

ZENLIN KWEE

Investigating Three Key Principles of Sustained Strategic Renewal

A Longitudinal Study of Long-Lived Firms



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A longitudinal study of long-lived firms

Onderzoek naar drie kernprincipes van
duurzame strategische vernieuwing
Een longitudinale studie van lang bestaande bedrijven

PROEFSCHRIFT

ter verkrijging van de graad van doctor
aan de Erasmus Universiteit Rotterdam
op gezag van de rector magnificus

Prof.dr. S.W.J. Lamberts

en volgens besluit van het College voor Promoties.

De openbare verdediging zal plaatsvinden op
donderdag 25 juni 2009 om 13.30 uur

door

Zenlin Kwee
Geboren te Tanjung Balai, Indonesië



Promotiecommissie

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Erasmus Research Institute of Management – ERIM

Rotterdam School of Management (RSM)

Erasmus School of Economics (ESE)

Erasmus University Rotterdam

Internet: <http://www.irim.eur.nl>

ERIM Electronic Series Portal: <http://hdl.handle.net/1765/1>

ERIM Ph.D. Series in Research in Management, 174

Reference number ERIM: EPS-2009-174-STR

ISBN 978-90-5892-212-0

© 2009, Zenlin Kwee

Design: B&T Ontwerp en advies www.b-en-t.nl

Print: Haveka www.haveka.nl

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Voor mijn allerliefste Peter

For my beloved parents, Nurlie & HanKheng Kwee

In loving memory of my brother, Kawi Kwee, and my godmother, AhDjie Kwee

Preface

Long-lived firms have long fascinated me. As a researcher, their long existence has made me ponder how they renew themselves over time in the context of changing external conditions.

The starting point of my research on corporate longevity can be traced back to January 2004 when I had my first MSc thesis meeting with my thesis coach at TU Delft, Ivo Wenzler. Ivo introduced me to the topic of corporate longevity and provoked my interest in delving into this topic further. Soon after I defended my MSc thesis, Erik den Hartigh, my other thesis supervisor back then and now one of my colleagues at TU Delft, informed me that there was a PhD vacancy for the research topic of corporate longevity and self-renewing organizations at the Erasmus Research Institute of Management (ERIM). I owe both Ivo and Erik many thanks.

Back then as part of my application for the PhD vacancy, I had an interview with Frans van den Bosch and Henk Volberda who later became my PhD supervisors. I would like to thank both Frans and Henk for giving me this unique research opportunity. The overall research has provided me with invaluable learning experience. Frans and Henk, I also thank you for giving me indispensable guidance and especially for believing in me when I most hesitated along the route.

During my PhD time, I was surrounded and supported by wonderful colleagues at the Department of Strategic Management and Business Environment (RSM). I would like to thank my former officemates Ancella, Ania and Marja for giving me moral supports and for sharing with me the ups and downs of being a PhD student. I thank Anna and Raymond for giving me encouragement especially during the Academy of Management conferences. I thank Marten for his companionship at the JMS conference in Oxford and for helping me to move my office stuffs from Rotterdam to Delft. I thank Joy, Annelies, Andriew, Flore, Henri, Pieter-Jan, Michiel, Hans, Pepijn, Frank, Justin, Koen, Ilan, René, Patrick, and the rest of the former as well as the current department members for being nice colleagues and friends. I would also like to thank Marc Baaij for helping me during the proposal stage at the Shell project, for giving his helpful comments during the project, and for being one of my PhD committee members. My special thanks go to the secretariat office: to Carolien, Patricia, Marisa, and (formerly) Cindy for being always helpful and supportive.

The longitudinal nature of my PhD research is time and resource intensive and I would not have been able to employ the longitudinal content analysis method without the help of my great research assistants. In particular, I would like to thank Paul Methorst. Paul and I started the research project at Shell by photocopying thousands of pages of Shell's Annual Reports from the early years. Later on Annika Kappner joined us. Both Paul and Annika helped me to digitalize thousands of pages of annual reports, code and document strategic renewal actions of Shell and BP. When I needed additional internal archival documents to analyze the self-organization principle, Bernardo Lima helped me to sort and code the data from the Shell's Organizational Directories. Additionally Bernardo also helped me to code parts of the strategic renewal actions of BP case. I also thank Oli Mihalache for reading some of my working papers, for giving his comments and for helping me to sort out the list of variables.

I am indebted to ERIM for funding my PhD project. In particular, I would like to thank Tineke, Olga, and (previously) Myra for their practical supports towards the achievement of this PhD thesis.

