies have appeared in competitive dynamics literature discussing how the timing of competitive actions and responses of industry rivals influence firms' competitive advantage and survival (Schumpeter, 1934; Smith et al., 1992; Smith Ferrier, & Grimm, 2001). The prevalent notion in this stream of research is that early movers can preempt market opportunities by building relationships with customers early on and outperform competition by securing superior resources before their value is understood by rivals (Sarkar, Cavusgil, & Aulakh, 1999; Spender, 1996; Lieberman & Montgomery, 1988; 1998). Such actions endow first moving firms with monopoly advantages that are temporary up to the point that they give rise to the response of rivals (Nelson & Winter, 1982; Porter, 1980).

This representation of the competitive interaction between rivals shows a close interrelation between sequencing and pacing (Boyd & Bresser, 2008) and would suggest that when it comes to the timing of competitive interaction, the faster, the sooner, the better. Indeed, numerous studies, in one way or another, attribute the positive performance implications of speed to the competitive advantages that emanate from early mover advantages (Lieberman & Montgomery, 1988, 1998). The conventional logic here is that speedy decision-making and action enables fast adoption of successful new products, business models, and efficiency-gaining process technologies (Baum & Wally, 2003).

Davis, Eisenhardt, and Bingham (2009: 441), for instance, argued that high-velocity environments in particular, provide managers with many high-payoff opportunities and that

“[b]y acting quickly, executives can secure a larger number of these superior payoffs for a longer time and so achieve high performance. In contrast, by acting slowly, executives are likely to secure fewer opportunities and to exploit them for less time, leading to low performance.”

However, empirical findings on the contingencies and outcomes of innovation speed are limited (Kessler & Bierly, 2002) and have yielded mixed results (Chen, Reilley & Lynn, 2005). While some studies have shown a positive relationship between the speed and performance of new product development (e.g. Kessler & Bierly, 2002), others found no association or indicated that speed is not always better on the basis that increasing innovation speed may undermine innovation quality and cost (e.g. Cooper & Kleinschmidt, 1994; Crawford, 1992; Meyer & Utterback, 1995).

In a similar vein, the question what constitutes an appropriate timing strategy seems equally intricate. Whereas early empirical studies led to a notion that early-mover advantages are ubiquitous (Schrerer, 1985; Golder & Tellis, 1993: 158), contradictory evidence of early-mover disadvantages soon followed. Research focusing on the advantages associated with later-mover strategies has shown that early mover behavior is “no guarantee for success” (Sandberg, 2001: 3) and points out potential benefits of delayed action (e.g. Boyd & Bresser, 2008; Cho, Kim, & Rhee, 1998; Shamshie, Phelps, & Kuperman, 2004; Shankar, Carpenter, & Krishnamurthi, 1998). Latecomers may, for instance, free ride on the investments made by early movers and learn from their mistakes to leapfrog and introduce improved emulations at lower costs. Thus, despite a substantial body of research, the existence of early mover advantages remains elusive (Christensen & Bower, 1996, Franco et al., 2009; Suarez & Lanzolla, 2007).

In sum, inconsistent findings in the broader research area suggest that neither high speed nor early timing is necessarily better (e.g. Chen, et al., 2005; Ittner & Larcker, 1997). Rather, organizational adaptation to environmental change may include both proactive and reactive approaches to pacing and timing (Gersick, 1994; Hrebiniak & Joyce, 1985; Miles & Snow, 1978; Smith & Cao, 2007). Critical gaps exist in

our understanding of the appropriateness of these approaches, as well as in our knowledge of the associated antecedents, mechanisms, and contingent outcomes. The studies in this dissertation are designed to address these issues using a multi theoretical, multi-level, and multi-methodological approach.

This PhD dissertation aims to advance understanding of the antecedents, contingencies, and outcomes of strategic timing in the domain of strategic entrepreneurship

1.3 Dissertation Overview

To address the aforementioned research aim, this dissertation is structured as follows. The present introductory chapter is followed by four chapters (2-5), each comprising a self-contained empirical study, and a general discussion of the findings and broader implications for existing literature and future research in strategic entrepreneurship (chapter 6).

The four studies uniquely link to the overall research topic of strategic timing and proactiveness yet can be seen as separate research papers with their own research questions, theoretical review and development, research design, data, methodology, and implications. In the following paragraphs, I provide a short summary of each research paper and an overview of the topics, theoretical lenses, methods, unit of analysis, sample, and data source overview of the tested hypotheses (see Table 1.1–Table 1.4).¹ Finally, Table 1.5 presents an overview of the specific literature gaps addressed by each study and the respective contributions made in this dissertation

1.3.1 Study one: Temporal fit: Aligning internal and external rates of change

In the first study, “Strategic Renewal over Time: The Enabling Role of Potential Absorptive Capacity in Aligning Internal and External Rates of Change,” we focus on firm-environment co-alignment in terms of internal and external rates of change. While the fit between the firm and its environment has long been considered as crucial for superior

¹ To reflect the valuable contribution of my supervisors and other co-authors, I will use “we” instead of “I” from here on.

firm performance and long-term survival in contingency theory (Donaldson, 2001; Miles & Snow, 1978; Venkatraman & Camillus, 1984), there is a paucity of research concerned with fit in terms of rates of change (Pérez-Nordtvedt, et al., 2008).

In line with the knowledge-based view of the firm and literature on absorptive capacity (Cohen & Levinthal, 1990), we develop a framework linking potential absorptive capacity – the ability to identify and acquire new external knowledge – to the degree of alignment. We empirically test our hypotheses on a unique longitudinal data set comprising 465 strategic renewal actions of Royal Dutch Shell plc. between 1980 and 2007, collected from annual reports and other archival sources. Using a cluster analysis to identify periods of low, medium, and high potential absorptive capacity, our findings suggest that Shell was better able to align the (internal) rate of strategic renewal actions to the external rate of change in the oil price during periods of relatively high potential absorptive capacity. Moreover, our results indicate that during these periods of relative alignment the company managed to achieve higher market shares than during periods of relative misalignment.

Table 1.1 Theoretical and methodological underpinnings of study one

Topic:	Antecedents and outcomes of temporal alignment
Outcome:	Co-alignment of internal and external rates of change
Predictor:	Potential absorptive capacity
Theoretical lenses:	<ul style="list-style-type: none"> • Contingency theory • Knowledge based view
Method:	<ul style="list-style-type: none"> • Content analysis • Cluster analysis
Unit of analysis:	Single case study of Royal Dutch Shell plc.
Sample:	Strategic renewal actions between 1980-2007
Data source:	Company annual reports, Thomson One Banker, various other sources

1.3.2 Study two: Leveraging exploratory and exploitative innovation in dynamic environments: The role of proactive strategic behavior

In Study two, “Leveraging Exploratory and Exploitative Innovation in Dynamic Environments: Performance Implications of Proactive Strategic Behavior,” we take a

closer look at the performance implications of strategic timing in the context of strategic renewal efforts. The focus is on the role of proactiveness, which is the strategic orientation to act ahead of competition rather than merely reacting to it (Lumpkin & Dess, 1996; Venkatraman, 1989). Proactiveness reflects timing in the sense that proactive firms are inclined to temporally pre-empt competitors by being relatively early – though not necessarily the first – to develop and introduce certain products, processes, and technologies. Our focus is on advancing current understanding of the appropriateness of exploratory innovation and exploitative innovation under different degrees of environmental dynamism.

Table 1.2 Theoretical and methodological underpinnings of study two

Topic:	Performance outcomes of configurations between exploratory/exploitative innovation, proactiveness and environmental dynamism
Outcome:	Firm performance
Predictors:	Exploratory innovation, exploitative innovation
Moderators:	Proactiveness, environmental dynamism
Theoretical lenses:	<ul style="list-style-type: none"> • Contingency theory • Strategic entrepreneurship • First mover advantage theory
Method:	<ul style="list-style-type: none"> • Survey • Moderated multiple regression analysis with lagged dependent variable
Unit of analysis	Firms
Sample:	Cross-industry sample of 268 Dutch firms
Data source:	Erasmus competition and innovation monitor 2007-2008

The existing literature claims that adaptation efforts in dynamic environments should focus on exploratory innovation rather than exploitative innovation (e.g. Jansen, Van Den Bosch & Volberda, 2006; He & Wong, 2004). More recently, the universality of this environmental contingency effect has become a source of discussion (Posen & Levinthal, 2011). In the present study, the degree of proactiveness is proposed as a key boundary condition influencing whether firms can benefit from exploratory and

exploitative innovation in more or less dynamic environments. The conceptual framework proposes a configurational approach where proactiveness, innovation type (exploratory and exploitative innovation), and environmental dynamism jointly affect firm performance. Building on lagged survey data from 268 executive directors of Dutch firms, moderated multiple regression analysis reveals that in dynamic environments, investments in exploratory innovation are more likely to benefit firm performance when combined with a proactive approach while such investments without proactive strategic behavior may be detrimental to firm performance. Moreover, contrary to our expectation, results indicate that firms can indeed benefit from exploitative innovations in dynamic environments when a more reactive approach is taken.

1.3.3 Study three: Determinants of proactive strategic behavior

In the third study, “Determinants of Proactive Strategic Behavior: A Configurational Approach to Employee Job Autonomy, Internal Cooperation and Environmental Dynamism,” we focus on the drivers of proactive strategic behavior. While proactiveness is a central concept in existing literature on strategic entrepreneurship, research on its antecedents is surprisingly limited. A plausible explanation is that much of the previous research has incorporated proactiveness as a key dimension of the Entrepreneurial Orientation (EO) construct (Covin & Slevin, 1989; Lumpkin & Dess, 1996), and that the majority of EO research studies its antecedents and consequences as a unified construct (Rauch et al., 2009). A second gap addressed in this study is that while research on proactive behaviors within organizations has burgeoned, insights developed in this domain remain largely detached from literature on the firm level of analysis.

In order to address these two gaps, the second study aims to develop an understanding of the micro-dynamics of firm proactive strategic behavior. We develop a contingency framework building on work design theory and empirically investigate to what extent configurations of employee job autonomy, internal cooperation, and environmental dynamism influence the degree of proactiveness. In line with our main hypothesis, results from our moderated multiple regression analysis of data collected from 743 Dutch firms suggest that employee job autonomy positively influences proactive strategic behavior. Moreover, our findings indicate that in dynamic environments, this

relationship is enhanced in a social context of low internal cooperation. In contrast, in more stable environments, employee job autonomy is more positively related to proactiveness when internal cooperation is high.

Table 1.3 Theoretical and methodological underpinnings of study three

Topic:	Antecedents of proactive strategic behavior
Outcome:	Proactive strategic behavior
Predictors:	Employee job autonomy
Moderators:	Internal cooperation, environmental dynamism
Theoretical lenses:	<ul style="list-style-type: none"> • Work design theory • Contingency theory • Entrepreneurial orientation / Strategic entrepreneurship
Method:	<ul style="list-style-type: none"> • Survey • Moderated multiple regression analysis
Unit of analysis	Firm-level measurement of individual, interpersonal, and firm-level constructs.
Sample:	Cross-industry sample of 743 Dutch firms
Data source:	Erasmus competition and innovation monitor 2009

1.3.4 Study four: Strategic timing and cost reduction from offshoring

In the fourth and final study, “Strategic Timing in International Sourcing: A Multilevel Analysis of Cost Reductions in Offshore Operations,” the perspective shifts to the implications of timing in the context of international sourcing, or offshoring (moving business processes outside of the company’s national borders in support of global business operations). While previous studies have emphasized the importance of timing in the international business literature, this body of work has focused strongly on the antecedents and performance outcomes of market-side dynamics of strategic timing such as performance effects of market entry timing (Mascarenhas, 1997; Pan, Li & Tse, 1999). Our study aims to extend this existing body of work by focusing on the role of timing as it relates to *resource-seeking* objectives in the international business context.

To this end, we investigate to what extent early versus late timing affects the degree of achieved cost-savings in offshore operations aimed at cost reduction. A multi-level

framework is proposed in which the knowledge intensity of the offshore activity and firm experience within and across geographical regions are investigated as moderators of the timing-cost-saving relationship. Hierarchical Linear Modeling (HLM) regression analysis of cross-industry, multi-region data of 639 offshoring activities nested in 214 firms provides evidence of an early mover cost advantage in offshoring activities with low knowledge intensity. Our findings further show that the positive effect of early timing on cost reduction is moderated by the depth of prior experience in the host region, but not by prior experience in other regions.

Table 1.4 Theoretical and methodological underpinnings of study four

Topic:	Early vs. late mover cost saving advantage in offshoring
Outcome:	Cost saving
Predictors:	Timing strategy (lag)
Moderators:	Knowledge intensity, geographical experience depth and breadth
Theoretical lenses:	<ul style="list-style-type: none"> • Internationalization theory • First mover advantage theory
Method:	<ul style="list-style-type: none"> • Survey • Hierarchical Linear Modeling
Unit of analysis	Multilevel: - Offshoring project level - Firm level.
Sample:	639 offshoring activities in 214 firms
Data source:	Offshore Research Network database (2006-2008)

Table 1.5 Gaps addressed in this dissertation and intended contributions

Study	Gap(s)	Main contributions
1. Enabling role of PACAP in aligning internal and external rates of change	<ul style="list-style-type: none"> Existing research suggests that long-lived firms align internal and external rates of change yet empirical evidence and understanding of drivers of such alignment is limited. 	<ul style="list-style-type: none"> Examining the degree of temporal fit between internal and external rates of change in a long-lived firm Assessing the role of potential absorptive capacity as driver of temporal alignment.
2. Leveraging exploratory and exploitative innovation in dynamic environments: Performance implications of proactiveness	<ul style="list-style-type: none"> Existing research on merit of exploratory vs. exploitative strategic adaptation to environmental change is inconsistent. Role of strategic timing as contingency factor is under researched. 	<ul style="list-style-type: none"> Introducing the notion of strategic timing to the exploration-exploitation framework. Extending the environmental contingency perspective on exploratory and exploitative innovation.
3. Determinants of proactive strategic behavior: The role of employee job autonomy, and moderating effects of internal cooperation and environmental dynamism	<ul style="list-style-type: none"> Literatures on proactive strategic behavior on the firm level and proactive behaviors on the individual level of analysis have developed independently with scant integration and cross-fertilization. Understanding of micro-dynamics of proactive strategic behavior is limited. 	<ul style="list-style-type: none"> Advancing integration between individual level and firm level proactive behaviors by linking proactive behaviors at the individual and firm level. Advancing environmental-contingency perspective on the structure-performance relationship.
4. Strategic timing in international sourcing: A multilevel analysis of cost reductions in offshore operations	<ul style="list-style-type: none"> Extant research in (international) timing of market entry focuses on market-side dynamics Role of strategic timing in the context of offshoring and cost savings is underexplored 	<ul style="list-style-type: none"> Investigating supply-side dynamics of strategic timing. Introducing strategic timing to offshoring literature. Developing understanding of the role of prior offshoring experience and knowledge intensity of offshore operations in cost savings.

Chapter 2. Strategic Renewal Over Time: The Enabling Role of Potential Absorptive Capacity in Aligning Internal and External Rates of Change¹

Abstract

Top managers of multinational corporations are increasingly confronted with an accelerating rate of change in the external environment. Yet strategic renewal literature has devoted limited attention to the organizational mechanisms enabling firms to align internal with external rates of change, so as to achieve a dynamic firm-environment fit over time. This paper addresses that gap by taking a knowledge-based perspective. We develop a framework clarifying how a firm's potential absorptive capacity enables it to align internal with external rates of change. We illustrate the framework empirically by analyzing the rate of change in strategic renewal actions of Royal Dutch Shell as an indicator of the company's internal rate of change in the period 1980-2007, and by comparing it with external rates of change in the oil industry over the same period. The findings show that Shell's potential absorptive capacity was positively related to the alignment of internal and external rates of change. In addition, we find evidence that the degree of alignment was positively related to the company's performance during the observation period. Our study implies that managers who are aiming to align internal and external rates of change over time should: 1) monitor external rates of change through environmental scanning and boundary spanning, 2) create shared understanding of the long-term implications of change, 3) identify drivers of internal rates of change and understand how to pace the rate of strategic renewal actions, and finally, 4) maintain baseline levels of potential absorptive capacity, since increasing potential absorptive capacity takes time and requires a long-term perspective.

¹ This study is in press as: S. Ben-Menahem, Z. Kwee, H. Volberda and F. Van den Bosch. 2012. Strategic Renewal Over Time: The Enabling Role of Potential Absorptive Capacity in Aligning Internal and External Rates of Change. A Longitudinal analysis of Royal Dutch Shell (1980-2007). *Long Range Planning*.

2.1 Introduction

An enduring perspective in strategy research is that to survive over time, organizations need to be aligned with their environment (Venkatraman and Camillus, 1984; Venkatraman & Prescott, 1990; Cohen & Levinthal, 1990; Zajac et al., 2000). This suggests that organizations may best match their internal strategic renewal to opportunities and threats arising in their external environment. Underlying this notion is a rich debate about whether organizations can self-renew in order to sustain such a dynamic fit over time. While one stream of research suggests that organizations are unable to change and become increasingly inert as they age and grow larger, another provides numerous examples of long-lived firms, indicating that organizations may well be able to sustain their competitive advantage in the face of change through strategic renewal (Agarwal & Helfat, 2009; Baden-Fuller & Volberda, 1997; Lewin & Volberda, 1999).

Hannan and Freeman's seminal article suggests that a resolution of these seemingly opposing perspectives should be sought in a temporal context (Hannan & Freeman, 1984). Rather than assuming that organizations fail as a result of a general inability to change when faced with environmental change, they argue that failure results from a discrepancy between the pace of organizational change and the temporal pattern of change in key environments (i.e., relative inertia). In a similar vein, Volberda & Lewin (2003), among others, suggest that organizational survival involves managing internal rates of change so that they equal or exceed relevant external rates of change (e.g., competitors, technology, customers, et cetera) (See also: Gersick, 1994; Brown & Eisenhardt, 1997; Eisenhardt, 1989; Hoyt et al., 2007; Levinthal, 1992; Williams, 1994). This notion is closely related to the concept of (tempo) entrainment, referring to the adjustment of the pace of an (endogenous) activity to match or synchronize with that of another (exogenous) activity (Ancona & Chong, 1996; Pérez-Nordtvedt, et al., 2008). Indeed, the realization that pacing rates of change is crucial for a firm's competitiveness and long-term survival is also apparent in practice. For instance, in General Electric's 2000 annual report, Jack Welch – CEO from 1981 to 2001 – writes that “when the rate of change inside an institution becomes slower than the rate of change outside, the end is in sight.”

Yet while the importance of aligning internal and external rates of change over time seems to be recognized, academic and managerial understanding of how organizations

manage this challenge remains limited (Flier et al., 2003; Kwee et al., 2008; Nadkarni & Narayanan, 2007; Pettigrew et al., 2001). For instance, a recent study by IBM involving 1,130 CEOs and public sector leaders from forty countries across thirty-two industries, signals that, while practitioners are increasingly expecting substantial changes in their environment, their ability to cope with and effectively manage these changes lags behind considerably (IBM, 2008).

This study aims to contribute to understanding of firm-environment co-alignment from a knowledge-based perspective. In line with this perspective, we present a framework to suggest that a firm's potential absorptive capacity – that is, its ability to acquire and assimilate externally generated knowledge – plays an important role in aligning the rate of its strategic renewal actions (reflecting realized absorptive capacity) with external rates of change (Zahra & George, 2002). We empirically examine our framework through a quantitative analysis of the association between Royal Dutch plc's potential absorptive capacity and the alignment of its strategic renewal actions with external changes in the oil industry between 1980 and 2007. Consistent with our framework, our findings indicate that during the observation period, Shell's potential absorptive capacity was positively related to its ability to align the internal rate of change with the rate of change in the external environment. Furthermore, we provide evidence that the degree of alignment was positively related to the company's performance during the observation period. From these results, we suggest that to increase the chances of organizational survival, managers should focus on developing and maintaining the organization's potential absorptive capacity so as to enable internal rates of change to be aligned with the rate of change in the environment. This paper is structured as follows: the next section starts with a brief review of relevant literature on firm-environment co-alignment and absorptive capacity. We subsequently develop the research framework, and present our analysis of Shell's strategic renewal actions and changes in the oil over the period 1980-2007. Finally, we discuss our findings as well as managerial implications and directions for future research.

2.2 Literature Review

2.2.1 *Strategic renewal over time: aligning internal and external rates of change*

A central notion in strategy research is that profitability, competitive advantage and long-term survival result from a dynamic fit between an organization and its environment (Drazin & Van de Ven, 1985; Miles & Snow, 1978; Venkatraman & Prescott, 1990). Two alternative theoretical perspectives can be distinguished in the body of literature which informs this notion of fit: environmental selection and organizational adaptation. A key difference between these perspectives lies in the extent to which firms are assumed to be able to renew themselves in the face of environmental change.

The environmental selection perspective posits that environmental factors determine which firm characteristics best fit the environment; firms themselves are limited to merely improving their existing routines and capabilities, which then become a source of inertia. While these routines and capabilities endow firms with a capacity to search, they also suppress attention span and limit the capacity to absorb new information because they prioritize ideas that are consistent with prior learning. Less deterministic representations of this perspective recognize that management can change firms so as to achieve a fit with their environment, yet only in response to external change (responsive fit). Moreover, from this perspective, firms are generally assumed to be unable to match the internal rate of change to temporal patterns of change in their environment (Lewin & Volberda, 1999; Hannan & Freeman, 1984).

By contrast, the adaptation perspective departs from the notion that management is incapable of overcoming rigidities and argues that strategic renewal can indeed be achieved by intentionally managing change (Child, 1972). In this view, managers actively manage the capacity to absorb new knowledge. In addition to changing strategies in response to external changes, management attempts to construct and shape the firm's environment to its own advantage. This indicates firms can behave proactively in achieving firm-environment fit (proactive fit) (cf. Eisenhardt & Martin, 2000; Nelson & Winter, 1982; Thompson, 1967).

Combining these environmental selection and adaptation perspectives, we argue that strategic renewal over time requires that a firm's rate of strategic renewal actions

remains co-aligned with the pace of change in the external environment over time. Surprisingly, however, this temporal dimension of strategic renewal remains under-researched. (Fine, 1998; Bourgeois & Eisenhardt, 1988; Mendelson & Pillai, 1999). Existing studies generally suggest that the rate of change in an organization's external business environment strongly influences the pace of internal operations and processes. Nadkarni & Narayanan (2007) explore the reverse causality and contend that the industry rate of change should be contemplated as a pattern of collective beliefs and aggregate actions of individual organizations. In accordance with Volberda & Lewin (2003); Flier et al. (2003) rather suggest that internal and industry rates of change co-evolve.

Furthermore, existing empirical studies have focused mainly on the speed and frequency of product and service innovations rather than giving fuller consideration to organization-wide strategic renewal actions (See for example: Eisenhardt & Tabrizi, 1995; Helfat & Raubitschek, 2000; Kessler & Chakrabarti, 1996; Smith et al., 2005; A notable exception is: Nadkarni & Barr, 2008). As a result of these gaps, our understanding of the relationship between a firm's internal rate of renewal (in terms of its realized strategic renewal actions) and external rates of change over time is limited. Moreover, it remains unclear which organizational mechanisms enable firms to achieve a dynamic fit between both rates of change, and how alignment influences firm performance. We argue that addressing these issues is essential for advancing managerial and academic understanding of how organizations are to cope with the challenge of increasing rates of environmental change.

2.2.2 *Absorptive capacity*

Research on strategic renewal has highlighted the importance of organizational learning as a process of incorporating new knowledge into a firm's existing operations (Beer et al., 2005; Crossan & Bedrow, 2003; Crossan et al., 1999; Fiol & Lyles, 1985; Huber, 1991). For instance, in an acclaimed study of long-lived organizations, Arie de Geus, a former planning director at Royal Dutch Shell, identifies organizational learning and sensitivity to the organization's business environment as being key drivers of self-renewal in long-lived firms (De Geus, 1999). In a similar vein, Cohen & Levinthal (1990; 1994) argued that absorptive capacity – which they define as the ability of a firm to

recognize the value of new, external information, assimilate it, and apply it to commercial ends – plays a crucial role in a firm’s overall ability to renew its competences, and is therefore an important factor for adapting to environmental change and sustaining competitive advantage (see also: Lane et al., 2006). According to this notion, firms with existing knowledge in a particular field will be better able to evaluate the potential worth of new external knowledge and to utilize it.

Building on this stream of research, Zahra & George (2002) propose a conceptual distinction between potential and realized absorptive capacity. *Potential absorptive capacity* refers to a firm’s ability to identify and acquire externally-generated knowledge that is critical to its operations (i.e., acquisition of knowledge), and employ routines and processes aimed at analyzing, processing, interpreting and understanding information obtained from external sources (i.e., assimilation of knowledge). *Realized absorptive capacity* refers to the firm’s ability to develop and refine routines that facilitate combination of existing and newly acquired and assimilated knowledge (i.e., transformation of knowledge), and to leverage and commercially exploit acquired, assimilated and transformed knowledge (i.e., exploitation of knowledge).

Based on Zahra and George’s work, studies have consistently suggested that potential absorptive capacity enhances the speed and frequency of strategic renewal and increases a firm’s responsiveness to environmental change. For instance, Liao and colleagues (2003) showed that external knowledge acquisition and intra-firm knowledge dissemination are both significantly related to internal responsiveness. Their study further suggests that, as the external rate of change increases, potential absorptive capacity becomes increasingly important for responsiveness (Liao et al., 2003). Similar studies show that the effectiveness of potential absorptive capacity for innovativeness and firm performance is positively related to environmental dynamism (Jansen et al., 2005). However, these studies have not used a longitudinal approach, so far. Such an approach allows investigating how a firm’s potential absorptive capacity is associated with the alignment of rates of realized strategic renewal actions and external rates of change over time (Lane et al., 2006; Volberda et al., 2010).

2.3 Research Framework

Our framework aims to conceptualize firm-environment co-alignment over time in terms of the relationship between internal rates of change (i.e., the rates of change in realized organization-wide strategic renewal actions) and external rates of change (i.e., as happening at industry level). Seeking to align internal with external rates of change over time is consistent with the idea of Requisite Variety, also known as Ashby's Law (Ashby, 1964). In the context of organizations, requisite variety suggests that long-term survival requires that a firm's internal variety is at least as diverse as the disturbances in its environment; in other words, that the internal rate of change must match or exceed those occurring externally. Correspondingly, Tushman & Romanelli (1985) argue that "[t]he greater the rate-of-change in environmental conditions, the greater the frequency of reorientation".

How can this important challenge be met? Building on a knowledge-based understanding of organizational adaptation, we argue that a firm's ability to align internal rates of change with external rates of change is influenced by its potential and realized absorptive capacity (Zahra & George, 2002). As shown in Table 2.1, potential absorptive capacity drives a firm's ability to perceive and anticipate external change and to develop the knowledge base needed to enable strategic renewal actions. Realized absorptive capacity refers to the ability to translate relevant knowledge into strategic renewal actions, being an indicator of the internal rate of change.

Potential and realized absorptive capacity are interdependent and complementary in the sense that, in order to generate value, externally generated knowledge must not only be acquired, it must also be disseminated internally through assimilation and transformed so that it can be exploited. The higher the level of a firm's potential absorptive capacity (i.e., the more a firm becomes adept at acquiring and assimilating external knowledge), the greater the variety of interpretations and comprehensiveness of understanding within the firm. The firm thereby becomes more likely to understand and anticipate future changes (e.g., to spot the commercial potential of technological advances). This broadens the range of potential organizational behaviors aimed at exploiting opportunities that arise in the environment (Huber, 1991). Accordingly, we argue that the higher a firm's potential absorptive capacity, the more likely it is for the firm to align the internal rate of change

with external (e.g., industry) rates of change.

Table 2.1 Dimensions, knowledge processes, roles in alignment of internal rates of change (IRC) and external rates of change (ERC), and operationalization of potential and realized absorptive capacity

Dimension	Knowledge Processes	Role in IRC-ERC Alignment	Operationalization
Potential Absorptive Capacity	<ul style="list-style-type: none"> • Knowledge Identification/Acquisition Environmental search and scanning; external boundary spanning; internalizing external knowledge • Knowledge Assimilation Creating shared interpretations and understandings 	Perceive and anticipate environmental change; enable strategic renewal actions	R&D intensity (R&D expenditures divided by annual revenues)
Realized Absorptive Capacity	<ul style="list-style-type: none"> • Knowledge Transformation (Re)combining and integrating new and prior knowledge • Knowledge Exploitation Capitalizing on knowledge assets through institutionalization and application of assimilated knowledge 	Effectuate strategic renewal actions	Number of strategic renewal actions per year (annual change is the indicator of IRC)

2.4 Empirical Analysis: Strategic Renewal Actions at Royal Dutch Shell (1980-2007)

Our empirical analysis is aimed at assessing the role of potential absorptive capacity in the alignment of internal and external rates of change over time. To this end, we examine the potential absorptive capacity and realized strategic renewal actions of Royal Dutch Shell (Shell) (Exhibit 1) in relation to rates of change in the oil industry in the period 1980-2007.

Our choice of Shell and the oil industry during the period 1980-2007 as the research setting is based on two main considerations. First, as shown by Cibin & Grant (1996) in their study of the strategic and structural changes within eight of the world's largest oil companies (between 1970 and 1991), following the 1973 and 1979 oil crises, the business environment of the major oil players underwent a momentous transformation. The oil industry changed from "an unusually-benign post-war environment of growth and stability to one of stagnation, microeconomic instability, volatile exchange rates and commodity prices, increased international competition and accelerated technological change". In a related study, Grant & Cibin (1996) show that this transformation was followed by significant changes in the strategies and structures of oil companies. Shell's position as a front-runner and long-term superior performer in the oil industry (Yip et al., 2009), as well as its proven ability to renew itself in the face of external change over the course of its existence make it a particularly interesting case for our specific inquiry. Correspondingly, the selection of the period 1980-2007 is primarily motivated by the aim and the historical context of our study. As our study intends to provide insight into how Shell adjusts its internal rate of change in response to rates of change in the oil industry (and the role of potential absorptive capacity herein), we decided to focus on a period during which the oil industry was turbulent and compelled strategic actions of oil majors. The end year of our research period (2007) was a significant milestone for Shell as it celebrated its 100th year of existence.

Exhibit 1: A brief description of Royal Dutch Shell plc.

Royal Dutch Shell plc is a vertically-integrated oil company operating upstream and downstream businesses in more than one hundred countries. Its primary activities consist of the exploration, extraction and transportation of oil and natural gas, and the refinement of crude oil into fuels, petrochemicals and lubricants which it sells to industrial and private consumers worldwide. The company further operates an extensive global retail network of over 45,000 gasoline filling stations. For most of the period after its formation in 1907, Shell has been one of the world's top two oil companies. In 2009, it ranked first in the list of Fortune Global 500 companies, with over 458 billion US dollars in revenues (2008).

Following the Second World War and the energy crises in the 1970s, Shell progressively diversified its business. Due to the disappointing performance of many of these efforts, increased competition, and major shifts in the environment during the 1980s and 1990s (e.g. oil price collapse in 1986, Gulf War in 1990, Asian and Russian financial crises in 1997 and 1998),

Shell gradually retreated from its diversification and decentralization strategy. Instead, the company shifted its focus to profitability and delivering shareholder value from only two businesses: oil products and petrochemicals. Accordingly, many non-core activities were gradually disposed of in the 1990s. While many competitors engaged in large mergers and acquisitions, Shell primarily grew organically and through takeovers of smaller, local, oil firms. In 2004, a major strategic event unfolded when it became apparent that Shell had overestimated its oil reserves. As a result of this issue, Shell's shareholders voted in favor of the unification of the two parent companies Royal Dutch and Shell Transport into Royal Dutch Shell plc. This new structure was implemented with the objective of creating more transparency and streamlining control, and included the appointment of the Group's first CEO and a new Executive Committee (Van Zanden et al., 2007).

Second, Shell is widely regarded as an authority in strategic planning and is well known for its development and use of scenario planning as an organizational learning tool. Scenario planning provides Shell with the process, tools and common language to identify and cope with critical developments in the global business environment. As such, the importance of scenario planning for Shell's strategic planning process provides a suitable context for investigating the extent to which the company's absorptive capacity is likely to have an impact on its strategic renewal.

2.4.1 Data and measurement

Our dependent variable is the *degree of temporal alignment*, defined as the difference between Shell's internal rate of change and rates of change in the oil industry over a specific period. To assess this, we analyzed the development of these two measures over the period 1980-2007 using the following procedure.

First, for the *internal rate of change* (IRC) measure, we identified 465 strategic renewal actions (SRAs) over the period 1980-2007 by means of a systematic content analysis of Shell's annual reports (see Appendix A). Using explicit coding rules (see Appendix B), each action was coded along five categories following Fine's (1998) dimensions of industry and organization 'clockspeed': 1) new products and services, 2) process innovations, 3) internal venturing (e.g., business start-up and termination), 4) external venturing (e.g., mergers and acquisitions, joint ventures, alliances), and 5) organizational restructuring. Table 2.2 provides the descriptive statistics of the strategic

renewal actions. We obtained the measure for the internal rate of change by calculating the absolute value of the yearly percentage of change within each category, and subsequently averaging the rates of change across the five categories. This approach provides a more reliable measure of the rate of company-wide strategic renewal than a single-category approach in which certain categories may be over-represented.

Table 2.2 Descriptive statistics on Shell's strategic renewal actions (SRAs) 1980-2007

SRA Category	Number of SRAs	% of total SRAs
New products and services	87	18.7%
Process innovation	76	16.3%
Internal venturing	138	29.7%
External venturing	112	24.1%
Organizational restructuring	52	11.2%
Total	465	100.0%

As a measure for external rate of change (ERC), we assessed the rate of change in the price of crude oil. This choice is based on two important characteristics of the crude oil price: its reflection of changes in Shell's general and task environment (Bourgeois, 1980), and its direct and indirect effects on the company's strategic decisions and profitability.

The first characteristic, oil price as a reflection of changes in the general and task environment of Shell and other oil companies, can be explained by the fact that crude oil is a largely undifferentiated commodity; its price is formed by global supply and demand as well as anticipated changes herein. The demand for oil is primarily driven by economic growth in oil-consuming nations as economic growth is closely tied to increases in energy demand. On the supply side, crude oil prices are largely influenced by the production capacity of OPEC members, which together produce 41% of the world's crude oil and possess roughly 77% of proven reserves. Considering the tight linkage between supply and demand and uncertainty regarding the growth and sustainability of reliable sources of supply, world crude oil prices are influenced by actual and threatening disruptions in supply and changes in the global economy. Historically, the price of crude oil also reflects political crises in oil-producing regions, such as the Iran/Iraq War (1980), the Kuwait Invasion and Gulf War (1990) and the Iraq War (2003). Not only does the oil price reflect

political turbulence but it also reflects financial and economic crises in oil-consuming regions, such as the Asian and Russian Financial Crisis (1997/1998) and the economic recession of the late-2000s that caused rapid and significant changes in the price of oil. Grant and Cibin argue that the increased turbulence in the oil industry after 1980 was “indicated most clearly by the increased volatility of the price of crude oil. This volatility increased sharply after 1980, when the price determination power first of the oil majors, and second of OPEC, gave way to market-determined prices.” (Grant & Cibin, 1996: 169).