The empirical part of this PhD research would not have been possible without the support from many former as well as active top executives and top managers at Royal Dutch Shell. In particular, I am indebted to Leo Roodhart. Leo has always given me his whole-hearted support. Despite his hectic schedule, he still made himself accessible to me whenever I needed to discuss my research with him. Special thanks to Jan van der Eijk, Peter Kwant, Michiel Groeneveld, and Hessel de Jong for giving me the opportunity to conduct my research at Shell. I would also like to thank Dave McCormick, Gerard Bol, Willem Manders, Shell GameChanger team in Rijswijk and Houston, Mariandl van Otterloo, Ramona Hazebroek, Xander Campman, Wim Schinkel, and Shell Student Society in Rijswijk. Although I was based in Rijswijk, I am very grateful to also get support from Shell's head office in The Hague, Shell Global Solutions in Amsterdam, and Shell's office in London. I thank Rob Lawa, Jan Peereboom, Bettina de Jong, the support staff of the Who's Who system and the personnel department for providing me with insightful archival data. Special thanks to Hans Bouman and Frits Hermans for sharing with me their broad range of experience. I am very much indebted to Shell's former and active senior executives who were willing to spend their valuable time receiving me for interviews with them.

In February 2009, I decided to go back to TU Delft. I am grateful to Alfred Kleinknecht for bringing me on board and for giving me the opportunity to finish my dissertation. I would also like to thank my current colleagues at the Department of Innovation Systems, in particular the sections of Economics of Innovation and Technology, Strategy & Entrepreneurship.

I owe my accomplishment at present to many friends and great people who have helped in the past. Special thanks to Bapak Muljono, Henk Sol, Peter Keen, Fr. Ben Engelbertink, Rev. Waltraut Stroh, Delft ISC choir and community, StuNed scholarship, Migo family in Delft, Indonesian friends and friends from many countries (especially to Theresia and Minnie). Thanks to Thuy, Annie, Tao, Ting, Xiaohong, Huiyan, Haibo, Lenny, Harris, and Diana for your friendship during our study at RSM.

I owe everything to my parents. They have been my life-long supporters. I am very blessed to have their unconditional love. I love you, mama and papa! In loving memory of my eldest brother and my godmother who both passed away in 2007, I dedicate this thesis to them. My special thanks to my sister and brother-in-law (Zuilin & Edwin), my brother and sister-in-law (Karmin & Anie), and my lovely nephews Leon, Terence, and Frederick. I thank God for giving me such a happy family and for his blessings in my life.

Being far away from my family in Indonesia, I am very grateful to have my second family in the Netherlands. I would like to thank John & Margriet Roosenboom; Lindy, Mark & Sjacco van Merode; Lion, Marion, Ferdie & Sjoerd Segers; Oma van den Aarsen and Oma Roosenboom; for embracing me with family warmth.

Peter Roosenboom, my biggest love, deserves the most special place in this preface. His true love has always been my unlimited source of happiness. Peter, thank you for your comforting hugs, constant support, and encouraging words. I am blissfully happy being with you, my love!

Zenlin Kwee
Roosendaal, May 2009

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Part I: Introduction

1. Introduction

1.1 Research background

In the business world, there are various forms and scales of corporate entities ranging from e.g. large enterprises, limited liability companies to small family firms. Nevertheless the basic goal of firms since their originations, besides to grow and to prosper, is often to survive (Barnard, 1938; Rice, 1963; Katz and Kahn, 1966; Adizes, 1989; Dertouzos et al., 1989; Suárez and Utterback, 1995; De Geus, 1999). However, in the course of time, most companies figure out how difficult it is to retain their sustainability as their business environments unceasingly change. Unruly economic and political conditions, rapid technological development, relentless competition, and many other external factors often impede or even halt the business journeys of a firm.

From a strategic standpoint to thrive over time, firms must align their internal actions with conditions of their external environments (Lawrence and Lorsch, 1967; Miles et al., 1974; Bourgeois, 1980; Hambrick, 1982; Miller and Friesen, 1983; Miller, 1992). The key premise here is that alignment between firms and their environments help maintain the competitiveness and survival of the firms over the long run (Summers, 1980; Hambrick, 1983; Baaij et al., 2007). Consequently, firms need to have an innate ability to assess environmental change and its implications for new strategies, structures, technologies and cultures in the firm. The research theme of how firms sustain strategic momentum or changes, innovations, and renewal has thus been central to both management scholars and practitioners (Weick, 1987; Boeker, 1989; Barr et al., 1992; Huff et al., 1992; Baden-Fuller and Stopford, 1994; Maljers et al. 1996; Volberda et al., 2001a, b; Sanchez and Heene, 2002; Crossan and Bedrow, 2003; Malerba, 2004).

Altogether corporate longevity, that we define in this thesis as sustained strategic renewal, merits thorough investigation. Existing research has resulted in several prominent findings on the common organizational characteristics of long-lived firms (e.g., De Geus, 1999; Collins & Porras, 1999; Hall, 1997; Huygens et al., 2001; Meyer and Zucker, 1989; Kwee, 2004; Stadler, 2007; Burgelman & Grove, 2007; Kwee et al., 2008). These common characteristics, however, focus mainly on the internal aspects of organizations. This focus is not incorrect, but rather it is incomplete because investigating corporate longevity requires a more encompassing, i.e. strategic, perspective on organizations. Such a dual perspective takes into account both internal characteristics of organizations as well as the

forces in their environments that set limits on organizational discretion and the possibility of influencing these forces strategically to increase the chance of organizational survival. The aforementioned approach requires a comprehensive framework of how firms change and deal with environmental changes over time and what kinds of competences and processes are required for sustaining strategic renewal within a firm's competitive regimes.

This PhD study intends to address these issues by incorporating several theoretical perspectives. The focus is on the fundamental scientific questions about key principles of self-renewing organizations (Volberda and Lewin, 2003) in order to understand how long-lived firms survive and renew themselves over time. We aim to contribute to the organizational longevity literature. To this end, there are at least six major tasks in our research agenda, i.e. to: (1) use both selection and adaptation perspectives to explore the three key principles of self-renewing organizations (Volberda and Lewin, 2003) as a prerequisite to corporate longevity or sustained strategic renewal; (2) develop a conceptual framework and propositions of the three key principles; (3) propose and use an appropriate methodology to do a longitudinal and empirical study of the three key principles; (4) investigate the main constructs and attributes of key principles; (5) operationalize these principles by discerning important attributes; (6) develop new metrics to quantitatively assess the principles (cf. Flier et al., 2003); and (7) substantiate managerial implications based on the enabling antecedents of the three key principles (Lewin and Volberda, 2004).

1.2 Why Does Research on Corporate Longevity Matter?

First of all, why does longevity matter in the corporate world? Such a question hardly crosses our minds. Perhaps this is because firms are all around us and thus, we tend to take their existence for granted (Aldrich, 1979). Our reflection to the question leads us to address the question from two sides. First according to Suárez and Utterback (1995, p. 415), from the side of the firm itself, "survival is, at least in the long term, a prerequisite for success in other terms, such as market share and profitability." Hannan and Freeman (1984, p. 158) also posit: "Nothing legitimates both individual organizations and forms more than longevity. Old organizations tend to develop dense webs of exchange, to affiliate with centers of power, and to acquire an aura of inevitability." Firm survival is, therefore, a fundamental objective for organizations (Barnard, 1938; Rice, 1963; Katz and Kahn, 1966; Adizes, 1989; Dertouzos et al., 1989; Suárez and Utterback, 1995; De Geus, 1999). We may acknowledge, however, that some organizations have no intention to endure for a long period of time. The study by Porsander (2000), for instance, shows that the temporary organization 'Stockholm – Cultural Capital of Europe 1998' is meant to be short-lived since its core purpose is only to handle the

processes leading up to the event in 1998. Once it had accomplished this core purpose, it was dissolved. Nevertheless, even in such (con)temporary organizations, the study described that the struggle for immortality still prevails during their limited durations.

Second, from the side of our human society, most of us may have some interests in the survival of commercial firms. Parson (1956) and Aldrich (1979) argued that this is because long-lived firms are necessary and important in our lives as purposive systems that enable us to accomplish collectively what cannot be accomplished by each of us as individuals acting on our own. Hence, the existence of long-lived firms plays an important role in our society and human well-being.

Consequently, we arrive at the fundamental question of the importance of conducting research on corporate longevity. Our reflection tells us that by studying corporate longevity, we are able to obtain a better understanding of sustained strategic renewal. Long-lived firms are not merely idiosyncratic organizational outliers. Their long records of history are substantial for us to keep track of how they have engaged in renewal activities as changes emerge over time. This is very much in line with the concept of strategic renewal that propounds renewal as an ongoing journey shaped by management's strategic actions and the evolvment of the environmental changes (Volberda et al., 2001a). Studying corporate longevity is thus a promising advancement of a better understanding of sustained strategic renewal phenomenon.