Second, in addition to reflecting key geopolitical, socio-economic and competitive developments in Shell’s environment, the price of crude oil also has an important direct influence on the company’s strategic decisions and overall profitability. The primary raw material input for refined oil products (e.g., gasoline) and petrochemicals (e.g., plastics products), crude oil is one of Shell’s key resources. Rising prices increase the profitability of upstream petroleum exploration and production, and decrease the profitability of downstream oil-refining and petrochemical production. As such, the price of crude oil has important implications for deciding which strategic renewal actions to pursue—including, for instance, the exploration of sources, refining capacity and location of production units—as well as for the organization’s overall performance (Adner & Helfat, 2003; Grant & Cibin, 1996). In his analysis of corporate change and adaptation in the oil industry, Davis argues that this high rate of change and volatility of the crude oil price after the 1970s was a key driver of the restructuring in the oil industry in the 1990s (Davis, 2006). During this period, several large oil companies consolidated (e.g., Exxon-Mobil, 1999; BP-Amoco, 1999; Chevron- Texaco, 2001) and underwent internal restructuring.

To validate the rate of change in oil price as a measure for the external rate of change, we compared this measure with the volatility of the combined net sales of the six largest oil companies. Volatility was calculated using a variation of the environmental volatility measure developed by Dess & Beard, 1984 (see Bergh & Lawless, 1998; Nadkarni & Barr, 2008). It is calculated by regressing a variable for each year on a variable for net industry sales. Volatility for each year is estimated using the net industry sales from the preceding five years. Thus, net industry sales from 1977 through 1981 are used to predict volatility in 1982. The regression equation is: $y_t = b_0 + b_1t + a_t$, where y = industry sales, t = year, and a = residual. Volatility was the standard error of the regression

slope coefficient divided by average sales. Larger values indicate greater environmental volatility. Net industry sales were calculated as the total sales of the six largest oil companies: Royal Dutch Shell, ExxonMobil, BP, ConocoPhillips, Chevron Corp, and Total SA. The environmental volatility measure and the ERC measure are positively and significantly correlated ($r = .536, p < .01$), indicating that the rate of change in the oil price is an appropriate proxy for capturing important changes in Shell's external environment.

Following earlier studies, we use as our indicator of potential absorptive capacity the organization's research and development (R&D) intensity, calculated on the basis of annual R&D expenditures divided by annual revenues (Cohen & Levinthal, 1990; Eggers & Kaplan, 2009; George et al., 2001; de Jong & Freel, 2010; Tsai, 2001; Zahra & George, 2002). Data on R&D expenditure was collected from Royal Dutch Shell's annual reports and Thomson One Banker. R&D expenses represent direct and indirect costs relating to the creation and development of new processes, techniques, applications and products with commercial possibilities, and can be categorized as basic research, applied research and development costs of new products. The costs exclude customer- or government-sponsored research or contributions by government, customers, partnerships or other companies to Shell's research and development expense. This approach is based on the notion that the relative spending on R&D reflects Shell's effort to renew its knowledge base and keep up with technological developments in the external environment. As technology is a core factor in the company's operations, R&D investments enhance Shell's knowledge base by stimulating the recruitment of new talent, increasing understanding of developments in the external environment, and inducing learning by doing (Cohen & Levinthal, 1990; George et al., 2001).

Considering that potential absorptive capacity is a function of prior related knowledge, the level of potential absorptive capacity in a certain year was measured as a function of the average R&D intensity in the past three years (i.e., three-year moving average). Thus, in line with Dierickx & Cool's argument that "[i]t takes a consistent pattern of resource flows to accumulate a desired change in strategic asset stocks" (1989: 1506), investments (i.e., knowledge flows) in potential absorptive capacity over a given period are used to gauge the level (i.e., knowledge stock) of potential absorptive capacity. We further discuss our use of R&D intensity as an indicator of potential absorptive

capacity in Appendix C.

2.4.2 *Analysis and results*

To investigate the relationship between potential absorptive capacity and the ability to align internal and external rates of change, we assessed changes in potential absorptive capacity, internal rate of change (IRC), external rate of change (ERC), and their difference (IRC-ERC). We also explored the rate of change of each of the five strategic renewal categories for the period 1980-2007. A significant positive correlation is found between the level of potential absorptive capacity and the alignment of internal and external rates of change (IRC-ERC) ($r = .47, p < .05$), while there was no significant direct relationship between potential absorptive capacity and the separate measures for internal rate of change ($r = .34, n.s.$) and external rate of change ($r = -.31, n.s.$). This result provides initial support for our proposed positive relationship between potential absorptive capacity and the degree of alignment between internal and external rates of change.

To probe this finding further, we first divided the observation period into four distinct sub-periods. These periods were identified through a cluster analysis in which each year is allocated to one of three clusters, representing relatively low, medium and high levels of potential absorptive capacity (PAC). While cluster analysis has been a popular and important tool in strategy research, some controversy surrounds the technique (e.g. Barney and Hoskisson, 1990; Meyer, 1991). We followed the suggestions of Ketchen and Shook (1996) to address some major concerns related to cluster analysis.

Following Ketchen & Shook (1996), a two-stage procedure was used to define the number of clusters and cluster membership of each year, based on the level of potential absorptive capacity. As a first step, we used the average linkage procedure – a hierarchical agglomerative cluster algorithm that calculates the average similarity (Euclidean distance) of all elements in one cluster with all elements in another – so as to select the number of clusters and profile cluster centroids. A three-cluster solution was chosen based on inspection of the dendrogram, the increase in the value of coefficient from a three-cluster solution to a two-cluster solution, and the conceptual clarity that results from three clusters representing low, medium and high levels PAC.

Using the results of this analysis as a starting point, we next performed a *k*-means

cluster analysis to determine cluster membership. This procedure iteratively assigns each year to the cluster whose centroid (i.e. the average level of PAC of all years in the cluster) is nearest. The cluster solution yielded four consecutive periods associated with either a (relatively) low, medium, or high level of PAC. Cluster membership was distributed as follows: 1980-1985 – medium PAC, 1986-1994 – high PACAP, 1995-2000 – medium PAC, 2001-2007 – low PAC. The reliability of this cluster solution was subsequently confirmed by repeating the entire procedure using Ward's method as an alternative algorithm.

Table 2.3 presents the four periods with the associated level of potential absorptive capacity. Subsequently, we compared the relative level of potential absorptive capacity for each of the four periods with the difference between the average internal and external rates of change (IRC-ERC). During the first period (1980-1985) Shell's average R&D intensity was 0.65%, corresponding to a medium level of potential absorptive capacity. Notably, the end of this period and the start of the second period (1986-1994) coincide with the oil price collapse of 1986. During this second period the average R&D intensity rose to 0.84%, the highest level in our observation period. The third period (1995-2000) showed a steady decline in R&D expenditure, lowering the average R&D intensity to 0.49%. This decline continued during the fourth period (2001-2007) to an overall low of 0.26%. Thus, in sum, our quantitative proxy for Shell's potential absorptive capacity evolved from medium to high over the first two periods and steadily declined from medium to low in the last two periods (i.e. in relative terms).

Figure 2.1 shows that, in the first three periods, the pattern of Shell's internal rate of change closely resembled the pattern of the external rate of change. This finding corresponds with previous studies which show that Shell employed a decentralized, market-responsive strategy and structure from the mid-1970s well into the early 1990s, which enabled it to accommodate environmental changes through timely adaptation (Grant & Cibin, 1996; Cibin & Grant, 1996).

As summarized in Table 2.3, the internal rate of change exceeded the external rate of change only in the second period of our study (1986-1994). Notably, this was the only period during which our measure for potential absorptive capacity was high relative to the other three periods. Moreover, the period with the lowest level of potential absorptive

capacity (2001-2007) was also found to be the one with the largest (negative) difference between the internal rate of change and the external rate of change. In other words, during the early years of the 21st century, Shell seems to have been less adept at aligning the internal rate of change to the rate of disruptive changes in its environment.

Table 2.3 Overview of results by period

Period ^a	Average R&D Intensity	Potential Absorptive Capacity ^b	Average SRAs per year	Average Internal Rate of Change (IRC)	Average External Rate of Change (ERC)	Difference IRC-ERC ^c
1980-1985	0.65%	Medium	14.2	17.4%	19.3%	-1.9
1986-1994	0.84%	High	19.4	14.0%	10.5%	3.5
1995-2000	0.49%	Medium	18.2	5.9%	7.9%	-2.0
2001-2007	0.26%	Low	13.7	8.7%	21.2%	-12.5

^a Based on cluster analysis of potential absorptive capacity, see Appendix B

^b Relative to other periods between 1980-2007

^c Percentage points

Figure 2.1 Internal and external rates of change, potential absorptive capacity and market share

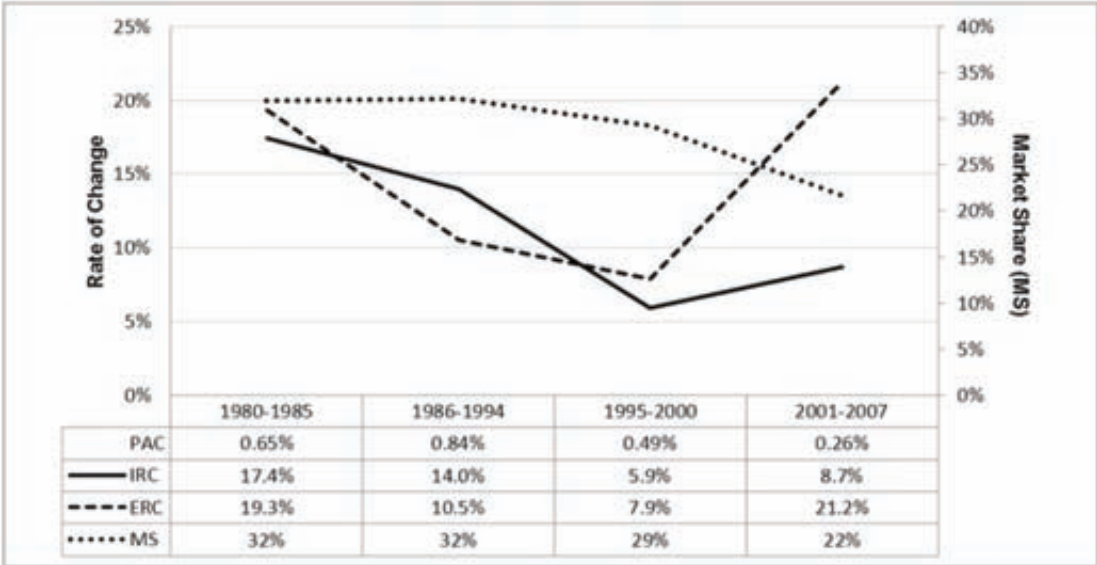


Exhibit 2 briefly illustrates key developments in Shell's external environment, internal alignment, and potential absorptive capacity for two critical periods. The 1986-1994 period stands out as the only period with a high potential absorptive capacity and a high degree of alignment. The 1995-2000 period reflects important developments leading up to a decline in Shell's potential absorptive capacity that extended into the final period included in our observation.

Exhibit 2 Environmental Change and Shell's Potential Absorptive Capacity

1986-1994 (period with high degree of alignment)

In 1986 the supply of oil had outstripped demand to such an extent that the OPEC cartel was no longer able to keep the price up. The result was a dramatic drop in the oil price. A 1985 study by Shell's scenario planning department on the effects of an 'Oil Price Collapse' scenario, commissioned by the Committee of Managing Directors, indicates that Shell had anticipated this event early on. The use of scenario-based planning served two important purposes. First, it increased the company's perceptiveness and understanding of the implications of events in its environment. Second, it served as a communication and leadership tool which helped to create a shared interpretations and understandings within the organization. Consequently, Shell was able to act quickly when the oil prices fell by halting a number of costly exploration projects and reducing the cost of oil production operations. Rather than cutting back on R&D expenditures, Shell reallocated these expenses to enhance the development of new technological solutions. These include three-dimensional (3D) seismic surveys used to improve insights in underground rock formation and reservoir behavior, and the development of other innovative technologies such as coal gasification, a technology first commercialized in 1993 and which continues to be an important pillar in Shell's technological portfolio. Thus, instead of focusing on incremental extensions of the current business in the old order, Shell's strategy was directed at creating potential to build new capabilities and seize new opportunities. This enabled the company to leapfrog competitors and proactively shape its environment, and contributed greatly to its success in weathering the turbulent 1980s.

A senior manager at Shell reflected upon the developments in this period as follows:

“During the 1986 oil crisis, Shell decided that it had to be more proactive and radical in creating a new path to our existing competences than it had to be when the industry was more stable. So we decided that at that time besides focusing on oil exploration and production, we worked on a number of innovative ideas, such as coal gasification, which was organized by Shell Research. At the end, that initiative surpassed everyone's expectations and helped propel us to race ahead of the competition.” (Interview with a senior manager of Shell, 3 October 2007).

1995-2000 (period with decreasing level of potential absorptive capacity)

In the mid-1990s, diversified oil majors faced increasing pressure from shareholders and the effects of globalizing markets. In addition to these pressures, the business environment was characterized by a long period of low oil prices, an increase in productivity as a result of computer technology, and increased possibilities for outsourcing. During this period, Shell's managers increasingly faced pressures to maximize shareholder value. To this end, top management implemented three strategies: improving operations through cost and overhead reductions, increasing leverage in the capital structure, and divesting assets that contributed only marginally to shareholder value. The increasing pressure from shareholders led to a major restructuring at Shell during which a large number of employees were laid off, including staff in R&D functions. Sluyterman (2007, p.288) comments that:

“(…) it was expected that staff members [of Central Offices] could be reduced by 30 per cent. (...) By the end of 1995, 500 of the planned 1,400 job losses had already been achieved through transfers and natural turnover, but 900 more had to follow. In February 1996 the staff of central offices had been reduced by nearly 27 percent. More than a quarter of the staff had been made redundant. This was a drastic measure with far-reaching consequences. In a short period of time a great deal of experience left the organization.”

After 1993, expenditures on research were reduced significantly. By 2000, it was nearly half what it had been ten years earlier, indicating a sharp decrease in the company's potential absorptive capacity.

To empirically investigate our assumption that a temporal difference between internal and external rates of change is associated with lower *firm performance*, we

analyzed Shell's market share as an indicator of its performance relative to its main competitors (i.e. ExxonMobil, BP, ConocoPhillips, Chevron Corp, and Total SA). Using market share is particularly appropriate for our study because it enables us to assess Shell's performance over time irrespective of industry size, oil price developments, and inflation. The significant positive correlation between Shell's market share and our fit measure (IRC-ERC) ($r = .419, p < .05$) shows (see Figure 2.1) that the company's market share was higher when the internal rate of change approached or exceeded the external rate of change (i.e. 1980-2000) than when the internal rate of change was notably lower than the external rate of change (i.e. 2001-2007). We also used gross profit margin deflated for GDP as an alternative performance measure with similar results. These results suggest that the degree of alignment between internal and external rates of change is indeed associated with Shell's performance for the observation period.

2.5 Discussion

Keeping up with the rate of change in the environment is an important condition for firm survival in a fast changing world, and as such, a key challenge for today's business leaders. Yet few studies have investigated this temporal dimension of strategic renewal. Consequently, understanding of how firms align the rate of strategic renewal actions (i.e., internal rate of change) and the external rate of change over time remains limited. Drawing on both adaptation and selection theories, we developed and tested a framework to address this gap in the literature. We argue that a firm's absorptive capacity is a key mechanism underlying the alignment of internal and external rates of change. Accordingly, we conjecture that the higher a firm's potential absorptive capacity (i.e., its ability to identify and assimilate external knowledge), the more likely it will be able to adjust the rate of strategic renewal actions to the environmental rate of change.

Using unique data of strategic renewal actions of Royal Dutch Shell over a period of twenty-eight years (1980-2007), our findings support our conceptualized role of potential absorptive capacity in aligning internal rates of change with external rates of change. Moreover, the results provide evidence for the widely-held, (Volberda & Lewin, 2003) but rarely tested, assumption that alignment of internal and external rates of change over time is associated with high firm performance. In the remainder of this section we

discuss how these findings contribute to managerial and scholarly understanding.

2.5.1 Managerial implications

This study highlights that regulating internal rates of change to match or exceed external rates of change over time is a key managerial challenge that is significantly related to performance. The empirical analysis shows that this challenge requires a focus on developing the firm's potential absorptive capacity. Based on these findings, we highlight four key implications for those managers aiming to sustain strategic renewal over time (see Table 2.4).

First, when aligning internal and external rates of change over time, managers need to monitor rates of change in their firm's external environment, i.e., to determine how volatile the business environment is. In order to do so, managers need to continuously develop routines, capabilities and measures for monitoring, scanning and tracking rates of change in the firm's environment (e.g., how frequently competitors are instigating new process and product improvements, changes in clients' expectations, et cetera).

Table 2.4 Implications for managers

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- Monitor external rates of change through environmental scanning and boundary spanning to assess the volatility in the business environment.
 - Create shared understanding of long-term implications of change.
 - Identify drivers of internal rates of change and understand how to pace the rate of strategic renewal actions.
 - Maintain baseline levels of potential absorptive capacity; understand that increasing potential absorptive capacity takes time and requires a long-term perspective.
-

In the case of Shell, such managerial efforts can be seen in the company's early attention to the rate of change in demand by oil consumers in relation to the supply by its competitors and OPEC members as well as in its consideration of environmental issues in the late 1980s. A relevant example at Shell pertains to the use of scenario planning (e.g., 'Oil Price Collapse' scenario in Exhibit 2) which proved instrumental in stretching managers' and staff's cognitive boundaries, enabling them to think beyond customarily identified and known situations. By analyzing different possible scenarios, the Shell

planners helped managers to be mentally prepared for a shift from low prices to high prices and from stability to instability (and vice versa). Second, to align internal and external rates of change, we suggest that managers should avoid a natural tendency to focus on incremental extensions of the current business. Instead, managers must create a shared understanding of the necessity to focus on long-term implications of change. This means that managers stress strategies that require longer time horizons. Third, to seize new opportunities and leapfrog competition, managers must first identify and understand the drivers of internal rates of change (e.g., organizational culture, employee engagement, stock of experience) and pace the rate of change accordingly. This leads on to our fourth managerial implication. It is easier to pace rates of change once an organization has developed and maintained a baseline level of knowledge of its environment and has acquired (technological) knowledge that can potentially be exploited in the future. For a high degree of firm-environment co-alignment, managers need to accumulate existing knowledge and experiences, and to be proactive in incorporating their own insights in order to further stimulate a relevant pace of change. To this end, organizations should develop potential absorptive capacity so that they can, at the right time, introduce new processes, products and services, launch new businesses, enter new markets, and undertake other relevant strategic renewal actions. During one of our interviews with a former senior manager at Shell, how this was achieved in the company was illustrated as follows:

“As a company that has already been around for a long time, we manage our innovation strategy in two ways. First, we innovate to keep up with the current competition and second, we innovate to move towards future competition. Take the example of our first LNG project. We built our first plant in 1970s, although at that time there was no market for LNG yet. Later on, our business developers spotted a growing need for a cleaner energy source than coal in Japan. LNG fitted the bill. We then got a contract with a Japanese power company that wanted to buy LNG. As a result of this, LNG became one of the key pillars in putting us one step ahead of our competitors.” (Interview with a former senior manager of Shell, 17 September 2007).

In sum, the crucial process of aligning internal and external rates of change requires managers to carefully monitor the firm’s potential absorptive capacity over time. As potential absorptive capacity is affected by accumulated prior related knowledge, and therefore cannot be developed instantaneously, a relatively low level of potential

absorptive capacity during a certain period is likely to negatively impact future alignment of the organization with its environment when the external rate of change suddenly increases. This implies that senior managers should value existing knowledge stocks embedded within the organization, and consider how resource allocation or cost-cutting strategies affect the organization's potential absorptive capacity, and thus the organization's potential to execute strategic renewal actions at the right point in time.

2.5.2 *Implications for research*

Several implications for future research can be drawn from our study. First, our empirical analysis extends previous literature on firm-environment co-alignment by demonstrating that an enduring temporal alignment between rates of internal and external change is relevant for understanding firm performance and survival. The findings thus highlight the relevance of a temporal perspective on firm-environment co-alignment. Indeed, time underlies the core topics in strategic management such as (temporary) competitive advantage, long-term objectives, and survival, and is inherent to organizational change in the face of environmental change in general (Huy, 2001). Therefore, our study makes a strong case for future research that explicitly conceptualizes and tests rates of change and related temporal elements of renewal, such as timing and sequencing of change, and investigates how these elements interact over time to affect firm performance.

Another important finding of this study is that firms can intentionally manage their capability to align internal rates of change with external rates of change. Specifically, drawing on organizational learning literature, and on Cohen & Levinthal's (1990, 1994) argument that an organization's absorptive capacity enables proactive behavior through a more accurate prediction of opportunities, Cohen & Levinthal (1990, 1994) we argue that potential absorptive capacity would enable the alignment of internal and external rates of change over time. In finding support for this relationship, our study extends both conceptual and cross-sectional studies that investigate firm responsiveness and sustained self-renewal as outcomes of absorptive capacity, and addresses recent calls in the literature for a longitudinal assessment of absorptive capacity and its outcomes (Liao et al., 2003; See also: Lane et al., 2006; Volberda et al., 2010). Our findings suggest that future

research on the relationship between micro-foundations of absorptive capacity and temporal elements of strategic renewal may prove particularly valuable for understanding firm performance and survival.

Finally, given the limitations of our study we suggest worthwhile avenues for further research. First, our empirical analysis concerns a single firm in the oil industry. While examining a single firm enables us to analyze strategic renewal actions in greater detail, this approach may limit the extent to which results can be generalized. The strategic importance of potential absorptive capacity emphasized in this study undoubtedly varies across industries. Our results may, for instance, be more generalizable to other industries where the ability to adapt to or drive technological developments is an important determinant of competitive advantage. By contrast, potential absorptive capacity may play a less important role when the organizational context is more static and predictable. Accordingly, future studies may gain further insight by applying our framework across different industry settings. Particularly promising in this respect would be to incorporate how environmental contingency factors (e.g., industry competitiveness and environmental complexity) influence the effectiveness of potential absorptive capacity for alignment of internal and external rates of change (Jansen et al., 2005).

Second, our approach to investigating the relationship between potential absorptive capacity and the alignment of internal and external rates of change does not allow us to draw conclusions with respect to temporal causality e that is, the question of whether or not higher levels of potential absorptive capacity precede co-alignment. However, we propose that a unidirectional relationship is unlikely to exist. Rather, in line with previous literature on absorptive capacity and the illustrative examples provided in this study (Van den Bosch et al., 1999), we suggest that a firm's potential absorptive capacity co-evolves with rates of environmental change. In other words, potential absorptive capacity may enable firms to anticipate and respond to environmental change, but firms may also increase their investment in potential absorptive capacity in an effort to cope with developments in their environment. In improving theory on absorptive capacity, future research may provide valuable insights by further examining this recursive relationship.

Appendix A. Data collection method

We collected data on strategic renewal actions through systematic content analysis of Shell's annual reports. In line with prior studies (e.g. Uotila et al., 2009), our study builds on realized strategic renewal actions that are aimed at aligning the organization to the environment and increasing its competitive advantage. These actions are thus likely to have an impact on the overall behavior and performance of the firm.

Content analysis is an important way to quantify historical data for longitudinal research designs in strategy. Moreover, archival data sources are well suited to exploring dynamic changes over time. Performing content analysis on annual reports is thus particularly useful for our purposes, as these documents provide consistent and comparable sources of data on strategic renewal actions over a long period of time (Fiol, 1995; Ginsberg, 1988; Jauch et al., 1980; Weber, 1990). Organizational researchers have corroborated the reliability and validity of annual reports as a source of information for various reasons. In the first place, the reports provide important information regarding the company's interpretation of its environment, and the relationship to relevant strategic actions. Second, they can be considered reliable in the sense that they do not suffer from retrospective sense making, a potential source of hindsight bias in longitudinal research designs. Third, as Bowman points out, senior executives are intensively involved in the creation of annual reports, increasing the internal validity of their content. This is confirmed by Fiol, who found that annual report statements did not differ significantly from internal documents in broad strategic issues and strategic facts (Bowman, 1984; Fiol, 1995; Golden, 1992; Golden, 1997; Nadkarni & Narayanan, 2007).

Following Fine's dimensions of both industry and organization 'clockspeed', annual reports were coded along five categories of strategic renewal actions associated with changes in the organization's knowledge configuration: 1) new products and services, 2) process innovation, 3) internal venturing (e.g., business start-ups), 4) external venturing e.g., mergers and acquisitions, joint ventures, alliances), and 5) organizational restructuring (Fine, 1998). We provide examples of the coding of annual report segments for each of the five strategic renewal action categories in Table A1 below. The internal rate of change is reflected by an average of annual rates of change in each of these five categories.

Table A1 Examples of annual report segments for each of the five categories of strategic renewal actions

Strategic Renewal Action	Example	Triangulation
New products and services	“New product initiatives continued with the launch of Shell Formula Diesel in more countries in 1988 and increased availability of unleaded gasoline.” (Shell Annual Report 1988, p.12; initial plan was mentioned in Shell Annual Report 1987, p.14)	Sluyterman (2007) p.207 Sluyterman, K. (2007). <i>Keeping Competitive in Turbulent Markets, 1973–2007: A History of Royal Dutch Shell, Volume 3</i> . New York: Oxford University Press.
Process innovation	“Process innovations and applications research have led to the development of water-based epoxy resin systems for use in paints and coatings. The award-winning Shell DeNOx catalyst system, which removes nitrogen oxides from flue gases, is both less expensive and easier to install than conventional methods.” (Shell Annual Report 1992, p.10)	Van Der Grift, Woldhuis, and Maaskant (1996). The Shell DENOx system for low temperature NO _x removal. <i>Catalysis Today</i> , 27, pp. 23-27. Shell Internationale Research Maatschappij, Eur. Patent 0 217 446
Internal venturing	“In the USA, Shell Oil has established a [wholly-owned] subsidiary through which it plans to explore biomedical business opportunities.” (Shell Annual Report 1983, p.8)	Sluyterman (2007), pp. 100, 127.
External venturing	“Shell Nederland Chemie and Akzo Zout Chemie in the Netherlands have entered into a joint venture for the manufacture of vinyl chloride and PVC, thereby achieving complete integration from feedstocks to end product.” (Shell Annual Report 1982, p.10)	New York Times (Feb 22, 1982), article entitled “Dutch Plastics Venture” www.nytimes.com/1982/02/22/business/dutch-plastics-venture.html
Organizational restructuring	“Building the future: Achieving a satisfactory return drives continuing restructuring in Group Operating Companies and business functions, complemented now by the new Service Companies’ organization which was put in place in January 1996. Together these form the base on which to build what we call the ‘New Shell’, a truly competitive business organization, retaining the best values of the past, but increasing its focus on the realities of modern-day business life.” (Shell Annual Report 1995, p.4)	Sluyterman (2007), p.102

To ensure the reliability of our data collection method, we made use of explicit coding rules in identifying strategic renewal actions (see Appendix B) (Kwee et al., 2011). One researcher coded strategic renewal actions for the entire observation period (1980-2007). Using the same coding rules, two other researchers subsequently coded two subsets (1980-1985 and 1995-2004). Cohen's Kappa for inter-coder reliability was .82, indicating high inter-coder reliability (Weber, 1990). Discrepancies between coders were discussed and resolved using the coding rules. To counter potential internal reporting bias, a random subset of the strategic renewal actions reported in the annual reports was cross-checked with key internal and external historical publications such as scholarly journals, databases and historical publications on the oil industry and Shell (examples are provided in the third column of Table A1).

Appendix B. Coding Rules for Content Analysis

1. Strategic actions contributing to new products and services are actions such as launching new products/services which are associated, among others, with search, variation and risk-taking. These actions do not include actions such as improvements to existing product quality which are associated, among others, with refinement and efficiency.
2. Process innovations include actions such as entering new technology fields and research on and the corresponding utilization of new process technology.
3. External venturing includes actions such as mergers, acquisitions, and joint ventures. These include strategic projects started up in a joint venture and strategic alliances. In addition, acquisitions of interests/territories are coded as external venturing actions since they imply participation of parties outside Shell.
4. Internal venturing is actions such as initiating new ventures without cooperation with external parties.
5. Organizational restructuring includes actions such as reorganizations of organizational structure, consolidation, down-scoping, or closure of functions.
6. Accept and code a strategic renewal action only if it is explicitly mentioned that the action is materialized or implemented in the year under review; otherwise do not code it.

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7. Deciding on dates: look for the date of implementation. If not available, look for the date of agreement/signing of contract in the annual report. Check other sources for triangulation.
 8. Actions that do not relate to strategic renewal, but that are part of daily operations (e.g. extension of production capacity), are not considered strategic renewal actions and should not be coded.
 9. Strategic renewal actions that are complementary should be coded as a single action. For example, complementary strategic renewal actions that involve joint ventures and the subsequent start of production should be coded as a single action provided that there is no specific description of the production (e.g. at a later point in time) or when the production involves existing products. In this case, such actions are coded as “external venturing” actions.
 10. Strategic renewal actions taken by subsidiary companies in which the parent has majority control (more than or equal to 50%), are considered to be actions of the parent and should be coded. Actions of minority holdings (less than 50%) are not coded.
 11. Pure financial actions such as bonds and warrants issues are not coded as strategic renewal actions.

Assessment of R&D intensity as measure for potential absorptive capacity

To support our assumption that R&D intensity is a valid proxy for potential absorptive capacity (i.e., the firm’s capacity to absorb external knowledge), we collected data on the number of people employed in Shell’s R&D function (Liu & White, 1997). Data was available for the period 1985-1994, for which the correlation with our absorptive capacity measure was positive and highly significant ($r = .817, p < .005$). This provides a compelling argument that R&D intensity is a justifiable measure for potential absorptive capacity in our study.

Chapter 3. Leveraging Exploratory and Exploitative Innovation in Dynamic Environments: Performance Implications of Proactive Strategic Behavior¹

Abstract

Prior research suggests that exploratory and exploitative innovation have differential performance effects under varying degrees of environmental dynamism. More specifically, findings indicate that in dynamic environments exploratory innovation is likely to increase firm performance while exploitative innovation may be detrimental. This study aims to provide a more comprehensive perspective of how firms successfully leverage these two types of innovation at different levels of environmental dynamism. Drawing on strategic timing literature, we conjecture that proactiveness is a key boundary condition for exploratory and exploitative innovation to pay off. In support of this notion, results show that in the absence of proactiveness, pursuing exploratory innovation can be detrimental to firm performance. Moreover, in contrast to prior research findings, our study provides evidence that firms can indeed benefit from investments in exploitative innovation in dynamic environments when combined with a less proactive, more reactive approach. Implications for practice and future research are discussed.

¹ This chapter is based on: S. Ben-Menahem, J. Jansen, H. W. Volberda, and F. A. J. Van Den Bosch. Leveraging Exploratory and Exploitative Innovation in Dynamic Environments: Performance Implications of Proactive Strategic Behavior. This paper is under review at *Strategic Management Journal*.

3.1 Introduction

Along with the proliferation of the exploration-exploitation framework in strategy research (March, 1991), scholars have shown an increased interest in understanding how exploratory and exploitative innovation influence firm performance (Lavie, Stettner, & Tushman, 2010). Several studies have argued the performance implications of exploratory innovation (i.e. innovation requiring knowledge, resources, and capabilities new to the firm) and exploitative innovation (i.e. innovation building on knowledge, resources, and capabilities existing within the firm) are contingent on environmental conditions (e.g. Auh & Menguc, 2005; Lewin, Long & Carroll, 1999; Levinthal & March, 1993). Generally, researchers have assumed that as environmental dynamism increases, firms are more likely to benefit from exploratory innovation while exploitative innovation becomes less valuable and can even be detrimental (e.g. Jansen Van Den Bosch & Volberda, 2006).

However, scholars have recently criticized this somewhat taken-for-granted perspective. Posen & Levinthal (2011), for instance, argued that change in the external environment does not necessarily imply the need for, or benefit from exploration over exploitation, and called for increased efforts to understand the appropriate organizational response to environmental dynamism. Indeed, significant gaps persist in our understanding of the mechanisms leveraging the value of exploratory and exploitative innovation for firm performance in dynamic environments (Lavie *et al.*, 2010; Raisch *et al.*, 2009). Particularly noteworthy is that while literature on organizational adaptation has stressed that timely responsiveness to threats and opportunities is crucial for achieving a competitive advantage in dynamic environments - for instance, through fast strategic decision-making and rapid product and service innovation (Bourgeois & Eisenhardt, 1988; D'Aveni, 1994; Davis *et al.*, 2009, Eisenhardt & Tabrizi, 1995), scholars have not explicitly explored the notion of timing in relation to pursuing exploratory and exploitative innovation in dynamic environments. Consistent with March's (1991) observation that the outcomes of exploration and exploitation differ with respect to timing, we propose that considering the joint effects of innovation type and timing orientation can enhance our understanding of the environmental contingency perspective on exploratory and exploitative innovation in important ways.

We aim to address this issue by providing two main contributions to prior literature. First, we provide a more comprehensive view of the conditions under which firms can leverage investments in exploratory and exploitative innovation (e.g. Auh & Menguc, 2005; Gibson & Birkinshaw 2004; He & Wong, 2004) by assessing the combined effect of both organizational and environmental contingencies on the relationship between exploratory and exploitative innovation and firm performance (cf. Lavie et al., 2010). We argue that there are compelling reasons to expect that the appropriateness of investments in exploratory and exploitative innovation will depend on the degree of proactiveness, defined as a firm's inclination to act ahead of its competitors (Lumpkin & Dess, 1996, 2001; Miller, 1983; Miller & Friesen, 1983; Venkatraman, 1989). Indeed, in a recent study, Katila & Chen (2008) highlight the importance of considering competitive dynamics in the context of firms' search to innovate, and provide evidence that search timing relative to competitors can potentially promote and suppress innovation. Building on these findings, our study explores the performance implications of configurations between a firm's innovation search and proactiveness under different levels of environmental dynamism.