1.3 Defining Longevity as Sustained Strategic Renewal

The idiosyncrasy of long-lived firms lies in their puzzling ability to renew themselves over time. We argue, therefore, that the research on organizational longevity could be treated as viewing *longevity as a firm's strategic capacity to sustain renewing itself over time*. Strategic renewal capacity of a firm is subject to among others its concurrent and balanced resourcefulness in pursuing novel innovations, capitalizing its current capabilities, and rejuvenating its mature business (Baden-Fuller and Stopford, 1994). We based our definition of corporate longevity as sustained strategic renewal on the following arguments.

Longevity: Internal focus

Understanding corporate longevity is not a straightforward notion. Even so, it does not mean that the notion is unreal and insubstantial. What is often unclear is its definition (Akin, 2000). First of all, what does one mean by "longevity" when speaking about corporate longevity? As the word "longevity" is analogous to the study of the length of life of living organisms, mounting research of corporate longevity has been conducted by using the biological perspective (e.g., Meyer and Zucker, 1989; De Geus, 1999; Konz and Katz, 1996, 2000). Firms are regarded as living entities experiencing the life cycle of birth, all kinds of changes and death (Adizes, 1989). Meyer and Zucker (1989, p. 70), for instance, define "the date of

birth as the date when an organization is founded and the date of death as the date when the organization is dissolved.”

Such parallelism, however, needs to be taken with extra care. Unlike any living organisms, firms “cannot die in an individual, biological sense” (Krell, 2000, p.9). Organizational death and biological death are *not* really identical (Sutton, 1987). For one thing, Sutton (1987, p.543) contends that “when a biological entity dies, so do all of its components (except in rare cases such as organ transplants)”. In case of organizations, organizational members could continue being alive despite organizational death. For another thing, the difference between organizational and biological deaths can also be argued from the age factor. Biologically, the mortality of a living organism increases with age. On the contrary, there is a likelihood that organizational mortality decreases with age (Sutton, 1997; Meyer and Zucker, 1989; Hannan and Freeman, 1984). This does not mean, however, that firms can last forever. Admittedly, it is a major weakness in current corporate activity where “long-term planning and investment decisions by management are based on the supposition that the life of the corporate is indefinite” (James, 1974: 49). Then again, what is a more appropriate way to define corporate longevity?

Organizational longevity denotes long duration or continuance. This means there is a sense of continuity from one generation of a firm’s leader to the next generation of leaders. This is also indicated by one of Shell’s former top executives during our interview:

“As a leader, you do indeed have a strong feeling that you inherit a great company and that you have to take a good care of the company to give it to the next generation. Most of the time, the successor that takes over will be involved in projects that his/her predecessor started. This is a sort of guarantee that there is continuity. I do think that such a feeling plays an important role in the long-term viability of the business.”

(Interview with a former top executive of Shell, 7 November 2007)

Montuori (2000) further defines corporate longevity as an organization’s ability to sustain its continuity; or briefly, the durability or continuance of firms. Considering this is still an all-embracing definition, we pose another question: what do we mean by “long-lived firms”?

On a cursory examination, long-lived firms are usually age-driven. But age itself is a relative measure. Akin (2000), for instance, established a thought that perhaps organizations as social constructions, like things, last as long as the society around them say they do. Sutton (1987) shared the similar line of thought by suggesting that if an organization is viewed as a social construction of reality, then it can be defined as dead only if potential participants perceive that it does not exist. Since it is generally acknowledged that relatively few companies survive as independent entities for very long periods of time, Krell (2000) further questioned

whether an organization can still be regarded as a long-lived firm if it no longer engages in the same business or purpose, if it merges with another firm, if it is taken over by new owners, or if it changes its name. Katz and Kahn (1966) addressed these issues by proposing that organizations are cycles of events; mergers or name changes are not considered here as deaths because the full set of the organization's activities continue intact, albeit under a different label. To put it another way, when mergers and name changes occur, the set of activities that compose an organization may continue intact even though it is construed as defunct. Next we look at corporate longevity from a renewal context that takes into account both the internal and external focus.