Second, we contribute to innovation and strategic timing literature by arguing that proactive timing is a distinguishable dimension of a firm's innovation strategy (Lumpkin & Dess, 1996) that is complementary to the extent to which innovations are more exploratory or exploitative in nature. We thereby highlight that engaging in exploratory innovation is not by definition proactive, nor is exploitative innovation always reactive. Finally, our insights regarding the effectiveness of configurations of timing strategies and innovation types under varying degrees of environmental dynamism also contribute to research on early-mover advantages (Franco *et al.*, 2009; Min *et al.*, 2006) by explicitly addressing a recent call in the literature for increased attention to the influence of environmental contingencies on early-mover advantage (Suarez & Lanzolla, 2007).

Using data from a sample of 268 Dutch firms across a variety of industries, our findings challenge current knowledge and understandings. Whereas prior studies have suggested that exploratory innovation is desirably in dynamic environments, our findings provide a more elaborate understanding by indicating that investing in exploratory innovation without behaving proactively may be detrimental to firm performance.

Moreover, also in contrast to previous findings, we show that exploitative innovation can contribute to firm performance in dynamic environments when combined with a less proactive, more reactive strategic approach. We further observe that in less dynamic, more stable environments, exploratory innovation combined with a more reactive approach is more beneficial to firm performance, while performance effects of investment in exploitative innovation were not found to be affected by the degree of proactiveness. Through these findings, our study provides theoretical and practical insights into what constitutes an appropriate response to environmental change (cf. Posen & Levinthal, 2011).

In the next section, we provide a review of the literature on performance effects of exploratory and exploitative innovation, and firm proactive timing. Based on this review, we develop hypotheses on the three-way interactions between these constructs. We subsequently test our hypotheses and present our empirical findings. Finally, we conclude with a discussion of the results, implications, and avenues for further research.

3.2 Literature Review and Hypotheses

Building on the contingency perspective on strategic management (Aldrich, 1979; Miles *et al.*, 1974), prior research indicates that the performance implications of exploratory and exploitative innovation are dependent on the level of environmental dynamism (He & Wong, 2004; Jansen *et al.*, 2006; Kim & Rhee, 2009; Levinthal & March, 1993; Sidhu *et al.*, 2007). *Exploratory innovation*, which requires a shift away from existing systems, structures, skills and knowledge through search in nonlocal domains (Benner & Tushman, 2003; McGrath, 2001), typically encompasses the development of radically new products, services, and distribution channels to capture opportunities in new markets (Abernathy & Clark, 1985; He & Wong, 2004). *Exploitative innovation*, by contrast, leverages the organization's existing systems, structures, skills and knowledge base, and results from organizational learning and search in local domains (Benner & Tushman, 2003; Lewin *et al.*, 1999). Such innovation typically constitutes improvements to existing products and services offered to currently served customers and markets, and increased efficiency of existing distribution channels (Abernathy & Clark, 1985; He & Wong, 2004).

In dynamic environments (Dess & Beard, 1984; Duncan, 1972), short product life cycles, rapid commoditization, and continuously changing technologies, regulations, competitive actions, and customer demand cause a firm's existing products and services to become obsolete more quickly (Miller & Friesen, 1983; Sørensen & Stuart, 2000; Tushman & Anderson, 1986). This erodes the value of current operations and creates a necessity to restore the fit between the organization and its environment (e.g. Huff *et al.*, 1992). Accordingly, studies have suggested that in dynamic environments exploratory innovation is highly valuable and necessary, whereas exploitative innovation is less beneficial (Eisenhardt, 1989; Levinthal & March, 1993). Yet we argue that environmental change does not necessarily imply that organizational adaptation through exploratory innovation is an appropriate response. While environmental change may devalue existing knowledge, ongoing turbulence can also decrease the returns on investments in exploration. Hence, under some conditions, exploitative innovation may be a more appropriate response to environmental dynamism (Posen & Levinthal, 2011). An important question that arises is what determines which innovation strategy constitutes a more appropriate response? Based on prior work (Dess & Lumpkin, 2005), our study focuses on the critical role of proactiveness as a dimension of innovation strategy.

3.2.1 Firm proactiveness

Current notions of firm proactiveness find their origin in early studies on entrepreneurship and the strategy-making process. Building on Mintzberg's (1973) work on modes of strategy-making, and Miller & Friesen's (1978) study on archetypes of strategy formulation, it was Miller's (1983) seminal paper which established proactiveness as a core dimension of the strategic entrepreneurship process. Here, the concept of proactiveness was used to refer to a firm's inclination to act rather than react to trends in the environment (Miller & Friesen 1978, Miller 1987) and reflect the initiative exhibited by the firm's actors. Following Miller's (1983) work, scholars have widely adopted the construct, most saliently in studies on entrepreneurial orientation (EO) (e.g. Covin & Slevin 1989, 1991; Lumpkin & Dess, 1996), marketing orientation (e.g. Narver *et al.*, 2004), and corporate entrepreneurship (Stopford & Baden-Fuller, 1994). In the process, numerous conceptualizations and operationalizations have emerged in the literature in

which proactiveness has been defined broadly and may refer to multiple meanings. We present a summary of conceptualizations used in main contributions to strategic entrepreneurship literature on firm level proactiveness in Table 3.1.

Analyzing the common element of these definitions we argue that the primary defining property of proactiveness lies in its reference to the relative timing, or order of action of that which is done proactively. To avoid confusion with other meanings that have been associated with proactiveness (e.g. opportunity-seeking) we henceforward use the term proactiveness to refer to this distinctive element of relatively early timing of action with respect to some reference point, for instance, the introduction of new products or services ahead of competitors. That is not to say that proactive firms are always first movers, but rather those at the commercial and technical forefront relative to competitors (cf. Banbury & Mitchell, 1995; Stopford & Baden-Fuller, 1994).

Our focus on proactive timing builds on the notion that firms are not reactive recipients of their environments *per se*, but can engage in change proactively. Smith & Cao's (2007) conceptual distinction between adaptive and entrepreneurial perspectives on the firm-environment relationship clarifies this point. From an adaptive perspective firms are considered to have a more reactive approach to organizational change and pursue innovations as an adaptive process induced by changing environmental conditions, problem oriented search, and competitive actions. The entrepreneurial perspective, by contrast, highlights that innovation may also result from key decision makers' expectations about the future evolution of markets and technologies. Consequently, "firms can, through their actions, upon occasion, shape and influence their environment" (Smith & Cao, 2007: 330).

Table 3.1 Key conceptualizations of the proactiveness construct

Study	Conceptualization
Miller & Friesen, 1978	Proactiveness of decisions deals with how the firm reacts to trends in the environment: does it shape the environment (high score) by introducing new products, technologies, administrative techniques, or does it merely react (p.923).
Miller, 1983	Entrepreneurial firm is one that engages in product market innovations, undertakes somewhat risky ventures, and is the first to come up with 'proactive' innovations, beating competitors to the punch. (p.771).
Miller & Friesen, 1983	Attempt to lead rather than to follow competitor (p.222).
Venkatraman, 1989	This dimension reflects proactive behavior in relation to participation in emerging industries, continuous search for market opportunities and experimentation with potential responses to changing environmental trends (Miles & Snow 1978). It is expected to be manifested in terms of seeking new opportunities which may or may not be related to the present line of operations, introduction of new products and brands ahead of competition, strategically eliminating operations which are in the mature or declining stages of life cycle.
Covin & Slevin, 1989	First to introduce new products/services, administrative techniques, operating technologies, etc.; Initiating actions which competitors respond to.
Chen & Hambrick, 1995	Proactiveness involves taking the initiative in an effort to shape the environment to one's own advantage; responsiveness involves being adaptive to competitors' challenges (p. 457).
Lumpkin & Dess, 1996	A proactive firm is a leader rather than a follower, because it has the will and foresight to seize new opportunities, even if it is not always the first to do so (pp. 146-147).
Lumpkin & Dess, 2001	Proactiveness is an opportunity-seeking, forward-looking perspective involving introducing new products or services ahead of the competition and acting in anticipation of future demand to create change and shape the environment (p. 431).

Indeed, similar arguments are made in a number of studies (Eisenhardt & Brown, 1998; Thompson, 1967; Granovetter, 1985). Perlow, Okhuysen & Repenning (2002), for instance, described how one firm's internal emphasis on fast decision-making amplified a need for speed within the organization and enabled it to play a key role in creating the external environment that it faced. Their study suggests "the perceived pressure for fast action is not solely an exogenous feature of a firm's environment, but instead has an endogenous component arising from the recursive relationship between organizational action and the evolving context" (Perlow et al, 2002: 948). Proactive timing then, is closely related to the idea of proactive temporal enactment (Pérez-Nordtvedt *et al.*, 2008). In organization theory, enactment implies that organizations do not merely adapt to their environment but are actively involved in constructing it (Smircich & Stubbart, 1985; Weick, 1979, 1995). Proactive temporal enactment refers to the organization dictating the phase and rates of environmental change (e.g. product development cycles) as a means of achieving temporal firm-environment fit and increasing firm performance (Standifer & Bluedorn, 2006; Pérez-Nordtvedt et al., 2008). A common example is Intel's impact on the microprocessor industry. For the past 40 years, Intel has relentlessly driven the rate of change by anticipating developments in its environment and maintaining a high rate of capacity expansion and new product introductions (Eisenhardt & Brown, 1998).

What, then, is the implication of a proactive orientation for the performance effects of exploratory and exploitative innovation under varying levels of environmental dynamism? Arguing that this conceptual dimensionality is critical yet insufficiently investigated in relation to the environmental contingency perspective on exploration/exploitation, we next discuss how proactive timing may influence the relationship between environmental dynamism and the performance outcomes of investments in exploratory and exploitative innovation.

3.2.2 Exploratory innovation, environmental dynamism and proactiveness

As environmental changes occur more frequently, a firm's existing products and services become obsolete more rapidly (Sørensen & Stuart, 2000). A received view is that exploratory innovation helps to reduce the risk of obsolescence encountered in such contexts by increasing internal variety (March, 1991). Moreover, dynamic environments

are abundant with high-payoff opportunities (Davis *et al.*, 2009; Zahra, 1996), which increase the potential benefits from exploratory innovation (Uotila *et al.*, 2009). Yet pursuing exploratory innovation in dynamic environments is also associated with more uncertain and risky payoffs as well as higher costs (Uotila *et al.*, 2009). Particularly challenging in this sense is that a firm's time frame for benefiting from exploratory innovation is more limited (cf. Davis *et al.*, 2009).

Proactive timing plays an important role in leveraging performance benefits from the pursuit of exploratory innovation in this context, due to the potential for early mover advantages (Lieberman & Montgomery, 1988; 1998). Early mover advantages may arise when firms can use production and market experience to outlearn competitors (Lieberman, 1984, 1989; Spence, 1981). Building on Adner & Kapoor (2010), we argue that firms with a greater learning opportunity will be more effective learners. When environmental dynamism is high and firms invest in exploratory innovation, the pressure for change in organizational routines and capabilities increases and learning opportunities emerge (Huff, Huff & Thomas, 1992). Proactive firms can leverage this greater learning potential to enhance their market position by achieving higher levels of efficiency ahead of rivals (Adner & Kapoor, 2010). In addition, proactive timing enables firms to set industry standards when leveraging exploratory innovation, and gain control over newly established distribution channels (e.g. Kerin *et al.*, 1992; Lieberman & Montgomery, 1988; Zott & Amit, 2008). This provides opportunities to capture attractive market segments and profit from premium margins before environmental conditions change and new products and services may diffuse (Brown & Lattin, 1994; Huff & Robinson, 1994; Lambkin, 1988). In that sense, proactive timing not only increases the likelihood of achieving temporary advantages and generating additional income from investments in exploratory innovation, but also benefit from such innovations over a longer period of time by increasing their lead-time over potential competitors (cf. Davis *et al.*, 2009; Wirtz *et al.*, 2007).

Moreover, when approached proactively, exploratory innovations are also likely to be very difficult to emulate on the short-term. Imitation is not only impeded by potentially high levels of causal ambiguity with respect to the formative elements (i.e. resources and capabilities) of exploratory innovation, but also requires followers to invest heavily in time and resources for the development of radically new knowledge and capabilities (Dierickx

& Cool, 1989). By contrast, firms investing in exploratory innovation without reaching temporal advantages over competitors may see their investments in new products and services devalue due to the rapid rate of environmental change and incur high development costs without reaping temporary benefits.

In stable environments, technologies develop at a slower pace and customer needs change less dramatically and emerge less frequently. Investment in exploratory innovation combined with a proactive approach to introducing these innovations can be detrimental to firm performance in this context. Market capacity will be limited for new products and services such that firms will find it difficult to recover their investments. Moreover, existing customers may not value or even be disrupted by the availability of unnecessary options that a firm proactively brings to market (Chen et al., 2005; Leonard, 1995). In addition, time compression diseconomies may arise when firms aim to introduce new products and services ahead of competitors. This can lead to increased costs and may have detrimental consequences for product quality while customer willingness to absorb these compromises is limited (Crawford, 1992). Taken together, we hypothesize that:

***Hypothesis 1a:** At high levels of environmental dynamism, the relationship between exploratory innovation and firm performance is more positive for firms with high levels of proactiveness than for firms with low levels of proactiveness.*

***Hypothesis 1b:** At low levels of environmental dynamism, the relationship between exploratory innovation and firm performance is more negative for firms with high levels of proactiveness than for firms with low levels of proactiveness.*

3.2.3 Exploitative innovation, environmental dynamism and proactiveness

Prior studies have argued that exploitative innovation may negatively affect firm performance in dynamic environments (Jansen et al., 2006; Sørensen & Stuart, 2000). The main argument underlying this relationship is that by improving existing products and services firms may not sufficiently address changes in environmental conditions. Notwithstanding the importance of adapting to environmental change, we argue that investing resources towards the improvement and extension of existing products and services may well be beneficial for firm performance in such a context as well. Indeed,

exploitative innovations can result in significant improvements in price or functionality for users (Nelson & Winter, 1977), and as such, may be an important means to attract and retain customers. Rather than assuming that exploitative innovation invariably has a negative effect on firm performance in dynamic environments, we suggest that the relationship is dependent on the extent to which a firm approaches such innovations reactively or proactively vis-à-vis competitors.

When a firm behaves proactively with regard to pursuing exploitative innovation, it quickly recognizes change in needs of existing customers and opportunities to extend the use of current knowledge and capabilities, and accordingly, modifies its product-market strategy ahead of competitors (Miller & Friesen, 1978). Doing so enables firms to prevent obsolescence in existing product-markets, which is typically observed in dynamic environments. Therefore, proactive firms can increase performance by retaining current customers and leveraging the life time of their portfolio, and by attracting new customers to increase their market share in existing product-market domains (Day 1994; Slater & Narver, 1993).

Second, as exploitative innovation is typically less complex and more easily understood by competitors, it is subject to an increased threat of imitation (Min et al., 2006; Zander & Kogut, 1995). Imitation reduces the performance potential of exploitative innovation by further shortening the time frame during which a firm can capture economic returns on its innovation. Proactive firms may pre-empt competitive moves and defer the detrimental effects of imitation in rapidly changing environments by impeding undesirable diffusion of the knowledge and capabilities underlying its innovation. This may be achieved through the early formulation of an appropriate intellectual property rights strategy and the development of complementary specialized assets (Pisano, 2006; Teece, 1986).

Finally, research suggests that proactive firms may enjoy a higher performance potential for exploitative innovation as existing customers of early-movers are more inclined to repurchase products and services (Golder & Tellis, 1993). Schmalensee (1982), for instance, argued that users of the first brand in a product category will form a preference for this brand over later entrants. In a similar vein, Carpenter & Nakamoto's (1989) experiment showed that successful early movers can positively influence

consumers' preference formation by establishing the ideal combination of attributes by which a product category is evaluated. Additionally, research indicates that proactive firms may have an advantage in binding customers, forestalling turnover, and increasing the likelihood of current customer repurchasing by (purposefully) creating switching costs, i.e. barriers aimed at discouraging customers to switch from one provider to another (Burnham et al., 2003; Jones et al. 2002; Lieberman & Montgomery, 1988). The effect of such mechanisms is likely to be particularly effective in more dynamic environments, in which consumers have imperfect information about the quality of market offerings (e.g. Schmalensee, 1982). On the basis of these arguments, we hypothesize that:

***Hypothesis 2a:** At high levels of environmental dynamism, the relationship between exploitative innovation and firm performance is less negative for firms with high levels of proactiveness than for firms with low levels of proactiveness.*

***Hypothesis 2b:** At low levels of environmental dynamism, the relationship between exploitative innovation and firm performance is more positive for firms with high levels of proactiveness than for firms with low levels of proactiveness.*

3.3 Method

3.3.1 Data collection, response pattern, and respondents

We tested our hypotheses using data collected from senior executives of private companies in The Netherlands. Our sampling frame was a randomly identified selection of 4,000 companies registered with The Netherlands Chamber of Commerce, with a minimum of 25 employees. The data collection process consisted of two temporally separated mail surveys, to reduce potential problems associated with common method bias and single-informant bias (Podsakoff *et al.*, 2003). Accordingly, the first survey was administered in 2007 and included the independent variables. After sending out the initial questionnaire, we sent out two reminders and contacted non-respondents by telephone. We received 901 usable questionnaires representing a response rate of 23 percent. These 901 respondents were sent a second survey including the dependent variable circa one year after the first round of data collection. The final number of respondents completing both

surveys and included in our analyses was 268 representing an effective response rate of 30 percent, which is common in this type of survey (Baruch, 1999).

Our final sample consists of firms in a wide range of industries, covering manufacturing (32%), wholesale (6%), transport (9%), financial services (3%), other professional services (30%), construction (17%), and others (3%). The average firm age was 39.62 years (s.d. = 30.44) and the average size was 180.05 (s.d. = 506.57) full-time employees. The average company tenure of respondents was 13.47 years (s.d. = 10.24). All respondents were employed during the period under investigation.

Potential non-response bias in our sample was examined in two ways. First, we compared respondents with non-respondents on the basis of size (number of full-time employees), age, and industry for both questionnaires. T-tests showed no significant differences ($p < .05$), suggesting that respondents are generally similar to non-respondents in terms of size, age and industry. Second, we compared differences between early respondents – i.e. firms responding after the first mailing - and late respondents – i.e. firms responding after the second mailing - along the main variables (exploratory and exploitative innovation, proactiveness, environmental dynamism, and performance). This approach assumes that late respondents are similar to non-respondents in that they would have been regarded as such had a second questionnaire not been sent (Oppenheim, 1966). This comparison did not reveal any significant differences ($p < .05$) between early and late respondents. On the basis of these test results we have no reason to assume that non-response bias jeopardizes the validity of our study.

3.3.2 Measurement of constructs

To measure the constructs in our study (see Table 3.2), we used items from existing multi-item, 7-point Likert scales that have been tested for reliability and validity in prior studies. The anchor points for item rating were: 1, “strongly disagree,” to 7, “strongly agree,” with exception of the items for firm performance, for which the anchor points were: 1, “much worse,” to 7, “much better.”

Table 3.2 Study variables, descriptions, and measures

Dependent Variable	Variable description	Measures
Firm performance	Financial and non-financial performance	How would you rate the performance relative to competitors over the past 3 years: <ul style="list-style-type: none"> • sales growth • number of clients • market share • ROE • profit growth • reputation • product and service quality • customer satisfaction
Independent variables	Variable description	Measures
Exploratory innovation	Investment in developing completely new products and services	Square root of average percentage of revenues invested in the past three years (“How much did your organization invest in development of completely new products and services over the past three years - as a percentage of revenues”).
Exploitative innovation	Investment in improving existing products and services	Square root of average percentage of revenues invested in the past three years (“How much did your organization invest in improving existing products and services over the past three years - as a percentage of revenues”).
Proactiveness	Tendency to introduce products, services, processes ahead of competition.	Three item scale assessing tendency to introduce products, services, processes ahead of competition and tap new markets ahead of competitors.
Environmental dynamism	Dynamism within the firm’s industry	Four item scale assessing frequency and intensity of change in market environment, customer demand, and volume relative to industry average.
Control variables	Variable description	Measures
Industry	Firm industry group	Dummy variable based on SIC
Firm Age	Firm age	Natural log of years since founding
Firm Size	Firm size	Natural log of number of FTEs in 2007
Competitiveness	Competitiveness within the firm’s industry	Four item scale assessing of presence and intensity of competition in the firm’s market environment and intensity of price competition
Prior Performance	Sales growth	Average percentage of yearly sales growth in the past three years (first survey)

Dependent variable. Previous research suggests that the multidimensionality of *firm performance* requires the use of both financial and non-financial indicators to reflect different kinds of organizational aspirations. Subjective measures are especially advantageous for evaluating a broader set of performance dimensions, have been shown to be reliable and valid reflections of objective performance (Dess & Robinson, 1984; Venkatraman & Ramanujam, 1987), and are generally more accessible than objective indicators. Moreover, as subjective performance measures can be stated in relative terms, they are easier to interpret and compare between different industry contexts (cf. Chandler and Hanks, 1993).

Considering the benefits of subjective measures and limited availability of objective and comparable performance data for our entire sample, a self-reported measure of firm performance was used in which respondents were asked to benchmark their firm's performance against competitors. This approach is adapted from Lumpkin & Dess (2001) and has been used in several other studies (e.g. Stam & Elfring, 2008). Our eight-item scale ($\alpha = .84$) includes (1) sales growth, (2) number of new clients, and (3) market share growth to indicate to what extent the organization was able to relate its innovations to the external environment and competitively satisfy demand (Zahra & Das, 1993); (4) return on equity and (5) profit growth to reflect the firm's ability to create value; and finally, (6) reputation, (7) product and service quality, and (8) client satisfaction to reflect non-financial elements of performance that may be important for the firm's long-term competitive strength.

To validate our subjective performance measure, we analyzed the correlations between the subjective measures and objective data for *sales growth* from published secondary sources. We were able to obtain data for 26 firms. Correlation between the subjective and objective measures for sales growth ($r = .59, p < .01$) was significant and supports the validity of our study's performance measure.

Independent and moderator variables. *Exploratory innovation* was measured as the investment in developing completely new products as a percentage of total revenues. *Exploitative innovation* was measured as the investment in improving existing products and services as a percentage of total revenues. Thus, these measures reflect the actual commitment of the firm to exploratory and exploitative innovation. *Proactiveness* was

measured using three items developed and tested by Covin & Slevin (1989) (see also Lumpkin & Dess, 2001; Miller 1983). The items ask respondents to indicate to what extent the firm has a tendency to act ahead of competition in introducing products and services, implementing new business processes, and recognizing and entering new markets ($\alpha = .90$). Finally, a four-item scale ($\alpha = .80$) for *environmental dynamism* was adapted from prior studies (e.g. Jaworski & Kohli, 1993). Items reflect the rate and frequency of change of customer demand, product obsolescence, and the organization's environment in general. The measure for environmental dynamism was calculated as the ratio of the firm's response to the industry group's average response for this scale (Drnevich & Priauciunas, 2011).

Control variables. This study also controlled for possible confounding effects by including a number of relevant control variables, including firm age, firm size, environmental competitiveness, industry, and prior performance. Previous studies have argued that established organizations run the risk of becoming trapped into established routines and competences that hamper organizational advancements (Hannan & Freeman, 1984). Older organizations may be more inclined to rely on existing knowledge and skills, and thus engage in exploitative rather than exploratory innovation (Lavie *et al.*, 2010). Accordingly, we controlled for *firm age*, measured by the natural logarithm of the number of years since the company's foundation. Prior literature also suggests that compared to small firms, larger firms generally have more slack resources for innovation, and are more likely to benefit from economies of scale, experience, and market power (Chen & Hambrick, 1995). Smaller firms, on the other hand, have a greater propensity for proactive action than their larger rivals (Chen & Hambrick, 1995). Therefore, we included the natural logarithm of the number of full-time employees to account for *firm size*. Empirical evidence shows that the intensity of competition within the organizational environment may also have an influence on the performance outcomes of both innovativeness and proactiveness (Lumpkin & Dess, 2001). A four-item scale measuring *environmental competitiveness* ($\alpha = .90$) was therefore also included (cf. Jaworski & Kohli, 1993). To control for additional industry effects, we included six of the seven *industry dummies*, using "other professional services" as the reference group. Secondary data on industry type was collected from the database of the Dutch Chamber of Commerce and measured at the

two-digit SIC code level. This study also controlled for prior performance because it can affect the degree of investment in exploratory and exploitative innovation, as well as the potential for proactive timing. Accordingly, we included in our analysis a variable measuring *average prior sales growth* over the past three years in comparison to key competitors. Data was obtained from the survey (Zahra, Ireland & Hitt, 2000). Inter-rater agreement on this variable was significant ($r = .83$, $n = 115$, $p < .001$) and supports the reliability of this control variable.

3.3.3 *Measurement reliability and validity*

A number of approaches were taken to assess the reliability and validity of our measures, and to evaluate and reduce the influence of common method bias (Podsakoff, MacKenzie, & Lee, 2003). First, in order to examine the reliability of our data and assess potential concerns associated with single-informant data (Venkatraman & Grant, 1986) a second member of each firm's senior management team was requested to return an additional survey. Of the initial sample, we received 38 responses, or 14% of the final 268 firms. The follow-up survey resulted in 62 responses, or 23% of the final sample. A within-group inter-rater agreement score (r_{wg}) (James, Demaree & Wolf, 1984) was then calculated to assess the consensus between the two respondents of each organization using the 2007 response for the independent and moderator variables and the 2008 response for the dependent variable. The median r_{wg} per variable ranged between 0.88 and 0.97, indicating acceptable agreement between respondents within organizations for both the independent and dependent variables.

Second, another important concern that deserves attention when using a single method for measuring variables is that estimates of the relationships between constructs may reflect variance arising from the measurement method rather than a true relationship (i.e. common method variance, CMV, Podsakoff, MacKenzie, & Podsakoff, 2012). Yet as several studies have pointed out, inflation of relationships cannot occur in the case of interaction effects (Evans, 1985; Podsakoff et al., 2012; Siemsen, Roth, & Oliveira, 2010). Rather, interaction effects are potentially deflated when CMV is present making them more difficult to detect statistically (Siemsen et al., 2010), such that even if CMV would have affected the measurement of our constructs, the results would be biased towards the

side of caution.

Third, exploratory factor analysis was conducted to validate the distinctiveness of the exploratory innovation, exploitative innovation, proactiveness, and environmental dynamism measures. The factor solution clearly replicated the intended four-factor structure with each item loading on its intended factor. Factor loadings were significant with values above .60 and no cross-loadings above .28. An integrated confirmatory factor analysis was subsequently performed to further assess the convergent and discriminant validity of all multi-item constructs. Each item was constrained to load only on the construct for which it was the proposed indicator. Results revealed a model that fits the data adequately ($\chi^2(185, N = 268) = 329, p < .01$; $RMSEA = .05, ns$; $CFI = .95$; $TLI = .94$). Item loadings were as proposed and significant ($p < .001$), providing evidence of convergent validity. Following Fornell & Larcker's (1981) criterion, discriminant validity was further evaluated by assessing whether each construct's average variance extracted (AVE) was greater than its shared variance with other constructs (Anderson & Gerbing, 1988). Every pair of latent factors passed this test. Finally, all composite scales exhibit good internal consistency with composite reliabilities (Cronbach's alpha) ranging from 0.80 for environmental dynamism to 0.90 for proactiveness. These results provide evidence that the measurement instruments used in our study meet the criteria for discriminant validity.

3.3.4 Analytical approach

We used hierarchical moderated regression analysis to test our hypotheses. This analytical approach enables a comparison between alternative models. We specifically test whether including the three-way interaction terms contributes significantly to the variance explained in the dependent variable beyond the main effects, two-way interactions, and control variables (Dawson & Richter, 2006). Before including the interactions of each pair of independent and moderator variables, we standardized the exploratory and exploitative innovation, proactiveness, environmental dynamism, and competitiveness variables (Aiken & West, 1991). Additionally, we performed several regression diagnostics to test whether modeling assumptions were satisfied and found no significant problems or violations.

3.4 Results

Table 3.3 reports descriptive statistics and inter-correlations for all the study variables. Since significant correlations were found among several variables, potential multicollinearity was evaluated by examining the variance inflation factors (VIFs) in the regression models. All VIFs were lower than 3.2 which is well below the rule-of-thumb cut-off value of 10 (Myers, 2000), and indicates that multicollinearity was not a significant problem in our analysis.

Table 3.4 reports the results of the hierarchical regression analysis. In model 1 we included the control variables (i.e. firm size, firm age, environmental competitiveness, average prior sales growth, and the industry dummies). In model 2, we added the main effects of the exploratory innovation, exploitative innovation, proactiveness and environmental dynamism variables. Together, the control, independent and moderator variables explained a significant share of the variance in firm performance (model 2: $R^2 = .14, p < .001$). A significant negative direct relationship appears between firm performance and exploratory innovation ($\beta = -.13, p < .05$), while significant positive direct relationships appear for exploitative innovation ($\beta = .12, p < .05$) and proactiveness ($\beta = .21, p < .005$). Environmental dynamism showed no significant direct relationship with firm performance ($\beta = -.02, n.s.$). In model 3, we entered the two-way interactions terms. Interestingly, with exception of a marginally significant negative interaction between exploitative innovation and proactiveness ($\beta = -.12, p < .10$), none of the two-way interactions were significantly associated with firm performance. Correspondingly, the increase of explained variance in firm performance was not significant (model 3: $\Delta R^2 = .02, n.s.$).

Table 3.3 Descriptive statistics and inter-correlations

Variable	mean	S.D.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
(1) Firm Performance	4.99	0.72															
(2) Exploratory innov.	4.70	8.40	-.09														
(3) Exploitative innov	5.34	7.67	.05	.44**													
(4) Environmental dyn.	4.43	1.24	.03	.13*	-.02												
(5) Proactiveness	4.11	1.35	.29**	.16**	.08	.25**											
(6) Firm Size ^a	4.22	1.03	.03	-.09	-.11	.07	.17**										
(7) Firm Age ^a	3.44	0.79	-.03	-.14*	-.10	-.06	.03	.18**									
(8) Prior performance	10.37	11.87.	.022	.02	-.01	.11	.13*	-.03	.18**								
(9) Competitiveness	5.39	1.16	-.01	-.02	.02	.22**	-.00	.18**	.14*	-.01							
(10) Professional services	0.28	0.45	-.03	.12*	.15*	.07	-.18**	-.11	-.24**	-.04	-.09						
(11) Construction	0.16	0.36	-.04	-.10	-.13*	.08	-.06	.04	.05	.14*	.20**	-.27**					
(12) Financial services	0.04	0.19	.19**	.02	.02	.06	.14*	.09	-.11	.09	-.05	-.12*	-.08				
(13) Transport	0.09	0.29	-.02	.05	.02	-.03	.07	-.10	-.01	-.05	-.05	-.20**	-.14*	-.06			
(14) Wholesale	0.06	0.24	.03	.03	.13*	-.06	-.02	-.06	.06	-.04	.05	-.16**	-.11	-.05	-.08		
(15) Manufacturing	0.34	0.48	.02	-.08	-.14*	-.09	.13*	.11	.20**	-.06	-.01	-.45**	-.31**	-.14*	-.23**	-.19**	
(16) Other	0.03	0.17	-.13*	-.03	.02	-.04	-.01	.03	.02	.01	-.09	-.11	-.08	-.03	-.06	-.05	-.13*

N = 268; ^aNatural logarithm; * $p < .05$; ** $p < .01$

Table 3.4 Results of hierarchical regression analysis: Effects on firm performance

	Firm Performance ^a			
	Model 1	Model 2	Model 3	Model 4
<i>Control variables</i>				
Firm size ^b	.02	-.01	-.01	.00
Firm age ^b	.00	-.01	-.01	-.01
Prior performance	.22 ^{***}	.20 ^{**}	.20 ^{**}	.18 ⁺
Competitiveness	-.01	.00	-.01	.01
<i>Industry dummies</i>				
Wholesale	.08 ⁺	.05	.04	.02
Manufacturing	.10	.06	.05	.04
Professional services	.06	.07	.06	.07
Transport	.04	.01	.03	.04
Financial services	.19 ^{**}	.15 [*]	.16	.14
Other	-.10	-.11 ⁺	-.11 ⁺	-.15 [*]
<i>Independent variables</i>				
Exploratory innovation ^c		-.17 [*]	-.14	-.22 [*]
Exploitative innovation ^c		.16 [*]	.18 [*]	.22 ^{**}
<i>Moderator variables</i>				
Environmental dynamism		-.03	-.03	-.08
Proactiveness		.29 ^{***}	.27 ^{***}	.24 ^{***}
<i>Two-way interaction effects</i>				
Exploratory innovation × env. dynamism			-.01	.07
Exploitative innovation × env. dynamism			.04	.03
Exploratory innovation × proactiveness			.00	.05
Exploitative innovation × proactiveness			-.17 ⁺	-.25 [*]
Proactiveness × env. dynamism			.00	.04
<i>Three-way interaction effects</i>				
Exploratory innovation × proactiveness × env. dynamism				.37 ^{***}
Exploitative innovation × proactiveness × env. dynamism				-.29 ^{**}
R ²	.10	.18	.20	.25
Adjusted R ²	.07	.14	.15	.19
Δ R ²		.08 ^{***}	.02	.05 [*]

^aStandardized regression coefficients are reported; ^bNatural logarithm; ^cSquared values

⁺ $p < .10$; * $p < .05$; ** $p < .01$; *** $p < .001$

In order to facilitate the interpretation of the three-way interaction, we visualize the effects on firm performance by plotting values of one standard deviation below and above the mean for the independent and moderator variables (see Figures 3.1 and 3.2). We probed the slopes of each regression line using a simple slope analysis to test whether

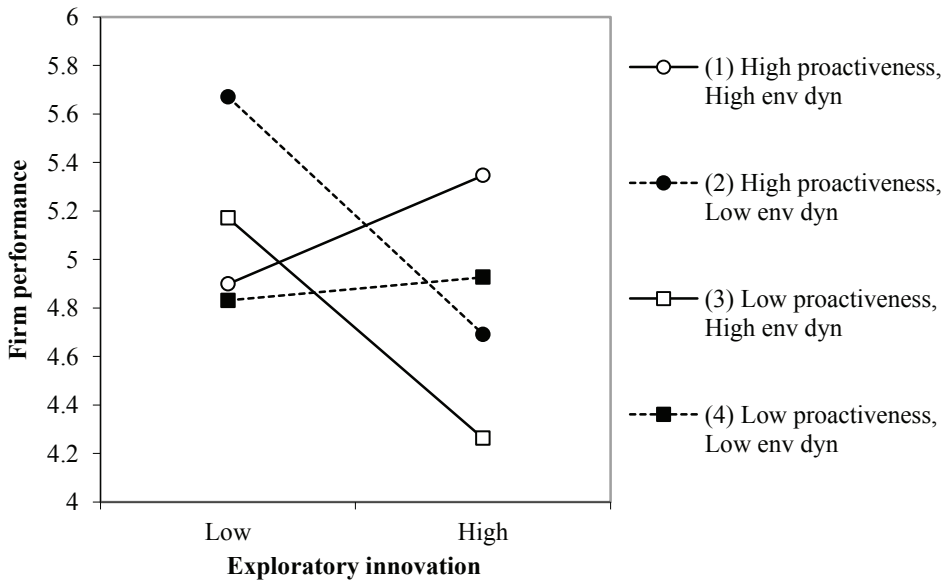
these were significantly different from zero (Aiken & West, 1991). The results show that the relationship between exploratory innovation and firm performance was significantly negative in *dynamic environments* when proactiveness was low ($b = -.45, t = -3.48, p < .005$) but neutral when proactiveness was high ($b = .22, n.s.$). A significant increase in firm performance appeared only at a value of 1.3 standard deviations above the mean value for proactiveness ($b = .33, t = 1.98, p < .05$). In other words, results are in line with hypothesis 1a for low and for high values of proactiveness. In *stable environments* (i.e. low environmental dynamism), the relationship between exploratory innovation and firm performance was significantly negative at high proactiveness ($b = -.49, t = -6.93, p < .001$) and neutral at low proactiveness ($b = -.05, n.s.$). This finding is in line with hypothesis 1b.