Longevity in renewal context: Internal and external focus

Following the preceding thoughts, we observe that besides the old-age factor, long-lived firms may be categorized into two models based on the types of renewal that are linked to the environmental conditions: first-order renewal and second-order renewal (Barr et al., 1992; Forte et al., 2000; Watzlawick et al., 1974; Winter, 1984). The *first*-order renewal model is the category of venerable firms that remain more or less the same. They retain some resemblance to their origins (such as its structure, culture, and systems) despite their ability to transform their activities (such as an addition of a new product to the portfolio or a business diversification). Their environments are relatively stable and benign. Such firms enjoy high levels of reproducibility where they essentially recreate structures and strategies that might have been adequate before the context changed, but which are now poorly aligned with environmental conditions. Winter (1984) termed this period and process as the “routinized regime”. Their ability to draw critical resources and legitimacy will be diminished. Their survival might be prolonged – if the environment is relatively benign, if they enjoy excess slack resources, or if new organizational forms are slow to emerge – perhaps resembling the “permanently failing organizations” described by Meyer and Zucker (1989). However, in a hostile internal and external context, such firms would eventually be defeated by new entities designed specifically to take advantage of the new environmental conditions.

The second-order renewal model is the category of firms which we refer to the sustained self-renewing firms (Volberda & Lewin, 2003). To some extent, through the processes of sustained renewal, firms in this category have mutated from its original state into its present state. By state, it means that the mutation or change can take place at the margins of structure, line of business, culture, or other organizational attributes. Since some of the underlying characteristics are not suited to the new competitive environment, firms in this model strategically renew themselves over time. Such periods of change in environmental dynamics are termed as “entrepreneurial regime” by Winter (1984). As suggested by Volberda et al. (2001a, p. 160), strategic renewal is referred to as “the activities a firm

undertakes to alter its path dependence.” Table 1.1 summarizes the two types of renewal order.

Table 1.1: Two renewal models

Renewal order	Definition	Type of environment	Key references
First-order renewal	Firms that experience slight rather than substantial changes and have high resemblance to their origins	Relatively stable and benign	Watzlawick et al., 1974 ; Winter, 1984
Second-order renewal	Sustained self-renewing firms that have mutated from their original state into their present state, renewed themselves over time according to the changing environment	Changing and dynamic environment	Winter, 1984; Barr et al., 1992; Forte et al., 2000; Lewin & Volberda, 1999; Volberda & Lewin, 2003

The second-order renewal is thus the main interest of our study. Accordingly, we propose that in this research, long-lived firms are firms that are able to manage sustained strategic renewal. Therefore, we refer to corporate longevity as *sustained strategic renewal*. In other words, we use the construct of sustained strategic renewal as a proxy of corporate longevity.

1.4 Research Aim, Approach, and Questions

A major proposition of the approach of this study is to use an in-depth contextual data to investigate the influence of external environment to internal corporate change and an extended sequence of longitudinal data in order to offer a longitudinal and comparative analysis. By this means, we hope to provide an expanded focus on sustained strategic renewal. Subsequently, the aim of this PhD research is:

“to investigate the dynamic relationships between a firm and its environment in the context of sustained strategic renewal by developing a conceptual framework and propositions and by conducting a longitudinal and comparative case study of large incumbent long-lived firms.”

Additionally, we base our study on the three dimensions of strategy: content, context, and process. In choosing this approach, we consider the sustained renewal construct as a three-dimensional phenomenon, like the concept of strategy, consisting of the context, content, and process (Pettigrew, 1988; Mintzberg, 1990). First, the content dimension is related to the “WHAT” question. Second, the context dimension, in this case we intend to take into account the environments in which firms operate relates to the “WHERE” question. Third, processes are related to the “HOW” question, particularly about describing and explaining the temporal sequence of events that unfold as an organizational change occurs (Abbott, 1988). Van de Ven and Huber (1990, p. 213) suggest that “process studies are fundamental to gaining an appreciation of dynamic organizational life, and to

developing and testing theories of organizational adaptation, change, innovation and redesign.”

As this issue is central to organization science, besides focusing on the content and context dimension, our research also focuses on the process element by studying how strategic actions emerge, develop, grow, and terminate in a firm’s sustained strategic renewal trajectory. This will be the advancement to the previous study of dimensions of strategic renewal as carried out by Volberda et al. (2001b). Furthermore, Volberda and Lewin (2003) identify three overarching principles of self-renewing organizations as shown in Table 1.2. In their judgment, these three key principles must underlie the theory of self-renewal, i.e. an organization that is capable of sustaining second-order renewal.