A limitation of the simple slope analysis is that the conditional values for the proactiveness moderator are arbitrary (Preacher, Curran, Bauer, 2006). In response to this issue, scholars have suggested probing interactions through the calculation of regions of significance via the Johnson-Neyman technique (Bauer & Curran, 2005). The region of significance provides the values of proactiveness at which the two-way interaction effect of exploration/exploitation – dynamism on firm performance is significant (see Curran et al. (2006). We calculated the region of significance using the PROCESS macro (Hayes, 2012). Results indicate that the interaction effect of exploratory innovation and environmental dynamism is significant ($p < 0.05$) for values of proactiveness falling outside the region $-.7481$ and $.3502$, corresponding to 71.3% of our sample.

We further probe the three-way interaction effect for exploratory innovation, proactiveness and environmental dynamism using Dawson and Richter's (2006) slope difference test. This test is a generalization of the two-way interaction slopes test proposed by Aiken & West (1991), and tests the hypothesis that the ratio between the difference in a pair of slopes and the standard error of this difference is significantly different from zero. The difference test for the slopes of lines 1 and 3 in Figure 3.1, representing the effect of exploratory innovation on firm performance in dynamic environments for high and low levels of proactiveness, respectively, is significant ($t = 3.10, p < .005$) and supports hypothesis 1a: in dynamic environments, exploratory innovation is more positively related to firm performance when combined with high proactiveness than when combined with low proactiveness. Assessment of lines 2 and 4 in Figure 3.1, representing the effect of

exploratory innovation on firm performance in stable environments for high and low levels of proactiveness, respectively, also provides significant support ($t = -3.01, p < .005$) for hypothesis 1b: in stable environments, exploratory innovation is more negatively related to firm performance when combined with high proactiveness than when combined with low proactiveness. Additionally, comparison of the slope of line pairs 1 and 2, and 3 and 4, respectively, provides further evidence of significantly different effects of high proactiveness between dynamic and stable environments ($t = 3.40, p < .005$) and low proactiveness between dynamic and stable environments ($t = -3.00, p < .005$).

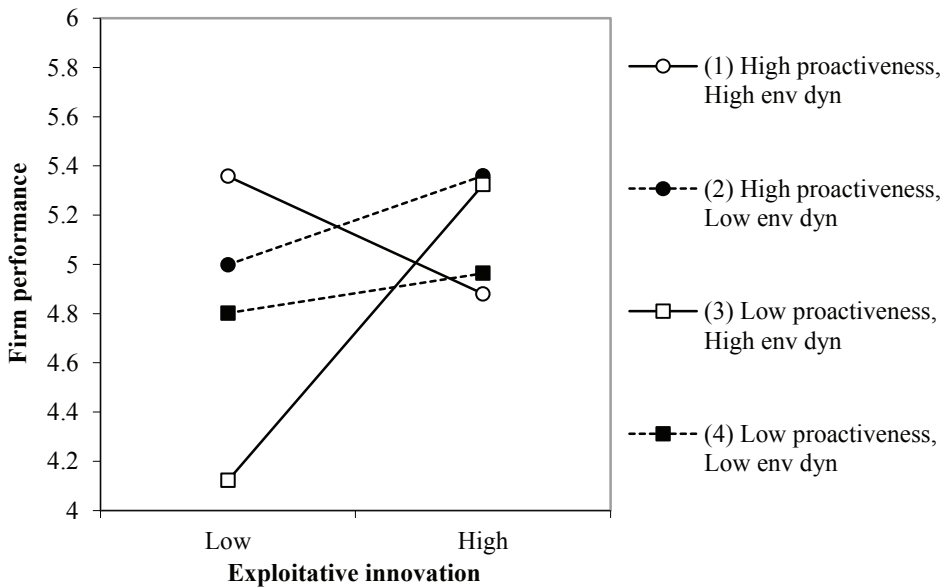
Figure 3.1 Interaction effects between exploratory innovation, environmental dynamism and proactiveness



We repeat the procedure for the relationship between exploitative innovation and firm performance (see Figure 3.2). Contrary to our prediction in Hypothesis 2a, the results of the simple slope analysis show that exploitative innovation was significantly positively related to firm performance in *dynamic environments* for low ($b = .60, t = 6.72, p < .001$) and average ($b = .18, t = 2.16, p < .05$) values of proactiveness, and negative with marginal significance when proactiveness was high ($b = -.24, t = -1.69, p < .10$). Calculation of the Johnson-Neyman region of significance indicates that the interaction effect of exploitative

innovation and environmental dynamism is significant ($p < 0.05$) for (standardized) values of proactiveness falling outside the region $-.6413$ and $.8588$, corresponding to 51.2% of our sample.

Figure 3.2 Interaction effects between exploitative innovation, environmental dynamism and proactiveness



The slope difference test for the regression lines 1 and 3 in Figure 3.2, representing the effect of exploitative innovation on firm performance in dynamic environments for high and low levels of proactiveness, respectively, is significant ($t = -3.43, p < .001$) yet with an effect opposite from Hypothesis 2a: in dynamic environments, exploitative innovation is *more positively* related to firm performance when combined with *low proactiveness* than when combined with high proactiveness. In *stable environments*, the relationship between exploitative innovation and firm performance was neutral at both low ($b = .08, n.s.$) and high ($b = .18, n.s.$) values of proactiveness. Although visual inspection of regression lines 2 and 4 in Figure 3.2, representing the effect of exploitative innovation on firm performance in stable environments for high and low levels of proactiveness, respectively, shows that firm performance seems to be overall higher for proactive firms, the slope difference test provides no support for hypothesis 2b ($t = .60, n.s.$). That is, in

stable environments, investment in exploitative innovation is not significantly more positively associated with firm performance when combined with high proactiveness than when combined with low proactiveness. However, comparison of the slope of line pairs 1 and 2, and 3 and 4, respectively, does show evidence of a significantly different effect of high proactiveness between dynamic and stable environments ($t = -2.51, p < .05$) and low proactiveness between dynamic and stable environments ($t = 2.48, p < .05$).

3.5 Discussion and Conclusion

While the exploration-exploitation framework in strategic management literature is widely used, understanding of the performance outcomes of exploratory and exploitative innovation remains limited (Raisch & Birkinshaw, 2008; Lavie *et al.*, 2010). Particularly salient is the lack of a thorough and comprehensive understanding of how firms successfully leverage these two types of innovation at various level of environmental dynamism (Posen & Levinthal, 2011). Our study set out to contribute to this emerging environmental contingency perspective on the exploration/exploitation framework (Jansen *et al.*, 2006; O'Reilly & Tushman, 2008; Raisch *et al.*, 2009) by articulating more comprehensively than before when investment in exploratory and exploitative innovation pays off. That is, we contribute to the question what configuration of organizational and environmental contingencies constitutes an appropriate response to environmental change (cf. Posen & Levinthal, 2011).

More specifically, we aimed to refine and extend previous insights on this important issue by theorizing and empirically testing the proposition that the degree to which firms can successfully leverage investments in exploratory and exploitative innovation under varying degrees of environmental dynamism will be dependent on strategic temporalities, conceptualized as the degree of proactiveness (Lumpkin & Dess, 1996, 2001; Venkatraman, 1989) (cf. Cohen & Levinthal, 1989). Consistent with our expectations, we demonstrate that an intricate relationship exists between the performance effects of exploratory and exploitative innovation, timing, and a firm's environmental conditions. Particularly interesting is that by considering the role of proactiveness, this study's findings challenge a common, yet somewhat simplistic assertion in extant literature that exploratory innovation is beneficial and exploitative innovation is potentially

detrimental to firm performance in dynamic environments, whereas opposite relations exist in more stable environments (Jansen *et al.*, 2006; Levinthal & March, 1993).

Importantly, we reveal significant evidence of the pivotal role of proactiveness as a boundary condition for leveraging performance benefits of exploratory innovation in *dynamic environments*. Pursuing high levels of exploratory innovation does not warrant high performance in dynamic environments and appears to be beneficial only when combined with a high level of proactiveness. Absent of proactive behavior, exploratory innovation can have a negative impact on performance in dynamic environments as firms incur the costs of exploration without extracting its benefits (Levinthal & March, 1993). Thus, when changes in consumer demand are frequent and product obsolescence rates increase rapidly due to technological and market developments, early timing vis-à-vis competitors is a necessary requirement for appropriating the value potential of investments in exploratory innovation (Bourgeois & Eisenhardt, 1988; Davis *et al.*, 2009).

This finding is largely consistent with theory on early mover advantage (Lieberman & Montgomery, 1988, 1998), which argues that pioneering firms may capture positive performance outcomes due to favorable market positions and high customer acceptance. Yet our results also show that the driving mechanisms underlying early mover advantage may not hold when attempting to leverage investments in exploitative innovation in dynamic environments. Previous studies have generally challenged the feasibility of benefiting from exploitative innovation in this context on the basis that high obsolescence rates of existing products and services renders investments in incremental improvements or extensions ineffective (cf. Sørensen & Stuart, 2000; Uotila *et al.*, 2009). However, that is not to say that firms *cannot* benefit from investments in exploitative innovations in dynamic environments (Posen & Levinthal, 2011).

In support of the pivotal role of timing – yet contrary to the hypothesized direction – our study points out that a more reactive approach to exploitative innovation, entailing that firms choose to lag their competitors, can be advantageous in more dynamic environments. A possible explanation is that attempting to introduce exploitative innovations proactively may increase product development costs and can negatively affect the ability to achieve the quality demanded by existing customers whom are familiar with the product or service (Chen, *et al.*, 2005). Moreover, under high paced environmental

evolution, proactive firms may be more rapidly superseded by later movers as such contexts are more likely to be characterized by lower customer switching costs and weaker appropriability regimes (Levin et al., 1987). That is, when the environmental rate of change is high, followers will have better opportunities to challenge proactive firms by differentiating their products and services on the basis of improved technology and changing customer needs (Suarez & Lanzolla, 2007). Such threats of imitation reduce the performance potential of exploitative innovation by shortening the time frame during which a firm can capture monopolistic returns on its innovation. Consistently, when environmental dynamism is high, efforts to introduce improved or extended products and services ahead of rivals may not be beneficial for firm performance and firms may benefit more from investments in exploitative innovation when they adopt a less proactive or more reactive approach.

This study also advances knowledge of the environmental contingency perspective on exploratory and exploitative innovation by providing insights in the performance implications of these two types of innovation in more *stable environments* (i.e. less dynamic environments). In extension to prior research findings suggesting negative performance outcomes for exploratory innovation (Jansen *et al.*, 2006), we find evidence that unfavorable performance effects of investing in new products, services, and processes may be averted when a more reactive strategic approach is adopted. Moreover, it is shown that a proactive strategic approach to exploratory innovation can be a detrimental factor for firm performance in more stable environments. By contrast, and in concert with prior work, our empirical analysis suggests that investing in exploitative innovation may indeed pay off in stable environments. However, neither a reactive nor a proactive strategy appears to provide a significant contribution to firm performance. Rather, consistent with institutional theory (e.g., Aldrich & Fiol 1994, DiMaggio & Powell 1983) and population ecology perspectives e.g., Aldrich 1979, Hannan & Freeman 1984), our finding that investment in exploitative innovation was most valuable to firm performance at medium levels of proactiveness suggests that pursuing isochronism or a temporal match between the organizational rate of change and the rate of change of industry competitors is the most favorable approach to timing exploitative innovation in stable environments (Pérez-Nordtvedt *et al.*, 2008).

Furthermore, the findings of this study highlight that the relationships between two salient dimensions of entrepreneurial orientation (Lumpkin & Dess, 1996), proactiveness and innovation, is contingent on environmental conditions and innovation type, and contributes to a more accurate and specific understanding of their contingent relationship (Covin et al., 2006; Rauch et al., 2009). Prior strategic entrepreneurship literature has suggested that high technological and market uncertainty forces industry players to make decisions based on a limited understanding of the nature and effect of environmental change and the likely consequences of their strategic actions (Ashill & Jobber, 2010; Milliken 1987, 1990). Choosing an appropriate timing approach for exploratory and exploitative innovations can enable firms to gain competitive advantage under these conditions. This requires careful consideration of when to actively shape the external environment and when to pursue a more reactive approach (cf. Chen & Hambrick, 1995; Miller & Friesen, 1978).

An important implication for further theorizing on the performance implications and interrelations of key dimensions of entrepreneurship is that scholars should carefully disentangle the temporal dimension implied by the degree of proactiveness and the nature of innovative action (Miller, 1983). Indeed, different configurations between both constructs are likely to have differential outcomes. This is consistent with Lumpkin and Dess (1996) argument that an inclination to proactive behavior does not necessarily imply that proactive firms are always first movers in introducing completely new products or services. Proactive timing may lead to first-mover advantages (Lieberman & Montgomery, 1988) yet firms may also proactively seek advantages by introducing imitations or improved products, services and technologies at lower cost (Lumpkin & Dess, 1996). Rather, the key point is that firms can be more or less proactive in pursuing exploratory and exploitative innovations (cf. Covin & Slevin, 1989).

Finally, this study also contributes to the current debate on first-mover advantage (FMA) theory (e.g. Lieberman & Montgomery, 1988, 1998). As argued by Suarez & Lanzolla (2007: 378) in their review of FMA literature, “existing FMA theory has been unable to sort out the conflicting evidence generated by empirical studies and to provide managers with coherent guidelines for strategy” despite the abundant research conducted over the past three decades. Our paper advances understanding of first-mover advantage

theory by answering recent calls in the literature for integration between the micro side of first-mover advantage theory - addressing the configuration and application of resources and capabilities, and the macro side dealing with environmental dynamics (Suarez & Lanzolla, 2007). We extend the important contribution of Franco et al. (2009) in this respect, by suggesting that first-mover advantage in the form of increased firm performance is contingent on the complementarities of proactiveness with both the type (i.e. exploratory and exploitative) and strength of innovation efforts.

3.5.1 Limitations and implications for future research

Our study is subject to some limitations which give rise to a number of interesting avenues for future research. Although we consider a broad range of performance attributes - including several that can be expected to make a representation of a firm's long-term performance prospects, and make use of perceptual scales that been widely used in the literature on firm proactiveness (e.g. Covin & Slevin, 1989; Lumpkin & Dess, 2001; Miller, 1983; Wirtz *et al.*, 2007), our cross-sectional research design does not allow us to fully capture long-term performance effects. The findings in this study should thus serve as a basis for future research measuring proactiveness using objective, independently verified data on introduction dates of realized exploratory and exploitative innovations from a sample of competing firms within a longitudinal research design (Miller, 2012). Such an approach could provide additional insights into distinct short-term and long-term implications of the interaction between proactiveness and exploratory and exploitative innovation (cf. Boulding & Christen, 2003; March, 1991).

Our focus in this study has been explicitly on internal product and service innovation. Lavie et al. (2010) point out that exploration-exploitation patterns may vary across different organizational pursuits. Accordingly, we highlight that further theoretical and empirical research is needed to gain a better understanding of the influence of proactive timing in other domains. Future research may, for instance, investigate how proactiveness influences the performance outcomes of exploration and exploitation in alliances and acquisitions to provide further insight in the role of timing in such contexts (cf. Lavie, Lechner & Singh, 2007).

This study's results indicate that managing proactiveness differentially with regard

to exploratory and exploitative innovation may play an important role in reconciling the opposing force of environmental dynamism on the effectiveness of exploration and exploitation. Accordingly, we suggest that proactiveness should be considered as a potentially critical antecedent of organizational ambidexterity, i.e. the simultaneous pursuit of exploration and exploitation (Gibson & Birkinshaw, 2004; Simsek, 2009).

In concert with Franco et al. (2009), the findings suggests that first-mover advantage theory should develop beyond the static approach of investigating a single instance of early entry into new markets, towards a more dynamic, process perspective in which timing of subsequent actions is also taken into account. The finding that early exploitation of existing knowledge and capabilities in stable environments has a clear value potential indicates that the relevance of timing reaches beyond that of the impact of “legacy-based advantages” (Franco *et al.*, 2009) on long-term survival (Banbury & Mitchell, 1995). Accordingly, we argue that conceiving of first-mover advantage as an outcome of firm proactiveness – a continuous effort to act ahead of competitors - may lead to a more insightful conceptualization of competitive timing.

Our findings also call for further research into the antecedents of proactiveness. While proactiveness takes a central role in literature on entrepreneurship and entrepreneurial behavior (Covin & Slevin, 1989; Smith & Cao, 2007), much more remains to be understood about what drives and enables firms to behave proactively (cf. Rauch et al., 2009; Miller, 2012). We expect that future studies adopting an in-depth, multi-level approach could prove particularly useful in clarifying why some firms are more proactive than others. On a more general note, based on the findings of this study, we highlight the need for theories and empirical work that develops current understanding of temporalities in the domain of strategic entrepreneurship. Considering the great importance of timing in strategic and entrepreneurial action, both in terms of its implications for internal organizational processes and competitive outcomes, we believe that time should be incorporated more explicitly in explanations of theoretical constructs and their relationships (George & Jones, 2000). In this paper, we have endeavored to enrich the current debate on the appropriateness of exploration and exploitation in different environmental contexts by showing how taking into account temporality can nuance prior understandings. We encourage future research efforts to consider how timing and related

temporal dimensions may further advance our knowledge of the environmental contingency perspective on the exploration-exploitation framework and beyond.

3.5.2 Conclusion

In sum, this study contributes to understanding of the relation between exploratory and exploitative innovation and firm performance in dynamic environments by investigating the moderating role of firm proactiveness. Whereas prior research suggests that exploratory innovation is beneficial in dynamic environments, we argue that this effect is more likely to occur in proactive firms while investing in exploratory innovation without behaving proactively may be detrimental to firm performance. Furthermore, where prior studies have argued that exploitative innovation may negatively influence firm performance in dynamic environments, our study shows that firms can indeed benefit from exploitative innovation in such a context if they behave more reactively. Overall, these results highlight the pivotal influence of timing for benefiting from both exploratory and exploitative innovation in dynamic environments, and call for further research into the dynamics underlying firm proactiveness.

Appendix A.: Measures and items

Exploratory Innovation

How much did your organization invest on average over the past three years on developing new products/services and/or processes (as a percentage of revenue)?

Exploitative Innovation

How much did your organization invest on average over the past three years on improving existing products/services and/or processes (as a percentage of revenue)?

Proactiveness (Covin & Slevin 1989, Miller 1983, Lumpkin & Dess 2001)*

In comparison to our competitors...

We are often the first to offer products/services to the market

Our organization is commonly the first to implement new business processes

We are often the first to recognize and tap new markets

Environmental dynamism (adapted from Jaworski & Kohli, 1993)

In our business environment changes are intense

Our clients regularly ask for new products and services

In our local market, changes are taking place continuously

In our market, the volume of products and services to be delivered change rapidly and frequently

Competitiveness (adapted from Jaworski & Kohli 1993)

Competition in our market environment is very intense.

Our organizational has relatively strong competitors.

Competition in our market environment is extremely high.

Price competition is strong in our market environment.

Performance (Lumpkin & Dess 2001)**

How do you evaluate your organization's performance over the last three years relative to your competitors?

Return on equity

Sales growth

Profit growth

Attracting new customers

Market share growth

Reputation

Product/service quality

Customer satisfaction

* all items were measured on a 7-point Likert scale anchored by 1 = "strongly disagree" and 7 = "strongly agree"

** anchored 1 = "much worse" to 7 "much better".

Chapter 4. Determinants of Firm Proactive Strategic Behavior: A Configurational Approach to Employee Job Autonomy, Internal Cooperation and Environmental Dynamism

Abstract

The present study aims to integrate perspectives on individual proactive behaviors and firm-level proactive strategic behavior by developing a conceptual framework taking into account the effect of employee autonomy (i.e. task context) and internal cooperation (i.e. social context) on firm proactive behavior at varying levels of environmental dynamism (i.e. environmental context). We empirically test our framework using survey data from 743 executive directors of small and medium-sized enterprises. Our findings support the framework and increase understanding on how proactive and relational work design characteristics and environmental contingencies jointly affect the degree to which firms behave more proactively with regard to introducing new products, services and business processes. Implications for practice and future research are discussed.

4.1 Introduction

Proactiveness¹ – that is, anticipatory, self-initiated, and change oriented action – lies at the core of strategic entrepreneurship and value creation, be it in the creation of new business ventures, market entry by incumbents, or the introduction of new products and services (Frese, 2009; Frese & Fay, 2001; McMullen & Shepherd, 2006). It is not surprising, therefore, that proactive behavior has received considerable attention in research on strategic entrepreneurship (Lumpkin & Dess, 1996, 2001; Rauch, Wiklund, Lumpkin, & Michael Frese, 2009), psychological perspectives of entrepreneurial intentions (Frese, 2009), and organizational behavior (Bateman & Crant, 1993; Crant, 2000; Grant &

¹ Different research domains may use either the term proactiveness or proactivity. In the interest of consistency we will use the term proactiveness throughout.

Ashford, 2008).

At the organization level, proactiveness generally refers to a firm's proactive strategic behavior reflected by an 'opportunity-seeking, forward-looking perspective involving introducing new products or services ahead of the competition and acting in anticipation of future demand to create change and shape the environment' (Lumpkin & Dess, 2001: 431). While this notion of firm proactiveness is widely used in the literature and evidence of the desirability of firm proactive strategic behavior is mounting, understanding of its idiosyncratic determinants is surprisingly limited (Parker, Bindl, & Strauss, 2010). A possible explanation is that in the domain of strategic entrepreneurship, proactiveness is commonly studied in unison with other dimensions of the entrepreneurial orientation (EO) construct, referring to the strategy-making processes underlying entrepreneurial decisions and actions (Lumpkin & Dess, 1996; Rauch et al., 2009). Recent literature reviews have concluded that in advancing understanding of these processes, more attention needs to be directed towards studying antecedents at the dimension level rather than as part of an aggregate construct (Miller, 2012; Rauch et al., 2009), suggesting that focused attention on firm proactiveness as a central construct is needed.

In line with this aim, the present paper advances knowledge on the organizational determinants of firm proactive strategic behavior by developing and testing a conceptual framework drawing on research on proactive behaviors of organizational members (Crant, 2000; Grant & Ashford, 2008; Parker & Collins, 2010). More specifically, we use theory on the behavioral effects of work design characteristics to suggest that the motivational and informational mechanisms linking employee job autonomy to proactive behaviors at lower levels of analysis may also drive proactiveness at the firm level. Additionally, in line with Grant and Parker (2009), our approach is to combine a proactive perspective that explains the role of work design characteristics in stimulating employees' initiative with a relational perspective that accounts for the implications of interpersonal interactions and interdependencies within the organization. Accordingly, a conceptual framework is presented in which the effect of employee job autonomy – i.e. an employee's discretion and control regarding job content as well as the timing and method of task execution – on firm proactiveness differentially influenced by the degree of internal cooperation at different levels of environmental dynamism.

In so doing, we make several contributions to existing literature. First, we extend current literature on proactive strategic behavior by linking it to the burgeoning research on individual-level proactiveness. In addition to the paucity of research on firm proactiveness at the dimension level, knowledge of proactive strategic behavior at the firm level has remained relatively isolated from important insights from studies focusing on proactive behaviors at the individual level of analysis. Our model and empirical findings provide important insight with respect to what extent established effects on lower levels of analysis are generalizable to the firm level. In so doing, we offer a better understanding of the determinants of strategic entrepreneurship. By theorizing and empirically testing how proactiveness can be achieved under different levels of environmental dynamism we further contribute to prior research which has shown that firm proactiveness may be particularly vital for performance in more dynamic environments (e.g. Lumpkin & Dess, 2001). In addition, the findings contribute to the discussion on the environmental contingency perspective on the role of organizational structure (Davis, Eisenhardt, & Bingham, 2009) by showing that *configurations* of multiple structural elements (e.g. autonomy and cooperation) may have important implications for whether more or less structure is beneficial under various environmental conditions.

Finally, studying employee job autonomy as an antecedent of firm proactiveness has great practical relevance in light of recent developments in work design such as the increase in flexible work methods (e.g. teleworking, virtual teams, and self-managing teams). With the proliferation of these information technology-driven changes to the work context, flatter organizational structures emerge in which organizational members enjoy greater autonomy and managers are increasingly dependent on employees' ability to drive and adapt to change (Grant & Parker, 2009). Investigating how internal and external contingencies influence the effect of autonomy on proactiveness at the firm level is therefore of great importance for successfully managing the changing work context as well as for building theory on the performance implications of work design configurations.

In the next section, we first introduce our theoretical perspective on firm proactive strategic behavior and employee job autonomy and offer a baseline hypothesis regarding their relationship. We then expand our framework by discussing internal and external contingency effects influencing this relationship. We first examine how internal

cooperation may enable autonomy of individuals to influence proactive strategic behavior on the firm level. Thereafter, we consider to what extent the joint effects of autonomy and cooperation are determined by the degree of dynamism in the firm's external environment. Then, we discuss the methodology used to test our hypotheses. Finally, we conclude with a discussion of our findings, limitations, contributions, and implications for future research.

4.2 Theoretical Foundation and Hypotheses

4.2.1 The conceptualization of proactiveness in organization studies

Scholars have generally used the concept of proactiveness broadly to describe a set of self-starting, change oriented, and future focused behaviors of individuals, teams, and firms (Bateman & Crant, 1993; Lumpkin & Dess, 1996; Parker et al., 2010). At a more detailed level, knowledge on proactive behaviors has developed within rather different domains and in separate literature streams (Crant, 2000; Parker & Collins, 2010). This broad interest shows the relevance of proactive behaviors yet also increases the potential for fragmentation and a lack of cross-fertilization. Indeed, even within literature streams the variety of applications is noteworthy. Accordingly, we briefly present the background of two distinct perspectives: firm-level proactive strategic behavior, and individual level proactive behaviors.

4.2.2 Firm level proactiveness in strategic entrepreneurship literature

Strategic management scholars have long investigated the conditions that enable firms to adapt and survive in the face of environmental change (Gersick, 1994; Nelson & Winter, 1982; O'Reilly & Tushman, 2008). While some scholars have conceived this strategic adaptation process as being responsive, gradual, and bounded by path dependencies emanating from the firm's existing experiences, routines, and capabilities, alternative perspectives highlight that firms may also engage in strategic behavior that reflects a more proactive approach to the firm-environment relationship (Hrebiniak & Joyce, 1985; Smith & Cao, 2007; Volberda & Lewin, 2003). An underlying assumption of the more voluntaristic orientation is that individual firms may choose to engage in

purposeful change aimed at improving fit with their environment (Child, 1972; Van de Ven & Poole, 1995). Change may be triggered by inter-firm rivalry (Barnett & Hansen, 1996; Bowen & Wiersema, 2005), technological developments (Tushman & Anderson, 1986), regulatory change, and other social and political developments in the firm's environment, causing a state of firm-environment misfit and prompting the firm to search for adaptive measures that can restore the alignment and improve chances of survival (Ahuja & Katila, 2004; Nelson & Winter, 1982). Alternatively, firms may enact their environment rather than reactively adapt to it. Weick, (1995: 163), for instance, argues that

(...) organizations play an active role in shaping their environments, partly because they seek environments that are sparsely inhabited by competitors, they define their products and outputs in ways that emphasize distinctions between themselves and their competitors, they rely on their own experience to infer environmental possibilities.

Similarly, the core of entrepreneurship literature is concerned with new entry and the disruptive nature of entrepreneurial action (Smith & Di Gregorio, 2002; Stevenson & Jarillo, 1990). An implicit assumption here is that new entry opportunities – being the very substance of entrepreneurship - can be successfully seized by “purposeful enactment” of aspirational individuals (Smith & Cao, 2007; Van de Ven & Poole, 1995). This notion is also reflected in the conceptualization of entrepreneurial firms as those demonstrating a high degree of proactiveness (Lumpkin & Dess, 1996; Miller, 1983). In their effort to identify successful archetypes of strategy formulation, Miller and Friesen (Miller & Friesen, 1978) describe proactiveness as the inclination to shape the environment by introducing new products, technologies, and administrative techniques, rather than merely reacting to it. Closely related is Miles & Snow's (1978) conceptualization of the prospector generic strategy type with its focus on “finding and exploiting new products and market opportunities” and creating “change in its respective industry” to “gain an edge over competitors” (1978: 551-553).

Building on these early formulations, subsequent entrepreneurship studies have adopted proactiveness as a core dimension of entrepreneurial orientation (EO), referring to a firm's tendency to shape its environment by acting ahead of competition rather than

merely reacting to it (Lumpkin & Dess, 1996; Venkatraman, 1989). An inherent aspect of this conceptualization is its link to the timing of entrepreneurial actions. Proactive firms are inclined to temporally pre-empt competitors by being relatively early – though not necessarily the first – to develop and introduce certain products, processes, and technologies. This temporality sets the notion of proactiveness apart from innovativeness, which, though closely related, is not a necessary aspect of proactive actions. As Lumpkin & Dess (1996) argue, “the products and services that firms proactively bring to the market also may be imitative or reflect low innovativeness”, as is the case “when a firm enters a foreign market with products that are tried-and-true in domestic markets, but uniquely meet unfilled demand in an untapped market” (1996: 148). Vice-versa, firms’ innovative efforts may reflect low proactiveness, for instance, when the competitive setting induces problemistic search (Cyert & March, 1963) and firms effectively follow competitors’ strategic actions.

The relevance of proactiveness as a dimension of entrepreneurial action can be best explained in relation to early or first mover advantage (Lieberman & Montgomery, 1988, 1998). First-mover advantage literature suggests that proactive firms (i.e. those acting among the first in the industry) can potentially gain benefits through technological leadership, preemption of rivals in acquiring scarce assets (e.g. input factors, premium geographic locations), and switching costs of customers. Such advantages have been found to drive market share and profitability (Lieberman & Montgomery, 1998). In line with earlier studies (e.g. Miller, 1983; Miller & Friesen, 1983), Lumpkin & Dess (2001) show that proactiveness is positively related to firm performance in terms of sales growth, return on sales, and profitability. This effect is contingent on the firm’s environment and industry life cycle, and particularly strong in growth stage industries and dynamic and hostile environments (Lumpkin & Dess, 2001; cf. Miller & Camp, 1985).

Considering the positive performance effects of firm proactiveness, it is somewhat surprising to find that little research has been devoted to the conditions enabling firms to behave proactively. Moreover, we find that important insights on micro-foundations of proactive strategic behavior may be gained from integrating literature on individual-level proactive behavior focusing on the actions of individual agents, with literature approaching proactiveness from a strategic entrepreneurship perspective. The underlying assumption is

that to achieve proactive behavior at the firm level, opportunity recognition and anticipatory actions of individuals need to be catalyzed. We next explore how factors considered relevant to individual proactive behaviors may enhance firm level proactiveness.

4.2.3 *Individual-level proactive behavior: The role of employee job autonomy*

On the individual level of analysis, scholars have defined proactive behavior as ‘anticipatory action that employees take to impact themselves and/or their environments’ (Grant & Ashford, 2008:8). This definition combines perspectives of proactiveness as both a behavioral tendency to effect change (Bateman & Crant, 1993) and an individual’s actual anticipatory and future-focused proactive behaviors (Frese & Fay 2001, Frese et al., 1996, Frese 2006). Proactiveness can thus pertain to a variety of work-related actions both within and beyond the boundaries of a specific role. While a comprehensive discussion of the various proactive behaviors discussed in the literature is outside the scope of this paper and available elsewhere (see for instance Parker & Collins, 2010), commonly studied examples include feedback seeking (Ashford, Blatt, & Walle, 2003), problem prevention (Frese & Fay, 2001), and taking charge (Morrison & Phelps, 1999).

With respect to the emergence of these proactive behaviors, prior work by Parker and colleagues (Parker et al, 2010; Parker et al., 2006), amongst others, shows that employees’ personal inclination towards proactive behavior (i.e. proactive personality) and specific features of the work environment are two pertinent determinants of proactiveness. An individual’s proactive inclination is generally considered to be a stable trait and thus not within the direct control of managers. Work design characteristics, on the other hand, i.e. the structure, content, and configuration of jobs individuals perform (Oldham, 1996), can be modified so as to influence the likelihood of employees behaving more or less proactively with regard to their role. We argue that studying the effects of work design characteristics as they pertain to proactive strategic behavior at the firm level of analysis is a timely endeavor. With the proliferation of information technologies, transformations in the workplace are often dramatic in terms of both speed and magnitude. Firms increasingly introduce new ways of organizing (e.g. flexible work methods) that significantly impact the way work is done and typically increase autonomy and discretion (Grant & Ashford,

2008; Parker, 2000). It is not surprising, therefore, that research on work design is experiencing renewed attention from organizational scholars (Grant & Parker, 2009; Morgeson & Campion, 2003) after an apparent decline in interest (Campion, 1996; Grant, Fried, Parker, & Frese, 2010).

One of the most dominant theories in research on work design is the job characteristics model described by Hackman and Oldham (1976, 1980). The rationale of this model is that individuals have a need for personal growth and development, which can be satisfied by engaging in challenging and meaningful jobs (Paul, Robertson, & Herzberg, 1969). Accordingly, jobs offering employees responsibility for decision-making (Hackman and Oldham, 1976) are more likely to drive intrinsic motivation and satisfaction (Parker & Ohly, 2008). Of the five core job characteristics found in the seminal work of Hackman and Oldham (1976) (i.e. skill variety, task identity, task significance, autonomy, and feedback), arguably the most attention has been given to the concept of job autonomy (Spector, 1986). A large body of research has shown that autonomy has significant theoretical and practical importance (Breugh, 1985), and existing evidence generally supports the notion that job autonomy results in higher motivation (Hackman & Oldham, 1976), satisfaction (Loher, Noe, Moeller, & Fitzgerald, 1985), and performance (Langfred & Moyer, 2004; Spector, 1986). Moreover, recent work confirms that autonomy is a key driver of a wide range of beneficial outcomes including various proactive work behaviors (Frese & Fay, 2001; Parker, 1998; Axtell & Parker, 2003, Parker et al., 1997; Parker, Williams & Turner, 2006). On the basis of these findings, we conjecture that there are strong grounds for proposing that job autonomy has relevant implications for proactive strategic behavior. However, research has yet to link autonomy as a central concept of work design to proactiveness at the firm level. We next elucidate this relationship and discuss the moderating roles of cooperation and environmental dynamism.

4.2.4 The impact of employee job autonomy on firm proactive strategic behavior

Building on prior work design literature, we focus on two mechanisms that we consider relevant for understanding the relationship between employee job autonomy and proactiveness, namely motivation and information (Langfred & Moyer, 2004).

The motivational effect of autonomy has been well documented in literature on job

design. Hackman and Oldham (1976) suggested that autonomy alters critical psychological states that in turn influence affective and behavioral outcomes associated with employees' increased motivation for greater effort. For instance, when given autonomy, employees may experience higher responsibility for the outcomes of their work, which in turn increases their work effectiveness and internal work motivation (Hackman & Oldham, 1976; Morgeson & Campion, 2003). Parker et al. (2006) argue that job autonomy enhances proactive work behavior such as proactive idea implementation, referring to "an individual taking charge of an idea for improving the workplace, either by voicing the idea to others or by self-implementing the idea", and proactive problem solving, referring to "self-starting, future-oriented responses that aim to prevent the reoccurrence of a problem (...) or that involve solving it in an unusual and nonstandard way" (Parker, et al, 2006: 637). These outcomes are affected directly by autonomy, but also indirectly through proactive cognitive-motivational factors such as role-breadth self-efficacy and flexible role orientation (Axtell & Parker, 2003; Parker, 2000; Parker, 1998; Parker, Wall, & Jackson, 1997).

High autonomy stimulates employees to control their work environment and take ownership and responsibility of problems, which increases motivation (Wall & Martin, 1987) as well as the perceived capability of carrying out a broader and more proactive role than formally expected (Parker, 1998, 2000). Similarly, researchers have found that autonomy and decision latitude (Karasek, 1979) promote personal initiative (Deci & Ryan, 1985; Frese et al., 2000; Frese, Garst, & Fay, 2007) and receptiveness to change (Hornung & Rousseau, 2007). Adding even further evidence, research on the team level of analysis also indicates a positive association between autonomy and collective inclination towards self-starting, change-oriented behaviors characterizing proactivity (Kirkman & Rosen, 1999; Williams, Parker, & Turner, 2010).

A related mechanism underlying the relationship between autonomy and firm proactive behavior concerns the efficiency and effectiveness of knowledge processes. Wall & Jackson (1995) suggest that autonomy contributes to an individual's understanding of the job due to greater job control. Consistent with this notion, Parker et al.'s (1997) study on the effects of autonomy on role orientations in a manufacturing environment, showed that employees with more job autonomy reported higher learning in terms of development

in the range of knowledge and skills they regarded as important in performing their roles. Increased experience in certain job domains is associated with a larger knowledge base, more accessible knowledge structures, and a better sense of how to apply knowledge in decision-making processes (Smith, Collins, & Clark, 2005). Combined with employees' autonomy to decide on how and when to apply accumulated knowledge as they see fit, employees are likely to anticipate problems and act on opportunities in the firm's environment more astutely than when relevant knowledge would have to be shared with other decision makers first (Morgeson & Campion, 2003). Moreover, such factors positively affect a firm's overall absorptive capacity for new external knowledge, and, consequently, enhance the firm's proactive exploitation of opportunities which may increase the rate of new product introductions (Cohen & Levinthal, 1990; Drazin & Rao, 2002; Kogut & Zander, 1992). In sum, on the basis of existing evidence and the arguments discussed above we propose that the behavioral and affective outcomes associated with autonomy are important determinants of proactiveness at the firm level. Thus, we predict that:

***Hypothesis 1:** Employee job autonomy is positively associated with firm proactive strategic behavior.*

4.2.5 The moderating role of internal cooperation

Prior theory and empirical studies on work design suggests that the social context of work is likely to moderate the effect of autonomy on proactive behavior (Grant and Parker, 2009). Several specific social characteristics have been articulated as such in previous studies – though particularly in the area of work teams, including task interdependence (Langfred, 2000, 2005; Langfred & Moye, 2004), trust (Clegg & Spencer, 2007; Langfred, 2004), and supportive management systems (Morgeson et al., 2006). Building on this foundation, we argue that the extent to which employee autonomy enhances the degree of proactive strategic behavior at the firm level depends on whether the social context enables individuals' proactive behaviors to engender collective action. In this respect, it is likely that internal cooperation between organizational members plays a particularly important role. Following the behavioral approach discussed by Chen, Chen, & Meindl (1998),

(internal) cooperation is defined as interactive, relational behavior of organizational members which is directed at collective action and task achievement (Milton & Westphal, 2005; Smith, Carroll, & Ashford, 1995). Examples of cooperative behaviors include combining and sharing ideas, information and other resources, communicating and discussing problems and conflicts, and providing support, assistance, encouragement, and help (Argyle, 1991; Tjosvold, 1988).

There are several reasons to expect internal cooperation to influence the relationship between autonomy and proactive strategic behavior. With regard to its influence on the motivational effect of autonomy, strong cooperation may cause individuals to feel more constrained by the system of which they are part (Weick, 1976). Dierdorff & Morgeson (2007) note that high social interaction between employees regarding role enactment increases their consensus on requisite role responsibilities, even in highly autonomous occupations. This strongly suggests that a cooperative context reduces the likelihood that employees will develop flexible role orientations (Parker, 1998; Parker et al., 1997) in which they feel ownership and responsibility for problems and broadly define their role beyond explicitly defined goals (Parker & Collins, 2010). As a result, it is less probable that autonomous individuals will engage in proactive strategic behaviors such as strategic scanning, suggesting improvements (Axtell et al., 2000), or anticipatory action aimed at preventing problems (Frese & Fay, 2001; Parker & Collins, 2010; Parker et al., 2006).

Another important way in which internal cooperation plays a role is through its influence on the efficiency of knowledge sharing between organizational members. Cooperation reflects the interdependence between employees and enables the building of relational ties. On the one hand, these ties are considered to promote the transfer of knowledge and facilitate the process through which employees learn about opportunities for applying their knowledge (Hansen, 1999; Burt, 1992). Yet on the other hand, strong ties may also “constrain the inflow of new knowledge and inhibit the search for new knowledge outside the established channels” (Hansen, 1999: 108). Dense linkages may produce “collective blindness” (Nahapiet & Ghoshal, 1998) and hamper the receptiveness to new ideas and practices (Weick, 1995). In a similar vein, Langfred (2005) notes that individuals’ dependence on other team members restricts the application of unique task-

specific knowledge. Accordingly, he finds that task interdependence negatively influences the positive effect of individual autonomy on team performance.

Further, autonomy and cooperation may have substitutive roles in their effect on individual proneness to proactive behaviors such as problem solving. In a quasi-experiment involving a workgroup redesign intervention, Morgeson et al. (2006) found that restructuring traditional teams into semi-autonomous teams generally enhanced effort expended, skill usage, and problem solving, yet only under deficient contextual conditions characterized by poor feedback and information systems. When such support systems were in place, however, the beneficial effect of autonomy was found to be less pronounced. With respect to information systems, this finding may reflect that greater availability of information provided by appropriate systems improves employees' problem-solving processes and reduces the need for substitute methods for gaining access to relevant information such as autonomy (Morgeson et al., 2006). Our prediction is, therefore, that when cooperation among employees is more intense, individuals with high job autonomy are less likely to engage in proactive behaviors that drive proactive strategic behavior on the firm level. Accordingly, we hypothesize that:

***Hypothesis 2:** Employee job autonomy and internal cooperation interact in such a way that the positive relationship between employee job autonomy and proactive strategic behavior is stronger for firms with low internal cooperation than for firms with high internal cooperation.*

4.2.6 The moderating role of environmental dynamism

In addition to social context attributes, characteristics of the organization's external environment can also be expected to constrain or enable the effect of autonomy on proactive strategic behavior. A key factor in the impact of the external environment is its association to uncertainty experienced by organizational members (Griffin, Neal, & Parker, 2007). Uncertainty may increase as a result of dynamism and unpredictability of change with regard to customers, suppliers, competitors, resources, technologies, and institutions (Burns & Stalker, 1961; Davis et al., 2009; Thompson, 1967; Milliken, 1987). This, in turn, affects the unpredictability in the inputs, processes, or outputs of work systems

(Griffin et al., 2007: 329). In line with role theory (Katz & Kahn, 1966), previous studies have argued that as uncertainty increases there is a higher need for self-directed action of employees because formalization of tasks and work roles hampers effective anticipation of contingencies (Ilgen & Hollenbeck, 1991; Griffin et al., 2007). This suggests that increasing autonomy in dynamic environments enhances the effectiveness of proactive behaviors of organizational members.

Consistently, a sizeable part of the research on what constitutes an appropriate level of organizational structure, or “constraint on action” (Davis et al., 2009: 415) focuses on the contingency of environmental dynamism. An apparent convergence in extant theoretical perspectives is that dynamic environments call for more organizational flexibility and hence less structure, whereas more structure is pertinent in stable environments where efficiency is important (e.g. Burns & Stalker, 1961; Thompson, 1967; Lawrence & Lorsch, 1967). Eisenhardt & Tabrizi (1995), for instance, show that in the dynamic personal computing industry less structure enables faster and more effective innovation. Overall, these literatures indicate that when environmental dynamism is high, increased agency of employees in shaping their roles and discretion in directing attention to emerging opportunities will enhance proactive behaviors. Accordingly, we hypothesize:

***Hypothesis 3:** Employee job autonomy and environmental dynamism interact in such a way that the positive relationship between employee job autonomy and proactive strategic behavior is stronger for firms in dynamic environments than for firms in stable environments.*

4.2.7 A configurational perspective on employee job autonomy, internal cooperation, and environmental dynamism

The complex nature of the modern work context suggests that building explanations of proactive strategic behavior requires an analysis of multivariate configurations in which task and social work design characteristics and environmental context attributes are considered in tandem (Aldrich, 1979; Grant & Parker, 2009). Indeed, the interplay between autonomy and cooperation can be expected to vary across different levels of environmental dynamism. Consistent with the argumentation for the previous hypothesis, highly dynamic

environments typically call for more flexibility and less structure (Davis et al., 2009). This corresponds to a combination of high autonomy for individual employees and low internal cooperation. Although autonomous employees may be more inclined to anticipate events and initiate preventive actions in fast-changing environments (Aragon-Correa & Sharma, 2003), cooperation can negatively influence the efficiency and speed of decision-making that would be needed to leverage such behaviors on the firm level. Effective internal cooperation increases the need to invest time on consensus building among employees, which is more difficult to achieve in a setting where continuous change is hard to predict and a greater amount of equivocal information needs to be processed. Moreover, overloads in communication channels may cause delays in information processing or render the system resistant to change (Weick, 1982; Volberda, 1988). By contrast, in more stable environments, organizational members may more effectively integrate knowledge and resources through cooperative ties such that the autonomy induced proactive behaviors of individuals are less affected. Thus, combining the previous moderating effects we hypothesize that:

***Hypothesis 4a:** In dynamic environments (high level of dynamism), the relationship between employee job autonomy and proactive strategic behavior is less positive for firms with high internal cooperation than for firms with low internal cooperation.*

***Hypothesis 4b:** In stable environments (low level of dynamism), the relationship between employee job autonomy and proactive strategic behavior is more positive for firms with high internal cooperation than for firms with low internal cooperation.*

4.3 Methods

4.3.1 Sample and data

We examined the proposed relationships between employee job autonomy, internal cooperation, environmental velocity, and proactiveness on the basis of a sample of primarily small and medium-sized enterprises (SMEs). Data were collected using a detailed questionnaire targeted at executive directors of these firms. Several steps were

taken to maximize response rate including telephoning, sending a second survey, and sending multiple reminder notifications to non-responders. Furthermore, we guaranteed confidentiality and promised key informants a customized benchmark report.

Of the 4,000 firms contacted, 901 surveys were returned, representing a participation rate of 22.5 percent. The final number of usable surveys completed by key informants of companies with more than 10 employees was 743 companies, representing an 18.6 percent participation rate. Key informants had an average age of 48 years and an average tenure with their organizations of 13 years. The distribution of firms per industry was as follows: food & agriculture (3.3%), manufacturing (25.7%), chemicals (5.2%), transport & trade (11.6%), construction (11.6%) financial service (1.6%), professional services (27.8%), media & publishing (2.0%), ICT (9.2%), and energy & utilities (2.0%).

To gauge the quality of the data, we took several precautionary measures and performed various tests for potential biases. First, given the 22.5 percent participation rate, we checked for possible non-response bias using two tests. As a first step, we compared participating and non-participating firms along the dimension of size (measured as number of employees), age, and industry. T-tests on the basis of these variables were statistically insignificant, suggesting that non-respondents do not differ substantially from the firms in our sample. Next, we compared early and late respondents (defined as those firms that participated only after a second reminder was sent) on the research variables (i.e. proactiveness, employee job autonomy, internal cooperation, and environmental dynamism). The rationale for this test suggested by Oppenheim (1996) is that late respondents are similar to non-respondents in that they would have been considered as such had a reminder not been sent. Results of this comparison showed that these groups did not differ statistically ($p < 0.05$), suggesting that nonresponse bias is unlikely to seriously distort our results.

Second, several considerations related to the potential issue of common method variance (CMV) deserve mentioning. In general, the use of a single method in the measurement of a study's main research constructs can typically give rise to bias with regard to estimation of their relationships (Podsakoff, MacKenzie, & Podsakoff, 2012). Yet as several studies have pointed out, inflation of relationships cannot occur in the case of interaction effects (Evans, 1985; Podsakoff et al., 2012; Siemsen, Roth, & Oliveira,

2010). Rather, interaction effects are potentially deflated when CMV is present making them more difficult to detect statistically (Siemsen et al., 2010), such that even if CMV would have affected the measurement of our constructs, the results would be biased towards the side of caution. Notwithstanding this corollary, we addressed the possibility of CMV affecting the direct effect in hypothesis 1 through the design of the survey as well as statistically.

Following the recommendation of Podsakoff et al. (2003), among others, we used a proximal separation between the measures of the predictor and outcome variables, by introducing measures of the predictor variables more towards the beginning of the survey and measures of the outcome variable towards the end of the survey. Increasing the physical distance between the measures of predictor and outcome variables should prevent that respondents use previous answers to answer subsequent questions. In addition, we used two different statistical techniques to diagnose whether common method variance (CMV) is likely to drive the result of the hypothesized main effect between employee job autonomy and firm proactiveness. As a first step, we conducted the widely used Harman's one-factor test (1976), which entails an assessment of the amount of variance explained by the first factor of the unrotated exploratory factor analysis solution. Researchers have argued that common method variance may be a problem when a single factor emerges from the factor analysis or the first factor accounts for most of the covariance among the measures (Podsakoff & Organ, 1986; Podsakoff et al., 2003). A factor analysis using principal axis factoring of all measurement items yielded four factors (as determined by the eigenvalues greater than 1 and scree plot criterion), which together explain 67 percent of the variance. As the first factor explained 25 percent of the variance, this test suggests that common method variance is not a serious concern when interpreting our results. However, some scholars have criticized Harman's one-factor test for being insensitive (Podsakoff et al., 2003). Accordingly, we also controlled for the effects of a latent common methods factor by examining the significance of confirmatory factor analysis (CFA) models in which survey items associated with the independent variables were allowed to load on the common method variance factor in addition to their respective theoretical construct (Podsakoff et al., 2003). While the results of these analyses cannot completely rule out the possibility of common method variance, we are confident that the *ex ante*

measures, the *ex post* statistical tests, and the complex specification of relationships among the independent and dependent variables, it is unlikely to be a critical limitation with the current data and confound the interpretation of results.

4.3.2 *Analytical approach*

We applied hierarchical moderated regression analysis to test our hypotheses. This approach involves comparisons between alternative models with and without interaction terms. Moderation is indicated when interaction terms contribute significantly to the variance explained in the dependent variable beyond the variance explained by the (conditional) main effects of independent and control variables (Podsakoff et al., 2003). Estimations were performed using the PROCESS macro (Hayes, 2012). Study variables were group mean centered by industry before including the interactions of each pair of variables. Additionally, we tested whether modeling assumptions for this type of regression were satisfied and found no significant problems or violations.

4.3.3 *Measurement of constructs*

The measurement items used in our survey were predominantly adapted from existing scales used in prior research. Measures for employee job autonomy, internal cooperation, environmental dynamism, and proactive strategic behavior were measured on seven-point Likert scales anchored 1 = “fully agree”, 7 = “fully disagree”.

Dependent variable. *Proactive strategic behavior* was measured using four items adapted from Covin & Slevin (1989) (see also Lumpkin & Dess, 2001; Miller 1983). The items ask respondents to indicate to what extent the firm has a tendency to act ahead of competition in introducing products and services, implementing new business processes, and recognizing and entering new markets ($\alpha = .90$).

Independent and moderator variables. *Employee job autonomy* was measured using a six item scale ($\alpha = .76$) based on Breugh’s work autonomy scale (Breugh, 1985, 1989, 1999). Items cover each of the three sub dimensions, i.e. method autonomy, scheduling autonomy, and criteria autonomy. Example items include “employees are free to choose their work methods” and “employees are free to modify their job objectives”. *Internal cooperation* was measured on a four-item scale ($\alpha = .76$) based on key sub dimensions discussed in the literature, such as the combination of information and ideas,

and providing assistance and support (Argyle, 1991; Tjosvold, 1988). Items include “within our organization employees can rely on people helping each other when necessary”, and “there is regular informal deliberation between employees of different departments”. Finally, a four-item scale ($\alpha = .85$) for *environmental dynamism* was adapted from prior studies (e.g. Jansen, Van Den Bosch, & Volberda, 2006). Items reflect the rate and frequency of change of customer demand, product obsolescence, and the organization's environment in general. The measure for environmental dynamism was calculated as the ratio of the firm's response to the industry group's average response for this scale (Drnevich & Kriauciunas, 2011).

Control variables. We further controlled for possible confounding effects by including several relevant control variables. Previous studies have argued that over time, firms are increasingly prone to becoming trapped into established routines and competences that obstruct organizational change (Hannan & Freeman, 1984). Older organizations may therefore be less likely to exhibit proactive behavior. Accordingly, we controlled for *firm age*, measured by the natural logarithm of the number of years since the company's foundation. Prior literature also suggests that compared larger firms, smaller firms have a greater propensity for proactive action (Chen & Hambrick 1995). Accordingly, we included the natural logarithm of the number of full-time employees to account for *firm size*. *R&D intensity* was also controlled for by a measure asking respondents to indicate the average annual percentage of revenues spent on R&D. To control for *industry* effects, we included ten industry dummies, using “other professional services” as the reference group. Secondary data on industry type was collected from the database of the Dutch Chamber of Commerce and measured at the two-digit SIC code level. This study also controlled for two measures of prior performance as it can affect the potential for proactive strategic behavior. We included prior performance in terms of *average prior sales growth* and *average profitability* over the past three years in comparison to key competitors (Lumpkin & Dess, 2001). Performance data was obtained from the survey (Zahra, Ireland & Hitt, 2000).

4.3.4 *Measurement reliability and validity*

Several approaches were used to assess the reliability and validity of our measures.

In order to examine the reliability of our data and assess potential concerns associated with single-informant data (Venkatraman & Grant, 1986) a second senior executive of each firm's was requested to return a survey. We received 129 responses, or 17% of the final 743 firms. A within-group inter-rater agreement score (r_{wg}) (James, Demaree & Wolf 1984) was then calculated to assess the consensus between the two respondents of each organization. The median r_{wg} per variable ranged between 0.86 and 0.96, indicating acceptable agreement between respondents within organizations for both the independent and dependent variables.

Exploratory factor analysis was conducted to validate the discriminant validity of the employee job autonomy, internal cooperation, environmental dynamism, and proactive strategic behavior measures. The results clearly replicated the intended four-factor structure with each item loading on its intended factor and jointly explaining 67% of the variance. Factor loadings were significant with values above .49 and no cross-loadings above .26. An integrated confirmatory factor analysis was subsequently performed to further assess the convergent and discriminant validity of all multi-item constructs. Each item was constrained to load only on the construct for which it was the proposed indicator. Results revealed a model that fits the data well ($\chi^2(98, N = 743) = 228, p < .001$; $RMSEA = .04, ns$; $CFI = .98$; $TLI = .97$). Item loadings were as proposed and significant ($p < .001$), providing evidence of convergent validity. Discriminant validity was further evaluated by assessing whether each construct's average variance extracted (AVE) was greater than its shared variance with other constructs (Anderson and Gerbing, 1988; Fornell and Larcker, 1981). Every pair of latent factors passed this test. Finally, all composite scales exhibit satisfactory internal consistency with composite reliabilities (Cronbach's alpha) ranging from 0.76 to 0.90. These results provide evidence that the measurement instruments used in our study meet the criteria for discriminant validity.

4.4 Results

Table 4.1 reports the means, standard deviations, and inter-correlations of all study variables. Significant positive correlations were found between proactiveness and employee job autonomy ($r = .16, p < .01$), internal cooperation ($r = .20, p < .01$), and environmental dynamism ($r = .30, p < .01$) respectively. This indicates that firms with high

employee job autonomy, internal cooperation, and dynamic environments are, on average, more proactive. We tested for multicollinearity using the variance inflation factors (VIFs). All VIFs were below 1.64, which is below the common cut-off value of 10. This result suggests that the model was adequately free of multicollinearity.

Table 4.2 reports the results of regression analyses in which firm proactive strategic behavior is the dependent variable. We ran the models using heteroskedasticity-consistent standard errors (Hayes & Cai, 2007). Model 1 contains the control variables. Prior revenue growth (model 1: $\beta = .26, p < .001$) and investment in research and development (model 1: $\beta = .20, p < .001$) have a significant positive effects on firm proactiveness. Model 2 includes the control variables and main effects of employee job autonomy, internal cooperation, and environmental dynamism, which jointly explain a significant share of the variance in proactiveness (model 2: $R^2 = .217, p < .001$). With regard to the relationship between employees' job autonomy and firm proactiveness, we found a significant positive effect (model 2: $\beta = .12, p < .01$), supporting hypothesis 1. Model 3 introduces the two-way interaction terms. Interestingly, adding these terms did not significantly increase the explained variance in proactiveness (model 3: $R^2 = .223, n.s.$). Furthermore, neither internal cooperation (model 3: $\beta = 0.09, n.s.$) nor environmental dynamism (model 3: $\beta = -0.07, n.s.$) showed a significant moderating effect on the relationship between autonomy and proactiveness. Thus, Hypothesis 2 and 3 were not supported. Finally, model 4 introduces the 3-way interaction term between (1) employee job autonomy, (2) internal cooperation, and (3) environmental dynamism. Addition of this term significantly increased the explained variance in proactiveness (model 4: $\Delta R^2 = .02, p < .001$), suggesting that the interaction of employee job autonomy and internal cooperation differentially affects firm proactiveness at different levels of environmental dynamism.

Table 4.1 Descriptive statistics and inter-correlations

Variable	mean	S.D.	1	2	3	4	5	6	7		
(1) Proactive strategic beh.	4.17	1.38									
(2) Autonomy	4.06	1.00	.16**								
(3) Internal cooperation	5.65	0.85	.20**	.30**							
(4) Environmental dyn.	4.58	1.36	.30**	.13**	.15**						
(5) Firm Size ^a	3.96	1.11	.03	-.04	-.04	.10**					
(6) Firm Age ^a	3.07	0.83	-.02	-.05	-.05	-.07	.21**				
(7) Revenue growth	4.74	1.27	.19**	.05	.20**	.01	.01	.03			
(8) Profit growth	4.90	1.12	.27**	.06	.19**	.07	-.06	-.02	.58**		
(9) R&D intensity	2.07	1.52	.25**	.11**	.13**	.19**	-.07*	-.06	.10**		
(10) Energy & Utilities	0.02	0.14	-.07	.01	.01	-.10**	.05	.02	.01		
(11) ICT	0.09	0.29	-.03	.04	.03	.19**	-.02	-.15**	.02		
(12) Media & Publishing	0.02	0.14	.04	-.03	.04	.08*	.02	.07	.03		
(13) Professional Services	0.28	0.45	-.03	.07	.08*	-.02	-.04	-.27**	-.03		
(14) Financial Services	0.02	0.13	-.03	-.04	.01	.02	.13**	-.03	-.06		
(15) Construction	0.12	0.32	-.09*	-.05	-.03	-.07*	-.02	.11**	-.03		
(16) Transport & Trade	0.12	0.32	-.03	.02	-.05	-.05	-.02	.07	.02		
(17) Chemicals	0.05	0.22	.08*	.00	.04	-.01	.05	.11**	.01		
(18) Manufacturing	0.26	0.44	.07*	-.03	-.06	.00	-.02	.15**	.00		
(19) Food & Agriculture	0.03	0.18	.01	-.06	-.07	-.02	.04	.06	.06		
	8	9	10	11	12	13	14	15	16	17	18
(1) Proactive strategic beh.											
(2) Autonomy											
(3) Internal cooperation											
(4) Environmental dyn.											
(5) Firm Size ^a											
(6) Firm Age ^a											
(7) Revenue growth											
(8) Profit growth											
(9) R&D intensity	.13**										
(10) Energy & Utilities	-.02	-.09*									
(11) ICT	.01	.14**	-.04								
(12) Media & Publishing	.11**	-.06	-.02	-.04							
(13) Professional Services	-.05	.05	-.09*	-.20**	-.09*						
(14) Financial Services	-.08*	-.01	-.02	-.04	-.02	-.08*					
(15) Construction	-.01	-.11**	-.05	-.12**	-.05	-.22**	-.05				
(16) Transport & Trade	.04	.01	-.05	-.12**	-.05	-.23**	-.05	-.13**			
(17) Chemicals	.01	.01	-.03	-.08*	-.03	-.15**	-.03	-.09*	-.09*		
(18) Manufacturing	-.01	-.03	-.08*	-.19**	-.08*	-.36**	-.08*	-.21**	-.21**	-.14*	
(19) Food & Agriculture	.06	.02	-.03	-.06	-.03	-.12**	-.02	-.07	-.07	-.05	-.11

N = 743; ^aNatural logarithm; * $p < .05$; ** $p < .01$

Table 4.2 Results of hierarchical regression analysis: Effects on proactiveness

Variables	Proactiveness ^a							
	Model 1		Model 2		Model 3		Model 4	
<i>Controls</i>								
Firm size ^b	0 .08+	(0.05)	0.05	(0.05)	0.05	(0.05)	0.06	(0.05)
Firm age ^b	-0.06	(0.06)	-0.03	(0.06)	-0.02	(0.06)	-0.02	(0.06)
Revenue growth	0.26***	(0.06)	0.22***	(0.06)	0.22***	(0.06)	0.23***	(0.06)
Profit growth	0.05	(0.05)	0.05	(0.05)	0.05	(0.05)	0.05	(0.05)
R&D investment ^c	0.20**	(0.06)	0.15*	(0.06)	0.15*	(0.06)	0.15*	(0.06)
<i>Industry dummies</i>								
Energy & utilities	-0.71+	(0.38)	-0.74	(0.38)	-0.77	(0.39)	-0.72	(0.38)
ICT	-0.24	(0.19)	-0.18	(0.18)	-0.20	(0.18)	-0.13	(0.18)
Media & Publishing	0.13	(0.26)	0.13	(0.23)	0.16	(0.23)	0.19	(0.23)
Professional services	-0.28	(0.13)	-0.26	(0.12)	-0.26	(0.12)	-0.22	(0.13)
Financial Services	-0.34	(0.47)	-0.32	(0.44)	-0.30	(0.45)	-0.25	(0.46)
Construction	-0.43	(0.18)	-0.45	(0.17)	-0.44	(0.17)	-0.35	(0.17)
Transport & Trade	-0.33	(0.18)	0.32	(0.18)	-0.30	(0.18)	-0.26	(0.18)
Chemicals	0.24	(0.24)	0.25	(0.25)	0.25	(0.25)	0.29	(0.24)
Food & Agriculture	-0.26	(0.28)	-0.23	(0.25)	-0.24	(0.25)	-0.24	(0.25)
<i>Main effects</i>								
Employee job autonomy			0.12*	(0.05)	0.10*	(0.05)	0.13**	(0.05)
Internal cooperation			0.14*	(0.06)	0.15*	(0.06)	0.17**	(0.06)
Environmental dynamism			0.23***	(0.04)	0.23***	(0.04)	0.25***	(0.04)
<i>Two-way interactions</i>								
Employee job autonomy × internal cooperation					0.09	(0.06)	0.02	(0.05)
Employee job autonomy × env. dynamism					-0.07	(0.05)	-0.06	(0.04)
Internal cooperation × env. dynamism							0.07	(0.05)
<i>Three-way interaction</i>								
Employee job autonomy × internal cooperation × env. dynamism							-0.13***	(0.04)
Intercept	2.30***		2.62***		2.58***		2.45**	
R ²	.14		.22		.22		.24	
Δ R ²			.08***		.00		.02***	
F	5.92***		10.18***		9.56***		10.41***	

Notes: N = 743; ^aHeteroskedasticity-consistent standard errors in parentheses; ^bNatural logarithm; ^cSquared values

⁺ p < .10; * p < .05; ** p < .01; *** p < .001

We next visualize the three-way interaction effect by plotting the effects on firm proactiveness for values of one standard deviation below and above the mean for the independent and moderator variables. For high and low levels of environmental dynamism, we show the interaction between employee job autonomy and internal cooperation in Figure 4.1 and 4.2 respectively. We further examine the significance of the slopes for each regression line by testing whether these were significantly different from zero (Aiken and West, 1991). The results indicate that for *high levels of environmental dynamism* (see Figure 4.1), the relationship between employee job autonomy and firm proactiveness was significantly positive when internal cooperation was low ($\beta = .19, t = 2.36, p < .05$) but negative and non-significant when internal cooperation was high ($\beta = -.07, t = -0.73, n.s.$). Conversely, for *low levels of environmental dynamism*, or more stable environments (see Figure 4.2), the relationship between employee job autonomy and firm proactiveness was significantly positive when internal cooperation was high ($\beta = 0.36, t = 4.61, p < .001$) and neutral when internal cooperation was low ($\beta = 0.05, t = 0.44, n.s.$).

A limitation of the simple slope analysis is that the conditional values for the proactiveness moderator are arbitrary (Preacher, Curran, & Bauer, 2006). In response to this issue, scholars have suggested to probe interactions through the calculation of regions of significance via the Johnson-Neyman technique (Bauer & Curran, 2005). The region of significance provides the values of environmental dynamism for which the conditional effect of the two-way interaction between employee job autonomy and internal cooperation on firm proactiveness is significant. We calculated the region of significance using the PROCESS macro (Hayes, 2012). Results indicate that the interaction effect is significant ($p < 0.05$) for values of environmental dynamism falling outside the region -0.61 and 1.25 , which corresponds to 47.3% of the companies in our sample.

Figure 4.1 Interactions effect of employee job autonomy and internal cooperation on proactive strategic behavior for high environmental dynamism

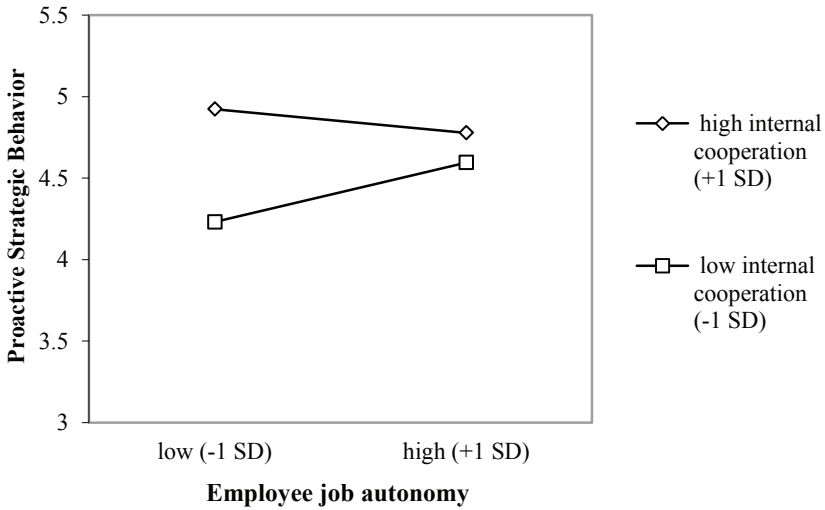
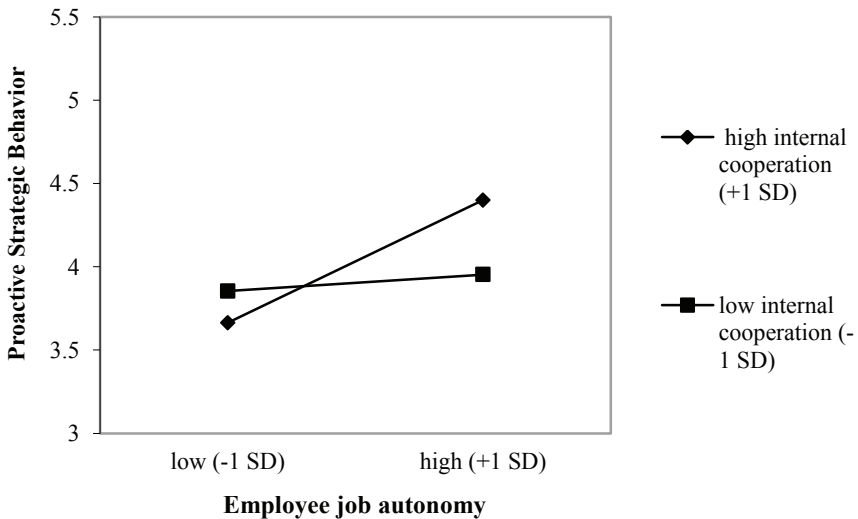


Figure 4.2 Interactions effect of employee job autonomy and internal cooperation on proactive strategic behavior for low environmental dynamism



Finally, we performed a slope difference test comparing the slopes of the regression lines for each level of environmental dynamism. The difference test for the pair of slopes in Figure 4.1 is significant ($t = -2.01, p < .05$) and supports hypothesis 4a; in dynamic environments, employee job autonomy is more positively related to proactiveness at low levels of internal cooperation than at high levels of internal cooperation. The difference test for the pair of slopes in Figure 4.2 is also significant ($t = 3.07, p < .001$) and supports hypothesis 4b; in stable environments, employee job autonomy is more positively related to proactiveness at high levels of internal cooperation than at low levels of internal cooperation. In addition, a slope difference test of the regression lines representing high cooperation in dynamic and stable environments, respectively, provides further support for a significant differential moderating effect of internal cooperation on the employee job autonomy-firm proactiveness relationship in different environmental contexts ($t = -3.10, p < .01$). No such differential effect was found with regard to the effectiveness of low internal cooperation ($t = 1.17, n.s.$), suggesting that the level of employee job autonomy is not important for explaining differences in level of proactiveness between firms in stable and dynamic environments when internal cooperation is low.

4.5 Discussion and Conclusion

This study set out to analyze configurations of organizational and environmental determinants of proactive strategic behavior, defined as a firm's inclination to shape its environment by acting ahead of competition rather than merely reacting to it (Lumpkin & Dess, 1996; Miller, 1983). While previous studies have focused on proactive behavior within a particular domain or level of analysis (Crant, 2000; Parker & Collins, 2010), the present study has pursued a stronger integration of proactive behavior from a strategic entrepreneurship perspective (Lumpkin & Dess, 1996) and an organizational behavior perspective (Parker & Collins, 2010). Building on job design theory (Grant & Parker, 2009) and literature on the relationships among organizational structure, behavioral outcomes and environment (Davis et al., 2009), we investigated how task context, social context, and environmental context interact to affect proactive strategic behavior at the firm level. Our empirical study of 743 SMEs reveals that depending on the level of environmental dynamism, configurations of employee job autonomy and internal

cooperation differentially affect a firm's proactive strategic behavior. While in stable environments high levels of internal cooperation amplified the effect of employee job autonomy on proactive strategic behavior, in more dynamic environments low levels of internal cooperation have a positive moderating effect. Although one could question the importance of the joint effect of employee job autonomy, internal cooperation, and environmental dynamism on the basis that the three-way interaction effect explains only an additional 2% of the variance, interactions in general tend to explain only limited amounts of extra variance and can nevertheless be important (Aiken & West, 1991). As this applies even more to higher order interactions, we are optimistic that the significant three-way interaction is salient. The findings provide several valuable implications for theory and future research.

4.5.1 Implications for theory and research

The importance of proactive behavior for firm performance has been frequently assumed and empirically substantiated in strategic entrepreneurship literature (Dess, Lumpkin, & Covin, 1997; Lumpkin & Dess, 2001; Wirtz, Mathieu, & Schilke, 2007). Yet despite the surge in research on the antecedents and outcomes of firms' entrepreneurial orientation (EO) – a construct of which proactiveness is considered to be a constitutive dimension – understanding the determinants of proactive strategic behavior has been surprisingly limited. To a great extent, this can be attributed to the process of increased convergence in measurement of EO dimensions in extant studies, which becomes evident from recent meta-analytical findings of Rauch, Wiklund, Lumpkin, and Frese (2009). This study contributes to the strategic entrepreneurship literature by developing and testing a model of critical determinants of proactive strategic behavior. Our conceptual approach has been to develop an understanding of proactive strategic behavior on the firm level by developing the theoretical link with proactive behaviors of individuals. The results of this study support the idea that important insights may be gained from such integration.

Specifically, the finding that employee job autonomy is positively associated with the ability to collectively behave more proactively is in line with previous research showing that autonomy stimulates employees to display proactive behaviors such as problem-solving, idea implementation (Parker et al., 2006), and prosocial rule breaking

(Morrison, 2006). Moreover, it confirms the suggestion of other scholars that being granted autonomy increases organizational members' self-efficacy, which in turn has been associated with behaviors that are critical for firm-level proactiveness such as anticipating future outcomes, planning the prevention or promotion of a future event, and acting in advance of the event toward future impact (Grant & Ashford, 2008). Employee job autonomy can thus enhance a firm's ability to take advantage of opportunities arising in its environment more rapidly. In summary, our findings support the argument that the motivational and informational mechanisms associated with employee job autonomy may be regarded as micro-foundations of proactive strategic behavior at the firm level.

Second, our findings extend literature on employee job autonomy as a key work design characteristic beyond its established effect on proactive behaviors at the individual and team level of analysis (Grant & Parker, 2009; Grant & Ashford, 2008; Hackman & Oldham, 1976). We show that creating an autonomous work context is also important for stimulating collective proactive behavior at the firm level of analysis given the right social and environmental context. As hypothesized, employee job autonomy was more strongly associated with proactive strategic behavior at lower levels of cooperation in more dynamic environments and higher levels of cooperation in more stable environments. This finding not only supports previous literature proposing that social context characteristics can influence the effects of autonomy (Langfred & Moya, 2004), but also shows that this relationship is more complex due to its dependence on environmental context characteristics. Langfred and Moya (2004), for instance, have argued that high coordination and interdependence interfere with an individual's sense of responsibility and curb the effects of individual autonomy. Our results substantiate this outcome in dynamic environments, yet oppose it in more stable environments. A possible explanation is that in dynamic environments individuals experience their work context as being more complex, so coordination and integration of work processes becomes more costly in terms of cognitive effort and time. Consequently, the motivational and informational advantages associated with increased autonomy are tempered, and the effect on a firm's proactiveness is diminished.

Finally, this study contributes to the ongoing debate in organization theory literature revolving around the role of environmental contingencies in the structure-performance

relationship (Davis et al., 2009). Central to this debate is the differential effect of structure in dynamic versus stable environmental contexts. Building on the assumption that dynamic environments require more flexibility, previous research has argued that less structure is beneficial to firm performance at high levels of dynamism. More stable environments, by contrast, are assumed to require greater efficiency and thus more structure (Burns & Stalker, 1961; Galibraith, 1973; Lawrence & Lorsch, 1967). Our model and empirical results echo the desirability of lower degrees of structure at higher levels of environmental dynamism to the extent that we found a positive interaction effect between employee job autonomy and low levels of internal cooperation in more dynamic environments. Previous studies have shown that firms in dynamic environments benefit from proactive strategic behavior by way of increased profitability and sales growth. Thus, our study provides an important indication that increased proactiveness may be an intermediate mechanism through which structure and performance are related. Yet this study also extends the current understanding in two important ways. First, we found that employee job autonomy has a positive effect in both stable and dynamic environments, albeit at different levels of internal cooperation. This suggests that low levels of structure can indeed potentially be beneficial in more stable environments. Moreover, in extension of Davis et al.'s (2009) recommendation to study the locus, asymmetry, and range of optimal structures, our study highlights that the environmental contingency perspective on the structure-performance relationship should also be studied in terms of the more complex *configurations* of various structure-inducing organizational elements. Second, beyond the discussion of the variances in slopes, several interesting insights emerge from the different levels of proactiveness. In general, there appears to be a prominent difference in the level of proactiveness between firms in dynamic and more stable environments. Rapid and frequent changes in the market environment present firms in high-velocity environments with many attractive opportunities that may effectively be seized by assuming a proactive strategic posture (Davis et al., 2009; Eisenhardt, 1989; Eisenhardt & Tabrizi, 1995). Stable environments, by contrast, provide fewer high-payoff opportunities for pre-emptive action such that firms may sense less incentive to behave proactively. Furthermore, the highest level of proactiveness was found in firms with high degrees of internal cooperation in dynamic environments. Thus, while we show that autonomy can be conducive to proactiveness at

lower levels of cooperation, our results do not preclude the possibility that firms may indeed be highly proactive when internal cooperation is high.

This study does have several limitations. First, the cross-sectional nature of the data used does not allow us to draw any conclusions with regard to causal relationships. Although prior research on the relationship between autonomy and the proactive behaviors of individuals provides a strong basis for the causal direction suggested in our study, future studies may apply a dynamic modeling approach in which changes in employee job autonomy, internal cooperation, and environmental dynamism can be more formally connected with changes in proactive strategic behavior at the firm level. Second, assessing proactive strategic behavior using self-reports of key informants, although widely applied in previous studies and generally considered a parsimonious method (Lumpkin & Dess, 2001; Rauch et al., 2009; Wirtz et al., 2007), might obfuscate a clear identification as to the definition of early mover behavior relative to competitors. While a more objective measurement of proactive strategic behavior can circumvent this problem such an approach may be sensitive to its own limitations such as comparability and generalizability across cases. Third, our approach to investigating employee job autonomy on a general level does not take into consideration the multilevel nature of autonomy. Future research efforts should focus on extending the model proposed in this study by taking a more fine-grained approach and differentiating between loci and levels of analysis at which autonomy operates (e.g. individual, team, unit). Furthermore, in light of previous research findings on the role of individual traits and preferences in the emergence of proactive behaviors within organizations (Grant & Parker, 2009; Williams et al., 2010), future research may further investigate the influence of employees' proactive personality in studies on proactive strategic behavior on the firm level.

Chapter 5. Strategic Timing in International Sourcing: A Multilevel Analysis of Cost Reduction in Offshore Operations¹

Abstract

While research on the importance of strategic timing in market-seeking situations has burgeoned over the last decades, the understanding of timing considerations in resource-seeking contexts remains limited. To address this gap, we consider the influence of timing on the cost reduction realized by relocating business activities to foreign locations. We provide a multilevel contingency perspective proposing that the timing of offshoring activities affects the degree of cost reduction and that the relationship is contingent on activity (i.e. knowledge intensity) and firm-level (i.e. offshoring experience) factors. Using data on 639 offshoring activities at 214 firms in various industries, we find evidence of an early-mover cost advantage in offshoring activities with low knowledge intensity. We further find that the positive effect of early timing on cost reduction is moderated by the depth of geographical experience (i.e., offshoring experience in the host region) but not by the breadth of geographical experience (i.e., offshoring experience in other regions). Our study highlights that the multilevel dynamics between activity and firm-level factors influence the effects of timing on the cost reduction of offshored activities.

¹ This chapter is based on: S. Ben-Menahem & O. Mihalache. Strategic Timing in International Sourcing: A Multilevel Analysis of Cost Reduction in Offshore Operations. This paper is under review at *Academy of Management Journal* (first round revise and resubmit).

5.1 Introduction

Over the past three decades, scholars in economics, strategy and marketing have become increasingly interested in how timing considerations enable firms to reach profits in excess of cost of capital (Lieberman & Montgomery, 1988: 41). While the majority of existing research has emphasized the benefits of early action, in contrast, a growing body of literature has argued that early mover behavior is “no guarantee for success” (Sandberg, 2001: 3) and points out potential benefits of delayed market entry (e.g. Boyd & Bresser, 2008; Cho, Kim, & Rhee, 1998; Shamshie, Phelps, & Kuperman, 2004; Shankar, Carpenter, & Krishnamurthi, 1998). Despite the contradictory predictions about the advantage of early movers over followers, a wealth of supporting evidence shows that, one way or the other, timing considerations have an important influence on firm performance in a variety of contexts (Kerin, Varadarajan, & Peterson, 1992; Lambkin, 1988; Suarez & Lanzolla, 2007; VanderWerf & Mahon, 1997).

Prior studies have predominantly investigated the effects of strategic timing in the context of product market entries. A major line of research addresses the importance of timing in domestic product entries by focusing on the mechanisms through which timing may impact a firm’s ability to achieve competitive advantage (Lieberman & Montgomery, 1988, 1998; Kerin et al., 1992). Building on insights from domestic product market entries, timing has also emerged as an important topic in the domain of international business. Here, scholars have focused primarily on the implications of early or late foreign entry on firm performance (Mascarenhas, 1997; Pan, Li & Tse, 1999; Rivoli & Salorio, 1996). Yet while previous studies have shown timing to be a relevant aspect of a firm’s international strategy as it relates to *market-seeking* objectives, there is a paucity of studies specifically exploring different conditions determining early vs. late-mover advantages and disadvantages as they relate to *resource-seeking* objectives.

Our study aims to address this issue by developing understanding of timing in the context of offshoring. Offshoring refers to the transfer of business processes outside of the company’s national borders in support of global rather than local (i.e. host country) business operations (Levy, 2005; Manning, Massini, & Lewin, 2008). As such, offshoring represents a context in which firms internationalize for resource-seeking motives. That is,

while offshoring involves entering foreign locations, it is typically not aimed at capturing the foreign market but rather on improving efficiency in sourcing to support existing market operations. More specifically, we argue that timing considerations concerning offshore activities in a specific region have important implications for a firm's resource-seeking performance in terms of achieved cost reduction. Timing is particularly relevant in this context as changing environmental conditions at the offshore location (e.g. wage levels, infrastructure, capabilities, institutions) alter the potential for cost savings, amongst others due to the accumulation of offshoring work and increasing competition over time (e.g. Ethiraj, Kale, Krishnan, & Singh, 2005; Manning, 2008). Yet a contrasting perspective suggests that moving early may come at a higher cost of learning due to uncertainty, such that later rather than early movers benefit from cost advantages (Lieberman & Montgomery, 1998).

To elaborate on these dynamics, we put forward a multilevel contingency perspective considering how the relative timing of entry in a specific region affects the cost savings achieved. In this way, our study advances existing literature in several ways. First, it extends prior work on strategic timing in an international context by probing early versus late mover advantages in a primarily resource-seeking setting, whereas previous timing studies in IB literature have primarily focused on settings in which market-seeking objectives (i.e. entering new markets) are important drivers of early-advantages (cf. Gaba, Pan, & Ungson, 2002; Pan et al., 1999). Key mechanisms associated with early mover advantages relevant to more commonly studied forms of foreign market entry such as customers' preference formation (Carpenter & Nakamoto, 1989), lock-ins, and switching costs (Gómez & Maicas, 2011) may not apply to resource-seeking objectives (cf. Kerin et al., 1992). Also, most existing work has tended to focus on profitability, market share, and survival as performance outcomes (cf. Frawley & Fahy, 2006; Lilien & Yoon, 1990). Although cost reduction has been implicitly identified as an important factor underlying these performance outcomes, explicit empirical investigations are limited.

Second, our multilevel contingency framework explicitly takes into consideration that any particular offshoring activity is nested within the firm's overall offshoring portfolio (Demirbag & Glaister, 2010; Henisz & Macher, 2004). Accordingly, we argue that the effect of timing in offshoring (i.e. for resource-seeking objectives) can be

enhanced or curbed by activity-level as well as firm-level factors. On the activity level, we consider the knowledge intensity of the activity as a potential moderator of the effectiveness of an early or late mover strategy for achieving cost savings. We propose that timing is particularly important for activities with low knowledge intensity, but may be of lesser concern for activities with high knowledge intensity due to the different requirements in terms of the factor inputs and the developmental path of relevant environmental conditions at the offshore location. On the firm-level, we consider the geographical depth (i.e., within region experience) and breadth (i.e., cross-region experience) of the firm's offshoring experience. Previous studies on the internationalization process model (Barkema et al., 1997; Johanson & Vahlne, 1977) suggest that experience with offshoring will influence the firm's ability to increase efficiency. Moreover, from a knowledge-based perspective, cost savings may further be affected by the ability to exploit accumulated knowledge and experience internationally (Lewin & Volberda, 2011; Kogut & Zander, 1993). By taking these effects into consideration, our study provides insight into the complex interrelations between activity- and firm-level factors in offshoring strategy.

Third, we contribute to the international sourcing literature by combining a strategic choice perspective with elements of incremental, path-dependent offshoring trajectories based on accumulation of experience, so as to arrive at a more comprehensive understanding of the drivers of cost savings (Hutzschenreuter, et al., 2007; Lewin & Volberda, 2011). By unfolding the implications of timing, our study offers insights into aspects of offshoring that have been overlooked by prior research, and address recent calls in the literature to increase attention to the role of time in IB research (see Eden, 2009). Specifically, whereas reducing costs is the underlying reason for many firms choose to relocate some of their processes to foreign locations (Agarwal, Farrell, & Remes, 2003; Farrell, 2005; Levy, 2005), the limited extant research on the topic shows that the realized cost saving are highly uncertain and their magnitude varies greatly (e.g., Dibbern, Winkler, & Heinzl, 2008; Schaaf, 2004).

We test the proposed multilevel framework on a sample of 639 offshoring initiatives, nested in 214 firms from the U.S. and Europe. Analyzing this data, we find support for the majority of our hypotheses. Specifically, we find that, overall, the timing of

an offshoring initiative in a particular region is indeed an important determinant of the achieved cost reduction. In addition, our results indicate that the relationship between timing and cost saving is more important for activities with low knowledge intensity than for highly knowledge intensive activities, and appears to be strengthened by the accumulation of prior within-region experience.

5.2 Theory and Hypothesis Development

Building on the substantial body of literature on order of market entry in domestic settings (see e.g. Golder & Tellis, 1993; Lieberman & Montgomery, 1988, 1998; Kerin et al. 1992; Shankar et al., 1998; Lambkin, 1988), several studies have investigated timing with regard to internationalization (Isobe, Makino & Montgomery, 2000; Johnson & Tellis, 2008; Mascarenhas, 1992, 1997; Luo & Peng, 1998; Pan et al., 1999; Madhok, 1997; Shaver, Mitchell & Yeung, 1997). In line with domestic oriented timing research, the majority of work on the international context has centered on first-mover (dis)advantages related to product entry and market-related performance effects of early versus late entrants. Mascarenhas (1992: 288), for instance, showed that first entrants in international product-markets maintain higher long-term market share and have higher market-survival changes profitability. In a similar vein, Pan et al. (1999) found that early entrants into China perform significantly better in terms of market-share and profitability than late followers. The general underlying logic is that firms' entry into foreign market engenders social recognition and legitimation that stimulates further entry by rivals (Hannan & Freeman, 1977). As more rivals enter a market, competition increases and reduces opportunities in the host-market. Therefore, firms need to act upon market opportunities in a timely manner before they dissipate, barriers to entry become too high, and the legitimation effect wanes (Gielens, Helsen, & Dekimpe, 2012).

Less well-studied is what role timing plays when it comes to internationalization actions that are not primarily driven by market considerations but rather by *resource-seeking objectives*, such as the case in international sourcing arrangements or offshoring. Reducing the cost of a business process prior performed at a domestic location is a key objective in the context of offshoring. A fundamental question, therefore, is whether and how firms can gain more efficient control over resources at a certain location at a certain

point in time. Timing matters in a resource-seeking setting in the sense that early movers may be better able to achieve cost benefits on strategic input factors ahead of rising competition by securing a favorable strategic position that provides access to scarce resources in a particular location (e.g. cheaper labor force, strategic resources, and benefits from governmental incentives) (Lieberman & Montgomery, 1988). On the other hand, the distinctive nature of offshoring may accentuate late mover advantages. Benefits from investments of early movers may flow to followers by hiring away trained employees (Guasch & Weiss, 1980), using a more developed infrastructure, and contracting more experienced offshore service providers. This raises the question under what conditions early vs. late timing of relocating activities into a specific offshore location will enable the firm to increase the likelihood of realizing cost reduction through offshoring.

5.2.1 Theoretical perspectives on cost reduction in offshoring: Strategic choice and path dependence

Several theoretical lenses have formed the basis for studies seeking to advance understanding on the drivers, processes and outcomes of international sourcing arrangements. Ranging between a focus on environmental determinism resulting from institutional factors to managerial intentionality resulting from organizational factors, these include amongst others, transaction cost economics (Williamson, 1979), resource-based view (e.g. Barney, 1991), evolution and learning (Nelson & Winter, 1982), and competence and knowledge-based view (Grant, 1996). While a complete discussion of these theories is beyond the scope of this study (and available elsewhere, see for instance Hätönen & Erikson, 2009), it is clear that no single theoretical lens or model can provide a comprehensive understanding of cost savings in offshoring, and a more integrative approach is necessary.

In line with this observation, scholars have recently argued that dominant IB theories - such as internalization theory (e.g. Buckley & Casson, 1976; Hennart, 1982), the eclectic paradigm (Dunning, 1980), and the knowledge-based view (Kogut & Zander, 2003) – have focused on path-dependent evolutionary dynamics shaped by the accumulation and international exploitation of knowledge stocks, experience, and capabilities, while focusing too little attention on managerial intentionality and the role

played by discretionary strategic choices (Hutzschenreuter et al., 2007; Lewin & Volberda, 2011). Consistent with a coevolution perspective (Lewin & Volberda, 1999; Volberda & Lewin, 2003) on internationalization and offshoring (Lewin & Volberda, 2011), our aim is to extend existing literature by considering cost reduction in offshoring activities as a joint outcome of strategic choice and path dependencies.

The strategic choice approach (Child, 1972; Thompson, 1967; Miles & Snow, 1978) emphasizes that managers play an important role in formulating strategy and executing strategic choices that can proactively shape the firm's environment and strategic position. This perspective differs from environmental selection or ecology perspectives that focus on industry or population level factors to explain why firms conform to industry trends and become increasingly inert over time (DiMaggio & Powell, 1991; Hannan & Freeman, 1984; Hrebiniak & Joyce, 1985). Rather, idiosyncrasies of firms within the same industry and variation in organizational outcomes can be explained as a result of "differing histories of strategic choice and performance" (Rumelt, 1984: 558). Indeed, based on the notion of strategic choice, various studies distinguish between the proactive, path-breaking actions of firms that initiate change, such as early movers and fast followers, and those that follow once the action and its consequences are better understood and more diffused within the population of firms (Abrahamson & Rosenkopf, 1993; Dacin, Goodstein & Scott, 2002; Lieberman & Montgomery, 1988, 1998). Correspondingly, offshoring activities can be viewed as moves reflecting strategic choice, insofar as managers are assumed to have a reasonable amount of discretion over the content, location, and timing of offshoring decisions aimed at lowering costs (Child, 1972).

Yet offshoring decisions are also likely to reflect path dependence. In line with the logic of the internationalization process model (Johanson & Vahlne, 1977), both the learning process preceding the decision to offshore and the accumulation of experience from engaging in offshoring are gradual, evolutionary processes (Nelson & Winter, 1982). Bounded rationality and limited information on opportunities for cost reduction and limited knowledge on how to manage offshore operations place constraints on managerial discretion (Nelson & Winter, 1982; Simon, 1976). Thus, assessing and realizing the potential for cost reduction within distinct offshoring activities will be constrained by prior experience and knowledge within the firm. Combining these two perspectives, we

investigate to what extent discretionary decisions with regard to relocating business activities to a specific location at a specific point in time interact with prior offshoring experience at the firm level to influence the ability to achieve cost reduction on the activity level over time.

5.2.2 *Offshoring and cost reduction*

Extant literature puts forward multiple valid reasons for offshoring. While motives such as accessing human resources to address shortage of talent at home (Contractor et al., 2010; Lewin, Massini, & Peeters, 2009) and accessing specialized skills and capabilities (Mihalache et al., 2012) have become increasingly important (Kenney, Massini & Murtha, 2009), cost reduction arguably remains one of the most predominant strategic driver of offshoring (Ellram, Tate, & Billington, 2008; Nachum & Zaheer, 2005). The cost-reduction motive is so entrenched in the offshoring decision that some authors define offshoring by the cost-minimization goal. For instance, Beugre & Acar (2004: 445) define offshoring as “the relocation of labor-intensive service industry to geographic areas remote from the business center to reduce costs” and Chua & Pan (2008) argue that “offshore sourcing is the trend where companies look for cheaper offshore resource options to reduce their base line costs” (p.267).

The present study focuses on the degree of costs reduction achieved by relocating a particular business function or process abroad. When discussing costs, we refer to the total costs to produce a product, deliver a service, or complete an intermediate task at the foreign location. This comprises both the cost of producing the product or service and the cost of coordination required such as managing, monitoring, transportation, and controlling the work (Cha, Pingry, & Thatcher, 2008). Therefore, cost reduction is the difference between the cost incurred when a process is performed at the domestic location and the cost incurred by the firm after relocating that process to a foreign location.

Offshoring can help reduce costs in several ways. Arguably the most important means is by leveraging the lower wage levels of developing countries (Allon & Van Mieghem, 2010). Such “resource cost arbitrage” involves the replacement of more expensive domestic labor resources with cheaper ones at foreign locations (Chua & Pan, 2008: 267). The lure of offshoring as a cost reduction mechanism is hardly surprising

considering the magnitude of labor cost differentials between the developed and developing countries. Garner (2004) notes that, in 2002, a computer programmer in India earned about nine times less than in the U.S. In addition to wage differentials, offshoring business activities can reduce costs by providing access to cheaper infrastructure and more beneficial government policies. In an effort to attract business, foreign governments provide an array of incentives such as tax advantages, reduced (or free) import duty for capital and financial assets, or financial assistance for training staff (Metters & Verma, 2008). Furthermore, offshoring can also reduce costs by allowing firms to take advantage of the economies of scale and accumulated expertise of offshore providers (Cha et al., 2008). Contrasting these advantages, some studies have highlighted the negative effect of offshoring on cost savings. Indeed, according to some accounts, hidden costs (Larsen, Manning & Pedersen, forthcoming), including set-up, transition, layoffs, productivity, and management costs, together can add an additional 15 to 55 percent to expected costs (Overby, 2003; Stringfellow, Teagarden, & Nie, 2008). Additionally, firms may incur knowledge transfer costs, which vary depending on activity-level factors such as location and governance mode (Adler & Hashai, 2007).

Considering the prevalence of offshoring, and that the majority of offshoring initiatives are driven by the intent to reduce costs, it is surprising to note the hazy understanding of the factors that drive cost reduction in offshoring. That is, while many studies highlight cost savings as an important driver of offshoring, there is a scarcity of research on determinants of cost reduction of offshored processes (Carmel & Nicholson, 2005). With firms increasingly pressed by competitive pressures to attempt to reduce costs by offshoring (Dossani & Kenney, 2003; Lewin & Peeters, 2006), it is important to understand why some offshoring activities achieve higher savings than others.

5.2.3 Strategic timing and cost reduction

We propose that early-mover advantages with regard to cost savings may arise in offshoring for several reasons. The main argument underlying this relationship is based on how changing environmental conditions at the host location influence an offshoring firm's potential for cost savings. Three mechanisms can be considered relevant in this respect. First, the cost-savings achieved through the offshoring of a particular activity depends on

the degree to which the input factors from the home location can be replaced with cheaper inputs at the offshore location. One of the major factors influencing the potential for cost savings therefore is the disparity between host- and home country costs of input factors, particularly the wage rate, after increased coordination costs have been accounted for (Wakasugi, Ito, & Tomiura, 2008). The large wage gap between western and low-wage countries such as India and China have turned the latter into offshoring hotspots over the course of the past few decades. Yet as a result of these locations' growing popularity, increasing economic activity and tightening supply for talent (e.g. Kripalani & Puliyeenthuruthel, 2005) have been accompanied by a rise in salaries (Lewin & Couto, 2007). Wakasugi and Ito (2008), for instance, show that the wage differential between Japan and China has reduced from 1:57 in 1996 to 1:14 in 2006 as a result of a 3.5 factor rise in Chinese wage rates. Similarly, recent studies by The Federation of Indian Chambers of Commerce and Industry and Aon Hewitt show that wage inflation in India is rising sharply. Estimates for 2011 range between 13-15 per cent and are likely to develop at a comparable rate in the years to follow. Due to such developments, operators in business processing in popular Indian cities are increasingly forced to hire less competent employees than those available in earlier times (Stringfellow et al., 2008). As the wages for trained people in India and the offshoring firm's home country converge, one of the key drivers of cost saving is diminishing. This suggests that early movers may enjoy higher cost saving due to the diminishing cost differential between host- and home-country factors over time.

Second, activities that are among the first to be offshored to a location may enjoy a low initial level of competition allowing for cost-advantages arising from the preemption of scarce and valuable resources. Pioneering firms may, for instance, capture superior physical locations or develop exclusive ties with local institutions, specialized suppliers, and service providers (Manning, 2008). Moreover, due to their relatively strong position, early movers can change local conditions (e.g. technical infrastructure and institutions) to their advantage such that customized resources can be obtained at low cost. For example, in an in-depth case study of two German automotive suppliers implementing engineering offshoring activities at a competitive 'hotspot' location (Shanghai, China) and a 'second-tier' location (Romania) respectively, Manning, Sydow, & Windeler (2012) contrast the

challenges associated with recruiting personnel as a follower in a competitive environment and as an early mover in a relatively less developed location. By setting up a joint training program in collaborating with the local university, the pioneering firm managed to secure a steady supply of sufficiently skilled engineers at low cost. Such collaborative programs were much more challenging in Shanghai, where university hiring and sponsoring had become much more competitive over time (Manning et al., forthcoming). Consequently, hiring low-cost engineers proved a difficult task for the German supplier in Shanghai.

Third, location attractiveness in terms of potential cost-savings is to a large extent influenced by the host country government's national economic development policy (Johnson & Tellis, 2008). Development policy may involve creating financial or fiscal incentives and concessions in the form of land use and supplies of resources to lure foreign business; an approach taken by many governments in upcoming and current hotspot offshore locations. For example, most companies offshoring ICT activities to Uruguay benefit from the emerging country's regulatory incentive schemes granting fiscal exemption from domestic taxes and elimination of import tariffs on input factors. Over the past few years such incentives have drawn a number of large activities and positioned Uruguay as an attractive offshoring destination in Latin America (UNCTAD information economy report, 2009). Research suggests that early movers will benefit more strongly from development policy as incentive schemes may gradually be receded (Shenkar, 1990). Moreover, as Frynas, Mellahi & Pigman (2006) argue, firm-specific political resources (i.e. early relationship with host country governments) not only constitute an important mechanism for creating first mover advantages, but also for maintaining an advantageous position on the long term. For example, Volkswagen's early entry into China in the late 1970s by means of a joint venture with the Shanghai Automotive Industrial Corporation enjoyed strong political support in the form of strategic and financial preferential treatment by the Shanghai government and senior political figures in Beijing (Frynas et al., 2006: 331). In contrast, later entrants faced high barriers to entry. Chrysler, for instance, was initially refused to manufacture its minivans in China due to the government's decision to temporarily halt foreign operations in that sector (Pan et al., 1999). Resultantly, Volkswagen was able to maintain an advantageous strategic position for a substantial period of time after its entry into China (Frynas et al., 2006). Taken together, we

hypothesize that:

***Hypothesis 1:** The later an activity is offshored to a given region, the lower the realized cost savings will be relative to earlier entrants in that region.*

5.2.4 Activity-level contingencies: The moderating role of knowledge intensity

While the timing of the offshoring activity is an important determinant of cost savings, we propose that the strength of this effect depends on the knowledge intensity of the activity that is offshored. Considering that firms offshore an increasing array of processes (e.g. Lewin & Peeters, 2006), for a more fine-grained understanding of strategic timing in offshoring it is important to understand activity-based distinctions. We distinguish between knowledge intensive activities such as R&D and software development activities, and less knowledge intensive activities such as administrative tasks, customer care, IT-support, marketing and sales, manufacturing, and procurement processes (Mihalache, Mihalache, & Jansen, 2011).

The distinction on the basis of knowledge intensity is particularly important when discussing the effects of timing because the difference in sophistication between the two types of functions translates in different input factor requirements at the offshore location. Offshoring initiatives that are early in a certain location typically encounter an environment that is characterized by low wages, but that generally does not provide specialized talent and expertise due to a lack of experience working with westerns multinationals (Manning, 2008). This kind of environment is well suited for the needs of activities with low knowledge intensity, but it lacks readiness for knowledge intensive activities. Whereas offshoring less knowledge intensive activities requires primarily a large pool of low wage workers, offshoring knowledge intensive activities has the additional requirements of more sophisticated skills, infrastructure, and supporting institutions that can provide controls such as intellectual property regulations. Thus, early timing is particularly important for activities with low knowledge intensity as early entrants encounter appropriate environmental conditions and can secure a range of benefits that is not available to later entrants in the same degree.

However, the case of knowledge intensive activities is different. When

encountering an environment that provides a low cost labor force but that lacks the required sophistication, pioneering knowledge intensive activities require specific adaptive investments. Offshoring knowledge intensive activities to an untapped location involve costs of upgrading the skills of the workforce, developing the capabilities of vendors (offshore service providers), improving the infrastructure, and adapting local institutions. Dossani & Kenney (2003) argue that the quality of the workforce in a certain location is partially a function of the agglomeration of earlier investors and their positive externalities. Supporting this point, Manning et al.'s (2011) study illustrates how the German car manufacturer that was offshoring to Romania had to invest in the local university in order to obtain a skilled labor pool adapted for their complex engineering needs. Also, the sophistication of the offshore providers increases as a function of their experience of working with Western companies. As such, offshore vendors that begin by providing low skilled services, over time develop their capabilities and can also perform more complex tasks such as engineering and R&D (Ethiraj et al. 2005; Yuan, Zelong, & Yi, 2010). For instance, Tata Consultancy Services uses a formal methodology to absorb knowledge gained from one client activity and apply it to its other activities (Oshri et al. 2007).

In this way, investments in early offshoring initiatives help to develop an offshore location's environmental conditions that can later support more sophisticated tasks requiring advanced skills and a more developed infrastructure. While the pioneering knowledge intensive activities incur the costs of developing the capabilities of the offshore labor force, the service providers, and the infrastructure, these factors have positive externalities for all subsequent entrants (Zaheer, Lamin, & Subramani, 2009). These early expenses lead to a tradeoff between the benefits of early entrance (e.g. lower wages, securing strategic assets, and government incentives) and the costs associated with the development of the required conditions for performing knowledge intensive activities. Conversely, knowledge intensive activities that are offshored relatively late to a particular region face a tradeoff between higher factor costs and lower investments in developing the environment.

Accordingly, we propose that the effect of timing on cost savings is more pronounced in the case of activities with low rather than high knowledge intensity.

***Hypothesis 2:** The knowledge intensity of offshored activities moderates the relationship between timing and cost reduction in such a way that early mover advantages in terms of cost reduction are higher for activities with low knowledge intensity than for activities with high knowledge intensity.*

5.2.5 Firm level contingencies: Depth and breadth of offshoring experience

Literature on organizational learning in strategic settings suggests that when a firm has gained experience in the past, knowledge from this experience can play an important role in sensing and seizing opportunities in the future (Cohen & Levinthal, 1990). Building on the notion of organizational learning as transfer of an organization's experiences from one activity to the other, international business studies have highlighted the importance of a firm's prior experience in explaining the success of subsequent foreign operations (Barkema & Vermeulen, 1998; Davidson, 1983; Erramilli, 1991; Gaba et al., 2002; Johanson & Vahlne, 1977, 2009). While literature on offshoring has provided little attention to prior experience, ample research has been conducted on the creation of strategic capabilities in the context of international acquisitions and alliances, and foreign domestic investment. Notwithstanding the numerous studies confirming the positive effects of learning from prior experience, scholars have come to the realization that the underlying mechanisms are more complex than generally assumed under traditional learning curve perspectives on organizational learning (Nadolska & Barkema, 2007). It is evident that experience is a double-edged sword and pivotal boundary conditions are at play (Haleblian & Finkelstein, 1999). In order to get a nuanced perspective on the role of prior experience in the context of timing offshoring activities, we distinguish between depth and breadth of geographical experience.

Geographical experience depth. Recent insights from related research deserve particular attention for understanding the mechanism underlying the influence of prior offshoring experience on the capability to engender cost savings in subsequent activities. In the broader range of organizational activities, experience is generally considered to be conducive for the development of strategic capabilities during the early phases of capability development (e.g. Nelson & Winter, 1982; Levitt & March, 1988). Because similar settings enable firms to transfer experience from one event to the next more easily,

the causal relationship underlying the activity and its effect on performance can be learned effectively. Accordingly, evidence from international business research shows that prior experience within a geographic region is likely to enable learning (Barkema & Schijven, 2008). Notable examples include studies on the effect of MNEs' acquisition experience on the success of subsequent acquisitions (e.g. Lee & Caves, 1998; Uhlenbruck, 2005), and related work on (international) alliances (e.g. Barkema & Vermeulen, 1997; Reuer, Park, & Zollo, 2002). However, experience transfer may not always have positive implications (Heimeriks, Schijven & Gates, 2012). Applying behavioral learning theory in the context of organizations' acquisition experience, Haleblan & Finkelstein (1999) argued that the value of prior experience is contingent on the similarity between that experience and the subsequent activity to which prior generated knowledge is applied. Consistently, they found that prior experience negatively affected acquisition performance when firms inappropriately generalized experience from prior acquisitions to dissimilar settings.

In line with these findings, we expect that a firm's prior experiences in offshoring activities to a particular location – i.e. geographical experience depth, will positively affect the relation between timing and cost savings. Early movers can benefit by readily applying knowledge gained from prior offshoring activities to the advantage of new activities (Urban, Carter, Gaskin, & Mucha, 1986). Although initial start-up costs may be high due to greater technological uncertainty and investments in the development of environmental conditions, cost savings in subsequent activities may arise from a more efficient allocation of resources and prevention of potential pitfalls due to a better understanding of local environmental opportunities, and thus, reduced uncertainty (cf. Robinson & Fornell, 1985; Suarez & Lanzolla, 2007). As time progresses and environmental conditions change, experiential knowledge accumulated during earlier offshore activities will be less useful such that firms with high experience will be more likely to inappropriately apply generalized knowledge from prior experiences (Haleblan & Finkelstein, 1999); thus decreasing the potential for realizing cost reductions. By contrast, late movers without prior within-region experience will be less likely to make such inappropriate generalizations. Accordingly, we hypothesize that:

Hypothesis 3a: *Geographical experience depth moderates the relationship between timing and cost reduction in such a way that early mover advantages in terms of cost reductions are higher when geographical experience depth is high.*

Geographical experience breadth. In contrast, geographical breadth of offshoring experience may offset the importance of early entry for achieving cost-savings. As experience leads to organizational learning (Barkema & Vermeulen, 1998; Goshal, 1987; Huber, 1991), firms that engage in offshoring projects in a wide range of environments develop an important offshoring-related resource base that they can draw upon when starting to offshore to a new region. As noted in the strategic timing literature, late movers with prior experience in an international context are able to transfer some of their knowledge and resource-based advantages to the new location (Lambkin, 1988; Mascarenhas, 1992; Shamsie, *et al.*, 2004); thus, geographical experience breadth may reduce the importance of being early for realizing cost savings.

First, the geographical breadth of offshoring experience can help firms adapt more quickly to operating in a new region, regardless of the timing of entry. Offshoring experience in a vast array of institutional contexts may reduce the importance of lead time for adapting to a new environment because the new context is likely to be less distant to them as they already have a wide array of experiences. That is, firms with offshoring experience in a broader range of regions may use their skills accumulated in previous contexts to curb the extra coordination, control, and knowledge transfer costs that may arise from dealing with culturally and geographically distant vendors (Dibbern *et al.*, 2008; Erramilli, 1991). Second, geographical experience breadth can also alleviate the resource capturing advantages of early entrants such as developing ties with local institutions and specialized suppliers. Specifically, these varied experiences may have exposed firms to ways in which to negotiate with suppliers, make contracts, and, more broadly, liaison with local stakeholders. Thus, firms with wider geographical offshoring experiences benefit from broader perceptions of alternatives and can draw on a richer skillset of how to implement offshoring activities than firms with narrower experiences. In addition, Magnusson, Westjohn, and Boggs (2009) suggest that firms with more diverse geographical experience are more likely to be perceived favorable in a new region due to their established international network. This higher status may help them access resources,

such as preferential contracts with suppliers and governments or attracting skilled personnel, advantages that usually are available only for pioneering firms. Hence, considering these arguments, we hypothesize that:

***Hypothesis 3b:** Geographical experience depth moderates the relationship between timing and cost reduction in such a way that early mover advantages in terms of cost reductions are lower when geographical experience breadth is high.*

5.3 Methods

5.3.1 Sample

We test the proposed hypotheses using data from the Offshoring Research Network (ORN) database. The ORN database is collected since 2004 by an international network of researchers coordinated by the Center for International Business Education and Research at the Fuqua School of Business of Duke University. An important aspect of the database is that it provides rich information on past, current and planned offshoring activities, and as such, offers the opportunity to consider offshoring activities within the context of a firm's offshoring portfolio. Our dataset contains information on offshoring activities of primarily U.S. and European firms. Several studies provide in-depth descriptions of the database and present emerging offshoring trends (e.g. Lewin & Peeters, 2006; Lewin & Volberda, 2011; Manning *et al.*, 2008) and various subparts of the ORN database have been used in recent publications (e.g. Hutzschenreuter, Lewin, & Dressel, 2011; Larsen *et al.*, forthcoming; Lewin, Massini, & Peeters, 2008; Roza, Van Den Bosch, & Volberda, 2011).

As the database taps into various aspects of offshoring, we use only the subset that covers our variable of interest, namely the cost reductions obtained for each offshoring activity. The final sample that contains all model variables comprises 639 offshoring activities nested in 214 firms. Since we are trying to explain variance in cost savings, we had to ensure that cost reduction was an important driver of relocating the activities in our sample. To this end, we analyzed the reasons behind each offshoring decision. For all 639 offshoring activities in our sample, the respondents indicated that reducing labor or other costs was at least moderately important (i.e. they answered at least three on a five point

scale).

The firms in our sample represent a wide range of industries, including energy, finance and insurance, production, professional services, retail, software, technical services, transportation, and others. Firms offshored to 14 major offshoring regions: Africa, Australia, Canada, China, Eastern Europe, India, Latin America, Mexico, the Middle East, Other Asia, the Philippines, Russia, U.S., and Western Europe. Expected differences in average cost savings can be observed between regions, ranging from 6.5 percent in U.S. to about 40 percent in the Philippines and China.

5.3.2 *Measures*

Dependent variable. Our dependent variable is the cost savings achieved by individual offshoring activities. The cost savings from offshoring refer to the difference in costs between performing a certain activity in the home location and the costs of incurred when the activity is performed at the offshore location. Investigating cost savings in the context of offshoring is a challenging task because the criterion is difficult to validate and cost reports for offshoring are not publicly available. Moreover, objectively verified cost savings data is also subject to its own limitations with regard to interpretability and comparability. Consequently, researchers are often confined to the use of self-reported measures. As we aim to compare a change in the total costs associated with the relocation of a certain business process to an offshore location (Allon & Van Mieghem, 2010; Cha et al., 2008; Van Mieghem, 2008), we asked the survey respondents to provide the percentage cost savings achieved for a particular activity after relocating it abroad (e.g., Lewin & Peeters, 2006). Measuring cost savings as a percentage rather than as absolute numbers has the advantage that it circumvents the size difference between offshoring activities.

Independent variable. To measure timing, we performed a two steps procedure by following established practice in strategic timing literature (see Urban et al., 1986 and Huff & Robinson, 1994). First, we established the first offshoring instance in a certain region in our dataset which we used as the benchmark entry year. Second, to arrive at the timing measure, for each subsequent offshoring entry into that region we calculated the logarithm

of the lag in years between that entry and the benchmark year². This approach allows us to provide a fine-grained assessment of timing, as opposed to self-reported measures where firms categorize themselves as early or late movers (Gaba et al., 2002). Previous studies have raised concerns of bias in such subjective measures, and proposed to use objective data on dates of assessed actions (Frawley & Fahy, 2006; Golder & Tellis, 1993; Kerin et al., 1992; Lieberman & Montgomery, 1998). Our objective measure of timing circumvents such concerns.

Moderating variables. We collected data on both activity- and firm-level contingencies. At the activity-level, we measured *knowledge intensity*. We distinguish between high and low knowledge intensity (Mihalache *et al.*, 2011). Activities with high knowledge intensity include R&D and software development, and activities with relatively low knowledge intensity include administrative tasks, customer care, IT-support, marketing and sales, manufacturing, and procurement processes. We measure knowledge intensity as a dummy variable that has the value ‘1’ for high and ‘0’ for low knowledge intensity.

At the firm level we measure the depth and breadth of geographical experience. *Geographical experience depth* refers to the experience a firm has in a particular offshoring region (Demirbag & Glaister, 2010; Henisz & Macher, 2004). Geographical experience depth is calculated as the number of offshoring activities a firm has in a particular region. *Geographical experience breadth* refers to the experience a firm has in offshoring globally and we measure it as the number of regions in which the firm has prior offshoring activities (Magnusson et al., 2009).

Control variables. In order to account for exogenous influences on cost savings, our study includes relevant activity- and firm-level control variables. As there can be significant differences in cost savings between the offshoring regions, we include dummies for the 14 regions (using the U.S. as the reference category). Offshore activity size is assessed by including the ratio of offshore employees to total employees of the organization. The ownership structure can affect the costs at the offshore location. Therefore, we included a dummy variable that has the value ‘0’ for offshore outsourcing and ‘1’ for captive offshoring (i.e., full ownership) (e.g., Lewin & Peeters, 2006). In

² We added one year prior to taking the log to ensure that the logarithmic function can be calculated.

addition, we also control for a firm's experience with offshoring activities with a particular level of knowledge intensity. Experience with knowledge intensive activities is calculated as the number of previous offshoring activities of that particular knowledge intensity level. On the firm-level, we control for between-industry differences in cost savings by including dummy variables for industry of the focal firm. We consider nine industry groups: energy (2%), finance and insurance (15%), manufacturing (28%), professional services (8%), retail (5%), software development (11%), technical services (13%), transportation (3%), and other industries (15%). We also control for firm size by including the natural logarithm of the number of employees of each firm. We further control for the home country of the offshoring firms in order to account for differences in cost savings due to country factors such as severance obligations (Farrell, 2005). Home country is measured as a binary variable that has the value one for US firms and zero for EU firms.

5.3.3 Analyses

Considering the hierarchical structure of our data (i.e., 639 offshoring activities were nested in 214 firms), we employ Hierarchical Linear Modeling (HLM; see Hox, 2010) to test our hypotheses. Two levels can be identified within the data. On the lower level (level 1) are the offshoring activities of which we assess the relative timing and knowledge intensity. On the upper level (level 2) are the firm-level characteristics geographical experience depth and breadth. Thus, while level 1 data may vary within firms, level 2 data may vary between firms. Scholars have pointed out several reasons why the observations in multilevel data should be modeled in a hierarchically nested structure. First, an important assumption of standard statistical tests is that observations are independent. In the case of multilevel data, this assumption is likely to be violated. Using conventional statistical tests, this results in standard errors that are artificially small, increasing the likelihood of Type I errors (Hox, 2010). Second, not accounting for non-independence can lead to variance inflation, which increases the standard errors and the risk of Type II errors (Bliese & Hanges, 2004). Multilevel models take into account the dependencies in the data and simultaneously analyze variables from different levels of analysis, reducing the risk of flawed conclusions due to Type I and Type II errors (Bliese & Hanges, 2004).

To test our hypothesis concerning the interaction effect between timing and knowledge intensity of the offshored activity (Hypothesis 2) on cost savings, we regressed the outcome variable on the two level 1 variables and their product. To test our hypotheses concerning the cross-level interaction effects (Hypotheses 3a and 3b, respectively), we added experience depth and breadth as level 2 predictors of the level 1 random effect of the relationship between timing and cost-savings. All variables are grand-mean centered when entered into the regression model (Hoffmann, Griffin, & Gavin, 2000).

5.4 Results

Table 5.1 provides the correlations and descriptive statistics of our model variables. Table 5.2 provides the results of the HLM regression. Model 1 is the intercept-only model. The results of this model indicate that there are significant between-firm differences in activity-level cost reductions ($p < 0.001$), thus justifying the use of HLM. In addition, a precondition for testing cross-level interaction effects (i.e. Hypotheses 3a and 3b) is that the slope of the relationship between timing and cost reductions varies across firms. Results show significant variance in the slope of timing (U_1 variance = 217.06, $\chi^2(211) = 5312.50$, $p < 0.000$), thus allowing for tests of cross-level interactions. Next, in Model 2, we include the control variables at the offshore activity and firm levels. Model 3 adds the main effect of the timing of offshoring activities within a region. Model 4 further adds the activity-level contingency, i.e. knowledge intensity. Lastly, Model 5 adds the firm-level contingencies, i.e. geographical experience breadth and geographical experience depth. We discuss the results of Model 5, the full model.

Table 5.1 Descriptive statistics and inter-correlations

	Mean	s.d.	1	2	3	4	5	6	7	8	9
1. Realized savings	32.65	20.83	-								
2. Timing (lag) ^a	2.79	0.61	-0.18	-							
3. Knowledge intensity	0.30	0.46	0.06	0.13	-						
4. Geographical experience depth	0.41	0.88	-0.04	0.11	-0.04	-					
5. Geographical experience breadth	0.93	1.39	-0.12	0.12	-0.02	0.20	-				
6. Offshore activity size ^a	0.11	0.50	0.10	-0.03	0.01	-0.09	-0.11	-			
7. Captive offshoring	0.42	0.49	-0.04	-0.06	0.02	0.08	0.03	-0.09	-		
8. Firm size ^a	8.14	2.62	-0.04	-0.02	-0.15	0.06	0.13	-0.32	0.11	-	
9. Home country (US)	0.65	0.48	0.29	-0.09	0.05	0.06	-0.07	-0.04	-0.12	0.34	-
10. Knowledge intensity experience	0.49	0.50	-0.11	0.17	-0.13	0.44	0.82	-0.11	0.07	0.09	-0.07

Note: Correlation coefficients above |0.08| are significant at $p < 0.05$; ^aNatural logarithm

Table 5.2 Results of HLM regression for offshoring activity cost savings

Explanatory variables	Model 1	Model 2	Model 3	Model 4	Model 5
Intercept	33.07 (1.26) ^{***}	20.88 (8.17) [*]	20.57 (8.64)	21.00 (8.63) [*]	22.32 (8.66) ^{**}
<i>Activity-level (first level) predictors</i>					
Offshore activity region (14 regions)	included	included	included	included	included
Activity size	1.49 (1.22)	1.01 (1.17)	1.01 (1.17)	0.99 (1.17)	1.08 (1.16)
Captive offshoring ^a	1.90 (1.50)	0.78 (1.44)	0.78 (1.44)	0.67 (1.43)	0.73 (1.42)
Knowledge intensity ^b	1.19 (1.36)	1.38 (1.28)	1.38 (1.28)	2.03 (1.30)	1.72 (1.30)
<i>Firm-level (second level) predictors</i>					
Industry (11 industries)	included	included	included	included	included
Firm size ^c	-0.92 (0.51) [†]	-0.90 (0.53) [†]	-0.90 (0.53) [†]	-0.87 (0.53)	-0.89 (0.53) [†]
Home country (US)	4.82 (3.20)	4.97 (3.34)	4.97 (3.34)	5.08 (3.34)	5.05 (3.34)
Knowledge intensity experience ^c	0.53 (1.57)	0.31 (1.46)	0.31 (1.46)	0.10 (1.45)	0.29 (1.44) [†]
Geographical experience depth ^c	0.55 (1.51) [*]	1.31 (1.41)	1.31 (1.41)	1.57 (1.40)	2.62 (1.43) [†]
Geographical experience breadth ^c	-3.89 (1.86)	-2.69 (1.80) [*]	-2.69 (1.80) [*]	-2.49 (1.80) [*]	-2.67 (1.80) [*]
Timing (lag)		-5.25 (2.63)	-5.25 (2.63)	-5.46 (2.62)	-7.27 (2.93) [*]
<i>Interaction effects</i>					
Timing × knowledge intensity (first level)				4.085 (1.86) [*]	3.63 (1.86) [□]
Timing × geographical experience depth (cross level)					-9.27 (3.05) ^{**}
Timing × geographical experience breadth (cross level)					1.47 (1.98)
-2 Log Likelihood	5371.48	5204.38 ^{***}	5166.84	5162.06	5152.80
$\Delta\chi^2$		167.10 ^{***}	37.54 ^{***}	4.78 [*]	9.26 ^{**}
Df	3	32	35	36	38

S.E. in parentheses; ^adummy coded as 0, “offshore outsourcing,” and 1, “captive offshoring.”; ^bdummy coded as 0, “low knowledge intensity,” and

1, “high knowledge intensity.”; ^cNatural logarithm. [†] $p < 0.10$; [□] $p = 0.05$; ^{*} $p < 0.05$; ^{**} $p < 0.01$; ^{***} $p < 0.001$

5.4.1 Test of hypotheses

Level 1 hypotheses. Hypothesis 1 predicts a negative relation between timing (i.e. lag) and cost savings. The empirical results indicate that there is a significant negative relationship ($\gamma = -7.27, p < 0.05$), such that offshoring activities that are early in a particular region are associated with higher levels of cost savings than those that are later in a region. Thus, Hypothesis 1 is supported. Hypothesis 2 predicts that the effect of timing on cost savings is stronger for activities with low knowledge intensity than for activities with high knowledge intensity. We find that in line with hypothesis 2, the moderating effect of knowledge intensity is significant ($\gamma = 3.63, p < 0.05$).

Cross-level hypotheses. We also find that the moderating effect of geographical experience depth ($\gamma = -9.27, p < 0.01$) is statistically significant. The negative sign before the coefficient of the interaction term is in line with Hypothesis 3a, which predicts that the (negative) relationship between activity timing (i.e. lag) and cost savings will be stronger for firms with higher levels of prior experience within the region (i.e. prior experience depth). By contrast, geographical experience breadth ($\gamma = 1.47, p > 0.1$) does not seem to moderate the relationship between timing and cost reductions. That is, we do not find statistical support for Hypothesis 3b, suggesting that offshoring experience breadth does not negate the effect of timing.

To further clarify the activity-level and cross-level moderating effects respectively, we plot the interactions graphs in Figures 5.1 and 5.2. Figure 5.1 depicts the moderating effect of the knowledge intensity of the offshore activity. Early and late timing are plotted as one standard deviation below and above the mean respectively. As predicted in Hypothesis 2, we observe that the effect of timing on cost savings is stronger for low than for high knowledge intensity. The average level of cost savings in low and high knowledge intensive activities is about the same at early stages of entry. However, for late entry, activities with low knowledge intensity exhibit lower average cost savings than knowledge intensive activities. Simple slopes analysis (Preacher, Curran, & Bauer, 2006) reveals that the relationship between timing and cost savings is significantly negative for activities with low knowledge intensity ($b = -8.36, z = -2.80, p < .01$) but negative and non-significant for knowledge intensive activities ($b = -4.73, z = -1.47$).

Figure 5.1 Activity level contingencies: the moderating effect of knowledge intensity

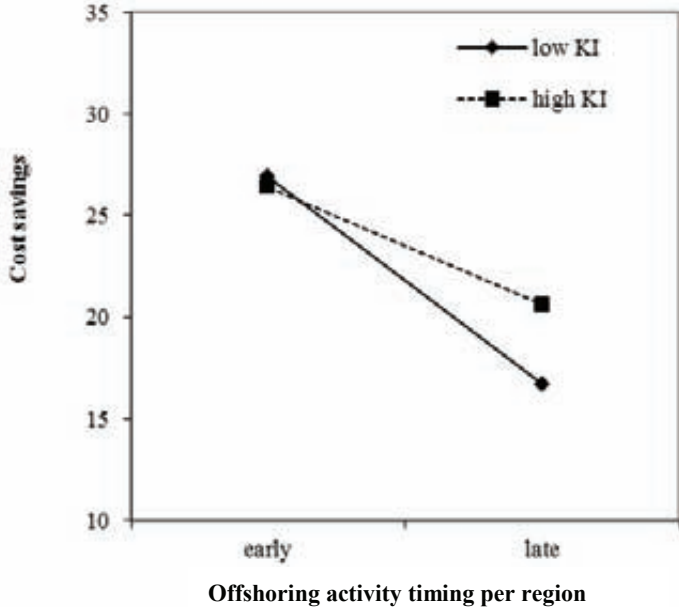
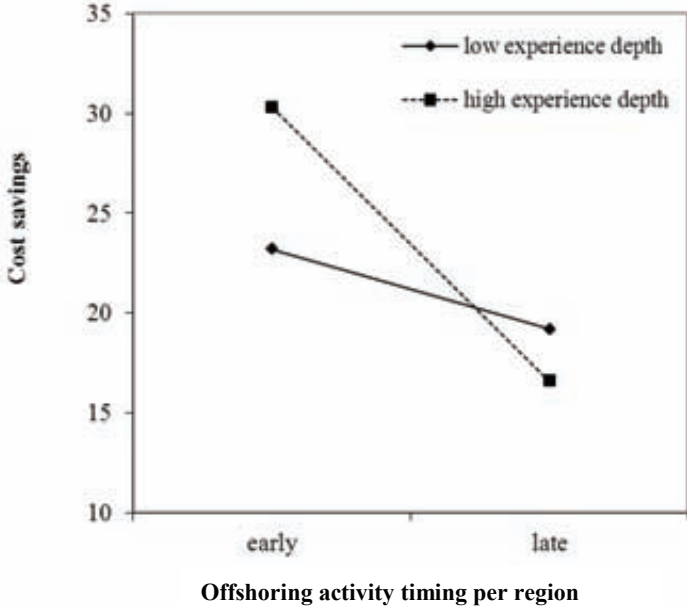


Figure 5.2 Cross level interactions: the moderating effect of offshoring geographical experience depth



Thus, Hypothesis 2 is supported insofar as we find that timing plays a significant role for cost savings in activities with low knowledge intensity but not in those with high knowledge intensity.

Figure 5.2 shows the cross-level interaction between timing and geographical experience depth. That is, it represents how the within-firm relationship between timing and cost savings changes as a function of experience depth. As proposed in Hypothesis 3a, we observe that the negative effect of timing on cost savings is more pronounced in the case of firms with high rather than low geographical experience depth. Simple slopes analysis (see Preacher, et al., 2006) reveals that the relationship between timing and cost savings is negative and non-significant for low prior experience depth ($b = -3.28, z = -1.12$), negative and significant for medium prior experience depth ($b = -7.27, z = -2.48, p < .05$), and negative and significant for high prior experience depth ($b = -11.26, z = -3.25, p < .005$). Together, these results support hypothesis 3a.

5.5 Discussion

Previous research on strategic timing of international operations has contributed to understanding of the antecedents and outcomes of first-mover (dis)advantages in foreign locations (Mascarenhas, 1992, 1997; Johnson & Tellis, 2008). These existing insights have developed primarily with respect to foreign market entry driven by market-side objectives (i.e. increasing market share). We extend this understanding by investigating the performance implications of strategic timing with regard to resource-seeking drivers of internationalization, specifically as it applies to the objective of cost reductions from offshore projects.

Our findings provide evidence that strategic timing in offshoring provides a potential source of competitive advantage by impacting the degree of cost reductions. This effect is found to be contingent on both activity-level and firm-level factors. With regard to the activity-level, our results support the expectation that the strength of the relationship between timing and cost reduction depends on the knowledge intensity of the offshored activity. Distinguishing between high and low knowledge intensity of offshored activities, we show that early mover advantages are particularly pronounced for less knowledge-intensive activities. This suggests that while relative early timing is particularly beneficial

for activities with low knowledge intensity, a tradeoff between cheaper resources and investment in developing the more sophisticated requirements for knowledge work makes timing less important for knowledge intensive activities. In addition, our findings indicate that on the firm-level, experience within a certain offshore location strengthens the relationship between entry timing and cost savings. That is, geographical experience depth was found to enhance the benefits of early entry and hinder the achievement of cost savings in subsequent activities more distant in time. Finally, in contrast to our expectations, our empirical analysis does not support the proposed moderating role of geographical experience breadth.

5.5.1 Theoretical implications

The conceptual approach and empirical findings of our study offer several contributions. First, it extends and refines the body of research on strategic timing in the international context (Eden, 2009). By considering a resource-seeking context, our study complements understanding from prior studies that have focused on early-mover advantages in terms of market share and market performance implications of foreign entry (Mascarenhas, 1997; Pan, et al., 1999; Rivoli and Salorio, 1996). Moreover, although previous studies have often conceptualized early-mover advantages in terms of cost advantages, direct empirical investigation of cost reduction have been scant to date. We show that early-mover advantages may also arise through the realization of cost-advantages in a resource-seeking context where previously studied market-side mechanisms may be less pronounced. Our theorizing and empirical findings further indicate that there are important multilevel dynamics that affect the extent to which firms can achieve early mover advantages in resource-seeking situations. Providing conceptual and empirical evidence for these multilevel effects regarding the interaction between specific offshoring characteristics and broader firm-level characteristics, we point to the limitations of taking a single-level approach and contribute to the debate on early versus late mover advantages (Suarez & Lanzolla, 2007).

Second, our study contributes to the offshoring literature. Despite a general consensus in the literature that saving costs is a primary reason for relocating business processes to foreign locations (Beugre & Acar, 2004; Lewin & Peeters, 2006),

understanding of the drivers and contingencies under which cost savings are realized in offshore activities remains limited (Dibbern et al., 2008). Our finding that establishing operations early within a particular region is positively associated with realized cost reduction for activities with low knowledge intensity, is consistent with the implicitly assumed but previously untested notion that “different locations are attractive at different times” (Hätönen & Eriksson, 2009: 151). That is, findings indicate that the attractiveness of particular locations changes over time. In this way, we advance the insights on location choice (Demirbag & Glaister, 2010; Henisz & Macher, 2004; Jensen & Pedersen, 2011) by showing that certain locations are more appropriate for performing *certain activities at certain points in time*.

Third, this study advances theory on internationalization processes, paths, and positions by providing increased understanding of the interaction between strategic choice and path dependency in offshoring (Hutzschenreuter et al., 2007; Lewin & Volberda, 2011). The moderating role of experience depth is consistent with the notion of incumbent inertia in first-mover advantage literature (Lieberman & Montgomery, 1988), and suggests that complacency and path dependence increase the risk that firms develop a preference towards re-entering the same location irrespective of the attractiveness of that location at a later point in time. In light of changes in the environmental conditions, experiential knowledge within a familiar setting can be harmful insofar as it drives blindness to threats in the current environment and to opportunities beyond their current setting (Abrahamson & Fombrun, 1994; Barkema & Vermeulen, 1998; Leonard-Barton, 1992; Levinthal & March, 1993). Thus, while managerial intentionality plays an important role in achieving offshoring objectives, we show that the effectiveness of managers’ discretionary actions are bounded by the path dependent forces of experience accumulation.

Moreover, literature on organizational learning from international diversity and expansion generally suggests that the broader a firm’s geographical experience, the more likely it is to reach performance benefits in an international context (Barkema & Vermeulen, 1998; Gaba et al., 2002; Vermeulen & Barkema, 2002). Contrary to prior insights regarding the role of experience in the internationalization process literature and our conjecture, we found no significant support for this relationship in the context of cost reduction in offshoring activities. A possible explanation for this result is that firms may

lack the mechanisms to absorb and transfer experience in controlling and coordinating offshore activities at the firm level. As Lewin & Peters (2006: 230) argue, many firms lack a corporate-wide, top-down strategy for guiding the adoption of offshoring. Vestring, Rouse, & Reinert (2005) found that such a top-down, comprehensive offshoring program is likely to enhance the potential for cost-savings. We encourage future research to further probe the role of a corporate strategy for offshoring in enabling the transfer of experiential knowledge and capabilities and its effect on choosing the right location at the right time. A second possible explanation is that the transfer of knowledge and skills between the offshore service provider and the offshoring firms may be more difficult and costly when geographical distance between activities is large (Dibbern et al. 2008). Indeed, Dibbern et al. (2008) argue that transfer costs may be particularly high in such instances as knowledge asymmetries between the firm and the offshore vendor hinder knowledge transfer.

Finally, the present study also answers recent calls for multilevel research in management research in general (Hitt, Beamish, Jackson & Mathieu, 2007), and international management research in particular (Arregle, Makino, Martin, & Peterson, 2012). To the best of our knowledge, our study is among the first to provide a multilevel contingency perspective in the context of international sourcing arrangements. In light of our findings, we highlight the need for scholars to take into consideration the complex context in which the success of offshoring is determined.

5.5.2 *Managerial implications*

The findings of our study have implications for offshoring firms and those considering reducing costs through the relocation of business processes abroad. Considering that cost reduction is one of the most important motivations for offshoring and previous research shows that there are high variations in the degree to which firms are able to realize cost savings, direction is needed on how firms can achieve this goal. We show that decisions regarding the content and context of offshoring should be considered in light of strategic timing. This implies that firms need to be aware of changing environmental conditions at the offshore location. Moreover, these environmental changes differently affect the potential cost reductions depending on the knowledge-intensity of the activity. These findings inform managers about the benefits and risks of locating operation to

offshoring hotspots versus emerging locations.

In addition, our findings suggest that offshoring firms need to carefully consider the relevancy of their experiential knowledge when evaluating location choice and timing of entry. Prior developed experience may become obsolete and drive firms into offshoring to familiar contexts while environmental changes have reduced the appropriateness of the location. Together, our findings of multilevel interactions between firm and activity-level factors highlight the complexity of offshoring and suggest that managers should consider each offshoring activity not as an isolated action, but as part of the firm's offshoring portfolio.

5.5.3 *Limitations and future research*

The findings of our study should be interpreted in light of its limitations. First, our measure of timing is calculated relative to the first entrant in our sample within a specific region. Evidently, these *relative* 'first movers' are not necessarily the very first to offshore their business activities to those regions. Thus, while our model captures the effects of timing by differentiating between earlier and later movers, future research should seek to validate our findings by investigating the impact of timing on cost savings in a population of offshoring projects including all entrants in a specific region.

Future empirical inquiry would also benefit from explicitly investigating the mechanisms driving the early mover advantage found in the current study. We have argued that changing environmental conditions at the offshore location will generally increase costs over time, and conceptualized the role of knowledge intensity as a potential moderator determining the firm's sensitivity to such changes, yet do not account for such changes directly. A particularly worthy avenue for investigation is to identify which context variables are more relevant than others in affecting realized cost savings, and provide a more detailed explanation with regard to their effect on specific offshored activities.

Another limitation of this study is the measurement of the knowledge intensity of the business processes offshored. Specifically, while we make a distinction on the basis of knowledge intensity, our measurement does not allow for comparisons within the same broad type of process. For instance, within the category of R&D activity offshored, we do

not quantify the distinctions between the degrees of knowledge intensity of various R&D processes. Our measurement, while not capturing the most fine-grained elements of the processes offshored, does provide an adequate measurement when dealing with such a high variety of activities offshored as in our large-scale multi-industry sample. Future studies desiring to use more fine-grained measures of the type of processes offshore could, perhaps, choose a sample of firms from a specific industry to allow for more homogeneity in the types of processes offshored; thus, allowing a more fine-grained measurement of a smaller array of business processes.

Future research may also investigate the influence of prior experience from the perspective of the offshore service provider on the ability to achieve cost savings. We argued that as firms offshore to a specific location there are knowledge spill-overs such that the sophistication of the labor force and providers at the host location increases over time (cf. Zhang, Li, Li, & Zou, 2010). In light of this, later entrants in a particular region may find more efficient providers. As such, future research may analyze to what extent offshore providers are willing to pass their improvements in efficiency to their clients in the form of lower costs at different points in time. In extension to the latter, future research may also choose to incorporate the quality of the services provided when considering cost savings as there may be inherent tradeoffs between price and quality.

5.6 Conclusion

This study provides contributions to previous literature on strategic timing and offshoring. We extend timing theory to the context of offshoring and show that early mover advantages in terms of cost reductions may arise when firms offshore labor intensive (i.e. less knowledge intensive) business activities, whereas such advantages are not found for knowledge intensive activities. Furthermore, our arguments and evidence suggest that firm-level experience in offshoring moderates the effect of timing such that firms with more experience in a particular location benefit from leveraging their experience early on. Moreover, we suggest that location experience may become detrimental when firms base later offshoring decision on prior experience as incumbent inertia may drive firms to offshore to familiar locations which may have lower potential for cost reduction at that point in time. Contrary to prior internationalization process studies which have

focused primarily on market-side dynamics, the present study does not find evidence of a beneficial effect of prior experience in different locations for cost reductions through offshoring. These contributions provide a foundation for future research in which scholars attempt to understand the emergence and consequences of strategic timing in internationalization processes in general, and offshoring in particular.

Chapter 6. Discussion and Conclusion

6.1 Introduction

The field of Strategic management and entrepreneurship, with its focus on dynamic organization-environment fit, and competitive advantage, is inherently related to the relational notion of time (Aristotle, Leibnitz) as involving an ordering of events. Strategic management and organization theory research suggest that organizations need to match or entrain to change in the environment for sustained performance (Pérez et al., 2008; Gersick, 1994; Volberda & Lewin, 2003). Moreover, from the early writings of military strategists to the more modern notions of first-mover advantage theory in strategic management scholarship (e.g. Bain, 1956, 1959; Nicholls, 1951; Lieberman & Montgomery, 1988; Robinson & Fornell, 1985; Lambkin, 1988; Kerin et al., 1992; Porter, 1985), strategic timing has been considered a core means of achieving competitive advantage. Yet notwithstanding the widely recognized importance of a temporal perspective on organizations in general, and strategic management and entrepreneurship more specifically (Albert & Bell, 2002; Ancona, Goodman, et al., 2001; Ancona, Okhuysen, & Perlow, 2001; Bluedorn, 2002; George & Jones, 2000; Gersick, 1994; Thompson, 1967; Zaheer, Albert, & Zaheer, 1999), recent reviews highlight that our understanding of the drivers and contingencies of temporal organization-environment alignment, as well as the outcomes of reactive vs. proactive behaviors and early vs. later mover strategies remains limited and fragmented (Pérez et al., 2008; Suarez & Lanzolla, 2007). Given the potential contributions of a temporal approach to strategy (e.g. Van Den Bosch, 2001), increased research efforts seem warranted and desirable.

In an attempt to advance our understanding and stimulate future research on temporalities in strategy and entrepreneurship, this dissertation focused attention on the temporal dimension of the organization-environment relationship. To this end, we conducted four studies that approached the main topic from multiple theoretical perspectives (e.g. knowledge based view, contingency theory, work design theory, internationalization theories), multiple levels of analysis (individual, project, and firm),

and multiple methods (survey data, archival data, content analysis). The findings of the four studies provide a number of important insights that extend knowledge on the drivers, mechanisms, and outcomes of timing strategies and highlight the need to redirect our attention more strongly to the role of time in strategic management. In the remaining sections, I first summarize the main findings and contributions of each of the four studies (§6.3) and subsequently discuss their broader implications for theory and future research, and management practice (§6.3). Finally, I provide a brief conclusion of this dissertation (§6.4).

6.2 Summary of the Main Findings

6.2.1 Study one

As long-term survival is assumed to depend on the degree of organization-environment fit over time, and environmental rates of change are alleged to intensify continuously, Study one takes a close-up view on a long-lived firm to explore the pattern, antecedents, and outcomes of alignment between internal and external rates of change in an increasingly dynamic environment. In our theoretical review, we focus on the knowledge-based mechanisms suggested to be critical for temporal co-alignment (e.g. Volberda & Lewin, 2003). In line with theory on absorptive capacity (Cohen & Levinthal, 1990; Lane et al., 2006; Volberda et al., 2010), we conceptualized the alignment between internal and external rates of change as a process through which potential absorptive capacity -- that is the ability to identify and acquire new external knowledge -- drives the realization of strategic renewal actions (cf. Zahra & George, 2002). We argued that given a higher level of potential absorptive capacity, a higher degree of alignment should be seen between the rate of strategic renewal and external rates of change (operationalized as volatility in the oil price).

Table 6.1 Hypothesis tested in study one

Hypothesis	Result
<i>Hypothesis 1: Potential absorptive capacity is positively related to the alignment of internal and external rates of change over time.</i>	<i>Supported</i>

Results of our longitudinal data analysis covering 27 years of strategic renewal actions confirmed our prediction (see Table 6.1). Periods with relatively high potential absorptive capacity were significantly stronger related to the alignment between the internal and external rates of change than to the independent rates of change. This substantiates that an organization's absorptive capacity enables adaptation through a more accurate prediction of opportunities (Cohen & Levinthal, 1990, 1994; Van Den Bosch et al., 1999) Moreover, in keeping with organization theory, comparison of the development of the firm's relative market share indicates that temporal fit is associated to superior firm performance. In sum, the findings of study 1 underline the value of a knowledge-based, temporal approach to strategic renewal research.

Table 6.2 Focus, research question, main findings and conclusion of study one

Focus:	Antecedents and outcomes of temporal alignment.
Research Question:	What drives the alignment of internal and external rates of change?
Main Findings:	Periods of high PACAP correspond with high alignment between internal and external rates of change; Periods of high alignment of internal and external rates of change correspond with higher firm performance.
Conclusion:	Temporal fit can be achieved by managing key knowledge processes that drive strategic renewal.

6.2.2 *Study two*

Building on the contributions of Study one, the second study focuses on the strategies available to decision makers when it comes to organizational adaptation, and recognizes that adaptation may be approached both reactively as proactively (cf. Hrebiniak & Joyce, 1985; Miles & Snow, 1978). Building on prior studies taking an environmental contingency perspective on the relationship between exploratory and exploitative innovation and firm performance (e.g. Jansen et al., 2006; Lavie et al., 2010; Tushman & O'Reilly, 2008), we suggest that the crucial role of strategic timing is missing from current theoretical frameworks. Accordingly, we proposed that the proactiveness with which firms approach both types of innovation should be considered as pivotal for understanding their performance implications in different environmental settings.

Table 6.3 Hypotheses tested in study two

Hypotheses	Results
<i>Hypothesis 1a: At high levels of environmental dynamism, the relationship between exploratory innovation and firm performance is more positive for firms with high levels of proactiveness than for firms with low levels of proactiveness.</i>	<i>Supported</i>
<i>Hypothesis 1b: At low levels of environmental dynamism, the relationship between exploratory innovation and firm performance is more negative for firms with high levels of proactiveness than for firms with low levels of proactiveness.</i>	<i>Supported</i>
<i>Hypothesis 2a: At high levels of environmental dynamism, the relationship between exploitative innovation and firm performance is less negative for firms with high levels of proactiveness than for firms with low levels of proactiveness.</i>	<i>Opposite effect</i>
<i>Hypothesis 2b: At low levels of environmental dynamism, the relationship between exploitative innovation and firm performance is more positive for firms with high levels of proactiveness than for firms with low levels of proactiveness.</i>	<i>Partly supported</i>

The findings support our theorizing regarding the essential influence of timing. Consistent with our prediction, we find that investing in exploratory innovation in rapidly changing environments is only beneficial when firms manage to introduce the resulting products, services, and processes in such a way that early-mover advantages can be realized. This finding substantiate the argument that dynamic environments provide many high-payoff opportunities and that firms need to behave proactively in order to capture such opportunities and maximize the pay-off period (Davis et al., 2009). Moreover, the results are in line with Posen & Levinthal's (2011) simulation study which suggests that "environmental change is not a self-evident call for strategies of greater exploration" (p.587). Indeed, we show that when a more reactive approach is taken, firms seem to forego the opportunity to benefit from their investments in exploratory innovation. This can be due to dynamic of firms investing in exploratory innovations that, by the time they hit the market, are no longer considered new. Indeed, changing environmental conditions potentially make all innovations obsolete, irrespective of whether they are considered to be exploratory or exploitative from the firm's perspective.

Table 6.4 Focus, research question, main findings and conclusion of study two

Focus:	Outcomes of proactive approaches to exploratory and exploitative innovation.
Research Question:	How does proactiveness influence the effectiveness of investments in exploratory and exploitative innovation for firm performance in more and less dynamic environments?
Main Findings:	<ul style="list-style-type: none"> • Investments in exploratory innovation enhance firm performance in dynamic environments when proactiveness is high; • Investments in exploratory innovation decrease firm performance in dynamic environments when proactiveness is low; • Investments in exploitative innovation enhance firm performance in dynamic environments when proactiveness is low (more reactive approach).
Conclusion:	Strategic timing vis-à-vis competitors, innovation type, and environmental contingencies interact in a complex way to affect firm performance.

6.2.3 Study three

Having considered the implications of proactive strategic behavior, Study three directs attention toward the determinants of firm-level proactiveness. Based on our review of the literature, we argue that while previous studies have incorporated proactiveness as a dimension of the widely studied Entrepreneurial Orientation (EO) construct, knowledge advancement on the dimension level itself has been very scant (see for instance the recent meta-analysis of Rauch et al., 2009). In addition, we note that much of the literature taking a psychological approach to proactive behaviors of individuals within the firm has remained largely detached from firm-level investigation of proactiveness. Study 3 addresses both gaps in the literature by investigating to what extent a well-accepted driver of individual level proactive behaviors, namely employee job autonomy (Hackman & Oldham, 1976; Grant & Ashford, 2008; Grant & Parker, 2009), can be considered to enhance organizational mechanisms leading to proactive strategic behavior on the firm level (Parker & Collins, 2010; Parker et al., 2010). Additionally, we consider the moderating role of internal cooperation as a key social context characteristic, and build on the environmental contingency perspective developed in the previous studies to determine how configurations of employee job autonomy and internal cooperation interact to affect proactiveness under different degrees of environmental dynamism.

Table 6.5 Hypotheses tested in study three

Hypotheses	Result
<i>Hypothesis 1: Employee job autonomy is positively associated with firm proactive strategic behavior.</i>	<i>Supported</i>
<i>Hypothesis 2: Employee job autonomy and internal cooperation interact in such a way that the positive relationship between employee job autonomy and proactive strategic behavior is stronger for firms with low internal cooperation than for firms with high internal cooperation.</i>	<i>Rejected</i>
<i>Hypothesis 3: Employee job autonomy and environmental dynamism interact in such a way that the positive relationship between employee job autonomy and proactive strategic behavior is stronger for firms in dynamic environments than for firms in stable environments.</i>	<i>Rejected</i>
<i>Hypothesis 4a: In dynamic environments (high level of dynamism), the relationship between employee job autonomy and proactive strategic behavior is less positive for firms with high internal cooperation than for firms with low internal cooperation.</i>	<i>Supported</i>
<i>Hypothesis 4b: In stable environments (low level of dynamism), the relationship between employee job autonomy and proactive strategic behavior is more positive for firms with high internal cooperation than for firms with low internal cooperation.</i>	<i>Supported</i>

Consistent with our theorizing, the results support a positive association between the degree of employee job autonomy and the firm's orientation toward proactive strategic behavior. In addition to the important way in which this finding translates key motivational and informational mechanisms associated with autonomy at the individual level of analysis (Campion et al., 1987; Langfred & Moye, 2004) to firm-level outcomes, our study also provides insights into the complex contextual conditions under which this relationship holds. More specifically, we find that as the firm's environmental context is characterized by more dynamic change, internal cooperation may obstruct the contribution of autonomy-induced proactive behaviors to contribute to firm proactiveness. This can be understood as a factor of increased complexity in the work context and the increased costs and effort required for the coordination and integration of work processes. Indeed, in more stable environments, where complexity can be assumed to be of a lesser concern, our results show that higher levels of internal cooperation enhance the effectiveness of employee job autonomy for firm proactiveness. In sum, the findings of study three contribute to current understanding on the ability to develop a more proactive strategic orientation, as well as to knowledge on how the external environment can alter the appropriateness of widely

researched work design characteristics.

Table 6.6 Focus, research question, main findings and conclusion of study three

Focus:	Antecedents of proactive strategic behavior
Research Question:	How do work design characteristics and environmental contingencies interact to influence proactive strategic behavior?
Main Findings:	<ul style="list-style-type: none"> • Employee job autonomy is positively related to firm proactive strategic behavior; • The relationship between employee job autonomy and firm proactive strategic behavior is enhanced by low internal cooperation in dynamic environments; • The relationship between employee job autonomy and firm proactive strategic behavior is enhanced by high internal cooperation in stable environments.
Conclusion:	Task and social work design characteristics interact with environmental dynamism in a complex manner to drive proactive behavior on the firm level.

6.2.4 Study four

In study four we explored the issue of strategic timing in the international, resource-seeking context of offshoring. Furthermore, the focus was on better understanding the substantial variance in achievement of cost-reductions in offshoring projects reported in the literature. Recognizing that firms undertake multiple offshoring activities, each with their own characteristics in terms of timing and content, and that projects are thus nested within a firm's broader offshoring portfolio, we took a multi-level approach in which project level and firm level aspects were simultaneously assessed. While offshoring is an increasingly popular business practice and both managerial and scholarly literature has burgeoned in recent years, little research attention has been devoted to the subject of timing. This is surprising, as traditionally, cost-reduction is a main driver of the decision to offshore a firm's business processes (Agarwal & Farrell, 2005; Lewin & Peeters, 2006), and cost-reductions are typically dependent on the ability to leverage cost-differentials (e.g. labor cost) which can dissipate over time as the environmental conditions in the offshore location change. Consequently, choosing the right offshore location at the right time is essential.

Table 6.7 Hypotheses tested in study four

Hypotheses	Result
Hypothesis 1: <i>The later an activity is offshored to a given region, the lower the realized cost savings will be relative to earlier entrants in that region.</i>	<i>Supported</i>
Hypothesis 2: <i>The knowledge intensity of the offshored activity moderates the relationship between timing and cost reduction in such a way that early mover advantages in terms of cost reductions are higher for activities with low knowledge intensity than for activities with high knowledge intensity.</i>	<i>Supported</i>
Hypothesis 3a: <i>Geographical experience depth moderates the relationship between timing and cost reduction in such a way that early mover advantages in terms of cost reductions are higher when geographical experience depth is high.</i>	<i>Supported</i>
Hypothesis 3b: <i>Geographical experience depth moderates the relationship between timing and cost reduction in such a way that early mover advantages in terms of cost reductions are lower when geographical experience breadth is high.</i>	<i>Rejected</i>

Accordingly, we have argued that timing considerations in offshore activities have important implications for a firm's resource-seeking performance in terms of achieved cost reductions. Our multi-level contingency framework proposed that firms that are relatively early to enter an offshore region will be better able to achieve cost savings, yet that this relationship is contingent on the knowledge intensity of the offshored activity, as well as on the firm's prior experience within and across regions. In line with our predictions, we find that pre-emption of location advantages is important for offshoring activities with low knowledge intensity, and less so for more knowledge intensive activities requiring a more developed infrastructure. Moreover, the findings provide evidence that prior experience within a certain offshore region can enhance the effect of early timing on the degree of cost reductions. Yet the results do not substantiate that experience in other regions plays a role. One possible explanation for this important non-finding is that firms may lack the ability to transfer cross-region experiences in offshoring, either due to a lack of a firm level offshoring function, or cross-region differences in culture.

Table 6.8 Focus, research question, main findings and conclusion of study four

Focus:	Outcomes of early vs. late mover behavior in offshoring
Research Question:	How does strategic timing influence the effectiveness of offshoring in terms of realized cost-savings?
Main Findings:	<ul style="list-style-type: none"> • Firms that are relatively early to enter an offshore region will be better able to achieve cost savings from offshoring; • Early mover advantages are more pronounced for non-knowledge intensive activities than for knowledge intensive activities; • Prior within-region experience positively moderates early mover advantage in offshoring.
Conclusion:	Strategic timing considerations are crucial for understanding firms' ability to realize cost savings in offshore projects.

6.3 Implications for Theory, Future Research, and Practice

Beyond the specific theoretical and managerial contributions discussed at the end of each chapter, the joint findings of the studies provide several broader contributions to existing literature and future research. I next discuss these contributions in terms of implications for research on outcomes of strategic timing and organizational adaptation, and implications for research on antecedents of proactiveness. Finally, a discussion of the managerial implications of this dissertation is presented.

6.3.1 *Implications for research on outcomes of strategic timing and adaptation*

Whether discussing temporal fit, degree of proactiveness, or early vs. later mover behavior, the timing of strategic renewal actions encompasses a core theme in the four empirical chapters. As a starting point, it is notable that studies one, two, and four yielded consistent evidence that timing has important implications on organizational performance, and more specifically, that both proactive and reactive timing orientations can potentially *increase* firm performance (study two). In itself, this observation is in line with a multitude of strategic management and organizational theory studies, and supports Morgan's observation that it is more important 'to do the right thing in a way that is timely and "good enough" than to do the wrong thing well, or the right thing too late' (Morgan, 1986: 35). Indeed, several underlying theories predict that timing *should* play a role. From a

resource based perspective, for instance, the rent-earning potential of tangible and intangible assets is strongly linked to the ability to preemptively build resource position barriers such as time compression diseconomies (Wernerfelt, 1984; Dierickx, & Cool, 1989). Yet a key contribution of our findings lies in elucidating the contingency factors involved in the timing-performance relationship.

With respect to the contingent performance effects of proactiveness and early vs. late mover behavior, the findings in studies two and four highlight the relevance of both environmental and organizational contingencies. Existing literature has framed the pace of technological change and market evolution as a central element in discussions on organizational dynamics (Aldrich, 1979; Barnett & Carroll, 1995; Davis et al., 2009; Dess & Beard, 1984; Hannan & Freeman, 1989; Lawrence & Lorsch, 1967; Miller & Friesen, 1983; Zahra, 1993). Moreover, the relationship between such environmental contingencies and preemptive advantages has also been considered previously (e.g. Porter, 1985). However, the explicit introduction of macro dynamics into first mover advantage theory is fairly recent (Suarez & Lanzolla, 2007). This study contributes theoretically and empirically to this macro approach by showing that the appropriateness of a certain timing orientation depends on the joint influence of environmental context and other strategic factors such as the firm's innovation capabilities. The value of understanding these contingencies should be seen in light of the inconsistent findings and oversimplified accounts in existing literature which have led to frequently contested insights on timing based advantages (see Table 6.9). For instance, where Suarez & Lanzolla (2007: 388) conclude that "first mover strategies are most likely to be successful when the pace of both market and technology evolutions is smooth", in contrast, Davis et al., (2009: 441) argue that high-velocity environments are rich in high-payoff opportunities, and executives should aim to secure those opportunities by acting quickly through fast strategic decision-making and fast product innovation (Eisenhardt, 1989; Eisenhardt & Tabrizi, 1995). In so doing, opportunities can be exploited for a longer period of time and increase firm performance. In a similar vein, Lumpkin & Dess (2001: 436) propose that a firm's proactiveness is more strongly associated with high firm performance when environmental dynamism is high than when it is low (see also: Zahra, 1993).

Table 6.9 Extracts from FMA literature

Arthur, 1998	“two maxims are widely accepted in knowledge based markets: it pays to hit the market first and it pays to have superb technology” (p.100)
Finkelstein, 2002	The “holy grail of first mover advantage is as elusive as it is exaggerated.” (p.39)
Franco et al., 2009	“In spite of 839 publications on first-mover advantage (FMA) in peer-reviewed journals, its existence has neither been conclusively proved nor refuted.” (p.1842)
Sandberg, 2001	“in most cases...being the first mover is no guarantee of success.” (p.3)
Suarez & Lanzolla, 2007	“The academic literature has been unable to provide conclusive empirical evidence to support or refute the existence of FMA [first mover advantages].” (p.377)

Our findings contribute to resolving this apparent discrepancy by showing that the performance outcomes of different timing strategies are a factor of a more complex interaction between organizational and environmental contingencies. More specifically, we find that firms can indeed benefit from proactive strategic behavior aimed at reaching early mover advantages in dynamic environments yet that such a timing strategy may apply more strongly to exploratory than to exploitative innovations. In contrast, we show that in more stable environments proactive approaches to exploratory innovation are detrimental to firm performance while such an approach befits exploitative innovations. In addition to the important way in which our results contribute to strategic timing literature, these findings are insightful for understanding when exploratory or exploitative innovation constitute a more appropriate response to environmental change (Posen & Levinthal, 2011; Lavie et al., 2010).

Further support of the important interaction between environmental and organizational contingencies in the context of strategic timing can be seen in our study on the role of timing in offshoring. Here too, we found firm-level, but also project level characteristics to place boundaries on the effectiveness of certain timing approaches. Although environmental dynamics were not specifically modeled, socio-economic evolution is known to be a major source of environmental dynamism in the context of

offshoring. The results of our empirical analysis confirm that the timing of strategic actions aimed at capturing opportunities in the environment -- in this case cost reductions from offshoring -- is in effect dependent on the knowledge intensity of the offshored activity as well as prior experience on the firm level.

On a more theoretical level, this dissertation contributes to literature on the junction of deterministic and strategic choice perspectives on organizational adaptation (Hrebiniak & Joyce, 1985; Smith & Cao, 2007; Volberda & Lewin, 2003). Consistent with a large body of research in strategic management and organization theory, this dissertation substantiates the fit-performance proposition (Venkatraman and Camillus, 1984; Zajac et al., 2000). Moreover, it is in line with entrainment theory (Pérez-Nordtvedt, et al., 2008), which highlights that “alignment does not only come from the fit of the types of activities to the environment [...], but also from the fit of timing and velocity of activities to the temporal pressures of the environment (e.g. how fast should the production process run to fit the needs of the customer)” (p.796). Simultaneously our findings are also consistent with a strategic choice perspective (Barnard, 1938; Child, 1972). That is, while the degree of discretion and available range of strategic choices is bounded by path dependencies (e.g. prior experience, study 4), heterogeneity in timing orientations and choices of managers on combinations of *what* and *when* strategic actions are undertaken in specific environmental contexts clearly exist, and matter for firm performance. In this sense, our discussion of proactive strategic behavior extends current entrainment theory by providing some important insight into how organizations may successfully pursue temporal enactment rather than reactive adaptation to external rates of change (cf. Pérez-Nordtvedt, 2008). In sum, combining the deterministic and voluntaristic perspectives supported in this dissertation, Weick’s (1979: 52) observation that an ability to “think in circles”, that is, conceive of choice as both a cause and a consequence of environmental change, is suggested to apply to strategic timing decisions. Such reciprocal relationships are a key challenge for future research efforts.

6.3.2 Implications for research on determinants of proactive strategic behavior

Building on recent studies and literature reviews, we have argued that understanding of determinants of proactiveness is still limited. For instance, while studies

on drivers of EO as an aggregate index abound, our understanding of determinants as they specifically relate to proactiveness is limited (Miller, 2012; Rauch et al., 2009). In a similar vein, models of early vs. later mover advantages and order of entry timing have offered sparse attention to the micro aspects and preceding capabilities (Franco et al., 2009; Suarez & Lanzolla, 2007). A key implication of this dissertation relates to its exploration of the determinants of proactive strategic behavior, or perhaps more generally, a strategic timing capability. Putting aside the discussion about how appropriate certain timing strategies and orientations are in certain organizational and environmental contexts, the question we addressed in this context is how we can stimulate proactive strategic behavior given the assumption that proactiveness has potential value in terms of its role in entrepreneurial action (Lumpkin & Dess, 1996; McMullen & Shepherd, 2006; Smith & Cao, 2007).

First and foremost, we argue that greater integration should be sought between different streams of research informing the ability to behave proactively. As illustrated in the study on the effects of work design characteristics on proactive strategic behavior, the specific approach taken in this dissertation was to link knowledge of motivational and informational mechanisms driving proactive behaviors within the firm (cf. Bateman & Crant, 1993; Crant, 2000; Grant & Ashford, 2008; Grant & Parker, 2009) to knowledge on proactive behavior as a strategic-entrepreneurial behavior of firms (Lumpkin & Dess, 1996; Miller, 1983; Smith & Cao, 2007). While these literature streams have long existed as separate domains of research focusing largely on distinct levels of analysis, the potential for cross-fertilization is apparent. For instance, in a notable study Parker & Collins (2010) show that while a variety of proactive behaviors exists within the organizational context – each with a different target of impact (e.g. person-organizational environment fit, organization-external environment fit), higher-order categories of proactive behavior can be identified with several shared predictors and common processes.

In a related vein, scholars taking a psychological approach to entrepreneurship (e.g. Baron, 2002, 2007; Baum, Frese & Baron, 2007) have started to show the importance of understanding proactive rather than reactive behaviors of agents when studying the process of economic value creation by entrepreneurs and incumbent firms (Schumpeter, 1934; see Frese, 2009 for an overview of relevant theories). Supporting this integrative perspective, our analysis indicates that the same factors driving proactive behavior of individuals may

manifest as drivers of proactive behavior at the organization level. These findings provide an important indication that future research into the underlying mechanisms of firm proactiveness should focus on uncovering the processes linking proactive behaviors across levels of analysis (cf. Crossan & Apaydin's (2010) discussion on the feedback loops from activities of organizational actors - to organizational and contextual outcomes - back to actors). Further pursuing this line of research – for instance, by means of detailed case analyses with a focus on the temporal dimension – can significantly contribute to our understanding of the dynamics of strategic timing and inter-firm heterogeneity in timing orientations; particularly when such an approach is combined with more developed theoretical foundations in the strategic timing literature (e.g. resource based approach to FMA, Lieberman & Montgomery, 1998).

6.3.3 *Managerial implications*

Besides theoretical implications, the findings of the studies composing this dissertation have important implications for management practitioners. Table 6.10 presents an overview of the key implications regarding the outcomes of temporal alignment and the selection of proactive versus reactive timing orientations, the antecedents of proactive strategic behavior and organization-environment co-alignment, and the contingency factors posed by the external environment.

First, this dissertation has shown that the degree of proactiveness—or more generally, timing strategies—can have important performance implications that are contingent on both organizational and environmental factors. Importantly, organizational outcomes should be seen as a factor of the content, timing, and environmental context of strategic actions. The results of the second study, for instance, indicate that depending on whether certain innovation efforts are aimed at making improvements to existing products and services (exploitative innovation) or developing new offerings (exploratory innovation), managers should carefully consider to what extent the firm can and should choose a more or less proactive approach to introducing such products and services to the market. Such considerations are strongly dependent on the pace of environmental evolution. Moreover, this implies that managers need to specifically take into account the greater competitive setting in which the outcomes of their innovation actions are shaped. A

key implication is that in rapidly changing environments, the ability to leverage investments in completely new products and services (exploratory innovation) is likely to be contingent on the firm's ability to introduce such products and services ahead of competitors to capture early mover advantages.

The interdependence of content, timing, and context is further indicated in study four. Our findings suggest that when the goal is to achieve cost savings from offshoring, the effect of relative timing depends on the type of activity in terms of knowledge intensity, as well as in the degree to which managers can leverage prior experience. In addition, in making decisions about when and where to offshore, managers need to consider whether early mover advantages can be achieved for the specific activity, and if so, how future developments in the environmental conditions at the offshore location may influence the sustainability of such advantages over time. Our results further warn against the downside of path dependence when considering an offshore location. While experience with offshoring to a certain location may enhance the ability to achieve cost savings due to early mover behavior, changes in the environmental context may have rendered the location inappropriate for subsequent offshoring activities.

In addition, the findings in this dissertation suggest how managers may enhance firm proactiveness. The framework developed and tested in study three indicates that work design characteristics—specifically the degree to which employees are granted autonomy and the level of internal cooperation—can be considered important drivers. Accordingly, managers should consider whether employees are provided enough autonomy to enable desirable proactive behaviors within the organization. The results suggest that the proper configuration of autonomy with internal cooperation can be influenced by the dynamism in the firm's external environment, such that the need for interpersonal interaction should be adjusted to support rather than hamper employees to deal with environmental contingencies.

Study one further suggests that generally, managers need to understand what drives their firm's ability to achieve long-term temporal alignment with the external environment. Key managerial levers are the monitoring of external rates of change through environmental scanning and boundary spanning and developing and maintaining knowledge-seeking and knowledge-acquiring mechanisms. Our study specifically indicates

that for technologically intensive organizations, continuous investment in R&D can be an important driver of temporal alignment.

Table 6.10 Overview of managerial implications

Outcomes of Temporal Alignment and Proactive vs. Reactive Timing Orientation

- Proactive and reactive timing strategies have different performance implications for different types of innovation. This relationship further depends on the environmental context.
- In the context of offshoring, proactivity can lead to increased cost savings. However, managers need to consider the knowledge intensity of the offshored activities and leverage prior experience with offshoring to a certain region early on.

Antecedents of Proactive Strategic Behavior and O-E Co-alignment

- Creating a work context in which employees have freedom to influence what they do and how they do it increases the potential for proactiveness at the firm level.
- Internal cooperation is a two-edged sword: Though it may enhance proactiveness in more stable environments, it can be detrimental to the proactive outcomes of employee job autonomy in a more dynamic environmental context.
- Increasing the firm's ability to identify and acquire new external knowledge is important for the ability to keep pace with external rates of change.

Contingency perspective: The Impact of Changing Environmental Conditions

- Environmental dynamism substantially impacts the appropriateness of strategic timing orientations and potential value of investment in exploratory and exploitative innovations. The more dynamic the environment, the more important a proactive approach to exploratory innovation.
- Dynamism further influences what constitutes the proper level of internal cooperation. Whereas high internal cooperation may enhance the proactive behaviors of autonomous employees, firm proactive strategic behavior in more dynamic environments is enhanced under lower levels of internal cooperation.

Source: Studies 1–4, this dissertation.

6.4 Conclusion

At its core, strategic management is concerned with organization-environment co-alignment as a means to prosper and survive over time. Against the backdrop of a dynamic business environment in which unpredictable and profound changes occur at accelerating rates, organizations face serious challenges in trying to achieve and sustain this fit with their external environment and gain competitive advantages within their industry. This dissertation focuses on the crucial yet under-researched temporal dimension of the adaptive and proactive actions organizations take to achieve fit in dynamic environments and

develops current knowledge on the outcomes and determinants of timing strategies in the domain of strategic entrepreneurship. To this end, we conducted four studies that combine strategic management, entrepreneurship, and organization theory literature and approached the main topic from multiple theoretical perspectives (knowledge-based view, contingency theory, work design theory, internationalization theories), multiple levels of analysis (individual, project, and firm), and multiple methods (survey data, archival data, content analysis). The four studies provide a number of important insights that extend knowledge on the drivers, mechanisms, and outcomes of timing. Specifically, the findings indicate that (1) potential absorptive capacity plays an important role in aligning organizational and environmental rates of change over time; (2) a proactive strategic timing orientation can either enable or hamper positive performance outcomes of exploratory and exploitative innovations under different levels of environmental dynamism; (3) work design characteristics are important levers for proactive strategic behavior of firms in dynamic environments and are thus a potential driver of an organization's ability to influence and manipulate its environment; (4) strategic timing, together with knowledge intensity and prior experience should be considered a crucial factor in offshoring decisions aimed at cost reductions.

Jointly, these results underscore the need to systematically address temporalities in strategic management and entrepreneurship research from a dynamic contingency perspective. In particular, this dissertation calls for further research on the outcomes and determinants of proactive strategic behavior at the firm level, as well as within the organization. Indeed, proactive behaviors are a driving force in entrepreneurship and economic value creation and as such are crucial to the development and advancement of society.

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Summary

An enduring notion in strategy and organization theory literature is that firms succeed and survive as long as a strategic fit exists between strategy, structure, processes, competencies, and resources on the one hand and opportunities and threats arising in the external environment on the other hand. Maintaining strategic fit over time requires that firms undertake appropriate change to reflect changing environmental conditions and shape the environment to their advantage.

This dissertation focuses on the crucial yet under-researched temporal dimension of the adaptive and proactive actions organizations take to achieve fit in dynamic environments and develops current knowledge on the outcomes and determinants of proactive strategic behavior in the domain of strategic entrepreneurship. Findings from the four studies composing this dissertation indicate that (1) potential absorptive capacity plays an important role in aligning organizational and environmental rates of change over time; (2) a proactive strategic timing orientation can either enable or hamper positive performance outcomes of exploratory and exploitative innovations under different levels of environmental dynamism; (3) work design characteristics are important levers for proactive strategic behavior of firms in dynamic environments and are thus a potential driver of an organization's ability to influence and manipulate its environment; (4) strategic timing, together with knowledge intensity and prior experience, should be considered a crucial factor in offshoring decisions aimed at cost reductions.

Jointly, these results underscore the need to systematically address temporalities in strategic management and entrepreneurship research from a dynamic contingency perspective. In particular, this dissertation calls for further research on the outcomes and determinants of proactive strategic behavior at the firm level, as well as within the organization. Indeed, proactive behaviors are a driving force in entrepreneurship and economic value creation and as such are crucial to the development and advancement of society.

Samenvatting (Dutch summary)

Om succesvol te zijn en te overleven op de lange termijn is het van belang dat bedrijven voortdurend zijn aangepast aan hun omgeving. Dit betekent dat strategie, structuur, processen, competenties en middelen dienen aan te sluiten op mogelijkheden en bedreigingen in de externe bedrijfsomgeving. Dergelijke aansluiting vereist dat bedrijven veranderingen ondergaan en zich zowel aanpassen aan veranderende situaties als de omgeving actief in hun voordeel beïnvloeden.

Deze dissertatie richt zich op de cruciale, maar onderbelichte temporele dimensie van adaptieve en proactieve acties die bedrijven ondernemen in het aanpassingsproces. De nadruk ligt op het bevorderen van kennis op het gebied van de antecedenten en gevolgen van een proactieve strategische benadering binnen het domein van strategisch ondernemerschap. De resultaten van de vier studies die samen deze dissertatie vormen tonen aan dat (1) potentieel absorptievermogen een belangrijke rol speelt in het aanpassen van interne en externe veranderingssnelheden; (2) een proactieve strategische timing oriëntatie het succes van investering in exploratieve en exploitatieve innovatievormen afhankelijk van de mate van omgevingsdynamiek zowel kan bevorderen als belemmeren; (3) kenmerken van werkontwerp belangrijk zijn voor het stimuleren van proactieve strategische gedragingen van organisaties in dynamische omgevingen, en als zodanig potentiële drijvers zijn van het vermogen van de organisatie om de omgeving actief te beïnvloeden; (4) binnen het domein van offshoring, strategische timing samen met kennisintensiteit en eerdere ervaring cruciaal zijn voor het realiseren van kostenverlaging.

Samen benadrukken deze bevindingen het belang van systematische aandacht voor temporele aspecten van strategisch management en ondernemerschap. In het licht van het grote maatschappelijke belang van proactiviteit voor het teweegbrengen van ondernemerschap en het creëren van economische waarde, onderstreept deze dissertatie in het bijzonder het nut van verder onderzoek naar de antecedenten en gevolgen van een proactieve benadering op het niveau van organisatiestrategie en proactief gedrag binnen de organisatie.

About the Author

Shiko Ben-Menahem (b. Jerusalem, 23 November 1984) obtained his MSc degree in Strategic Management (Cum Laude) from the Rotterdam School of Management, and his MPhil degree in Business Research (Cum Laude) from the Erasmus Research Institute of Management (ERIM), Erasmus University Rotterdam, The Netherlands. After working in the international auction industry for several years, Shiko commenced his PhD candidacy at the department of Strategic Management & Entrepreneurship of Rotterdam School of Management, Erasmus University in 2009. His research focuses on the temporal dimension of firm adaptation in changing business environments, specifically to the drivers and consequences of innovation speed, time-based strategies aimed at first-mover and fast-follower advantages, and the role of proactive behavior of individuals, teams and firms in organizational performance. One of his papers is published in *Long Range Planning*. Shiko has presented his research at major international conferences including *Academy of Management*, *Strategic Management Society*, *Academy of International Business*, *Sunbelt International Network of Social Network Analysis*, and the *Israel Strategy Conference*. He has further served as an ad-hoc reviewer for *Strategic Management Journal*, *Long Range Planning*, and *Journal of Engineering and Technology Management*. During his PhD candidacy he participated in the Mack Center's Emerging Scholars Workshop on evolutionary strategy at the Wharton School, University of Pennsylvania.



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STRATEGIC TIMING AND PROACTIVENESS OF ORGANIZATIONS

An enduring notion in strategy and organization theory literature is that firms succeed and survive as long as a strategic fit exists between strategy, structure, processes, competencies, and resources on the one hand and opportunities and threats arising in the external environment on the other hand. Maintaining strategic fit over time requires that firms undertake appropriate change to reflect changing environmental conditions and shape the environment to their advantage.

This dissertation focuses on the crucial yet under-researched temporal dimension of the adaptive and proactive actions organizations take to achieve fit in dynamic environments and develops current knowledge on the outcomes and determinants of proactive strategic behavior in the domain of strategic entrepreneurship. Findings from the four studies composing this dissertation indicate that (1) potential absorptive capacity plays an important role in aligning organizational and environmental rates of change over time; (2) a proactive strategic timing orientation can either enable or hamper positive performance outcomes of exploratory and exploitative innovations under different levels of environmental dynamism; (3) work design characteristics are important levers for proactive strategic behavior of firms in dynamic environments and are thus a potential driver of an organization's ability to influence and manipulate its environment; (4) strategic timing, together with knowledge intensity and prior experience, should be considered a crucial factor in offshoring decisions aimed at cost reductions.

Jointly, these results underscore the need to systematically address temporalities in strategic management and entrepreneurship research from a dynamic contingency perspective. In particular, this dissertation calls for further research on the outcomes and determinants of proactive strategic behavior at the firm level, as well as within the organization. Indeed, proactive behaviors are a driving force in entrepreneurship and economic value creation and as such are crucial to the development and advancement of society.

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