Table 1.2: Three key principles of self-renewing organizations

Three principles of self-renewal	Explanation and references
<ul style="list-style-type: none"> • The principle of managing internal rates of change 	Self-renewing organizations focus on managing requisite variety by regulating internal rates of change to equal or exceed relevant external rates of change (e.g., competitors, technology, consumers, etc.) (McKelvey, 2003).
<ul style="list-style-type: none"> • The principle of optimizing self-organization 	Self-renewing organizations optimize self-organizing (Anderson, 1999a; Nonaka, 1988)
<ul style="list-style-type: none"> • The principle of synchronizing concurrent exploration and exploitation 	Self-renewing organizations synchronize concurrent exploitation and exploration (Lewin & Volberda, 1999; Lewin et al., 1999; March, 1991).

Source: Volberda and Lewin, 2003

The challenge here is the operationalization of the three key principles by identifying important attributes, developing measurement proxies, and conducting quantitative analyses. To address this challenge, this PhD research is conducted in an attempt to answer the following research questions (RQs):

RQ1: Based on a selection-and-adaptation (coevolutionary) perspective, how do firms develop their *competences* to strategically renew themselves over time?

RQ2: Based on an adaptation perspective, how do firms *learn* and adapt in the context of changing knowledge environment?

RQ3: How do large incumbent firms regulate their internal *rates of change* to match up with the external rates of change?

RQ4: How do firms manage *self-organization* to sustain their strategic renewal over time?

RQ5: How do firms balance their *exploratory and exploitative* strategic renewal actions over time?

RQ6: To what extent does *top management team* influence the strategic renewal trajectory of a large incumbent firm?

Table 1.3 gives an indication of how we address each research question. The table also shows the types of study we employ for studying each research question, the case companies used and durations of each study, and the key constructs resulted from each of the study.

Table 1.3: Overview of PhD study

Research Question	Chapter	Type of Study	Case company and Period	Key construct
RQ1: Competences development	3	Conceptual, longitudinal and comparative	The Hudson's Bay Company (HBC) and Royal Ten Cate (RTC); 1800-2000	<ul style="list-style-type: none"> • Coevolutionary competence • Competence modes
RQ2: Organizational learning	4	Conceptual	None	<ul style="list-style-type: none"> • Stages of organizational learning processes • Type of action learning and type of knowledge environment
RQ3: Rate of Change	8	Empirical, longitudinal and comparative	Royal Dutch Shell (Shell), 1907-2008 and British Petroleum (BP), 1970-2008	<ul style="list-style-type: none"> • Quantification of internal and external rates of change • Comparison of the external rate of change in the oil industry with the internal rate of change of Shell/BP
RQ4: Self-organization	9	Empirical and longitudinal	Shell; 1985-2007	<ul style="list-style-type: none"> • Quantification of self-organization by using the Shell's case
RQ5: Balanced Exploitation-Exploration	10	Empirical, longitudinal and comparative	Shell, 1907-2006 and BP, 1970-2006	<ul style="list-style-type: none"> • Quantification of exploitative and exploratory strategic renewal actions • Longitudinal visualization of Shell's and BP's strategic renewal trajectories
RQ6: Role of Top Management Team	10	Empirical and longitudinal	Shell, 1959-2004	<ul style="list-style-type: none"> • The influence of top management team's corporate governance perspective on Shell's strategic renewal trajectories

1.5 Research Contributions

This research contributes to a more encompassing perspective on corporate longevity that takes into account both internal aspects of long-lived organizations and how these organizations cope with the forces from their environments. More specifically, this research contributes to the study of microstate adaptations through a firm-level adaptation over a very long period of time (cf. Lewin and Volberda, 1999). By doing this, it meets the empirical requirements of capturing organization adaptation within a historical context of a firm and its environment suggested by Volberda and Lewin (2003). This also corresponds to the strategy content research which focuses exclusively on what strategic actions of the firm that lead to competitive advantage under varying environmental contexts (Montgomery, Wernerfelt, & Balakrishnan, 1989).

Additionally, this work also contributes to the longitudinal study (Pettigrew, 1990) and strategy process research (cf. Chakravarthy & Doz, 1992; Burgelman, 1983, 1996) as it investigates how firms achieve and maintain strategic positioning through both deliberate and emergent actions. Our research methodology of longitudinal study, which demonstrates a strategy process approach, aims at tracking simultaneously over time, multiple contextual factors, strategic actions and the resulting outcomes. We suggest that the strategy process within a firm influences its adaptation and strategic renewal trajectories. Process studies are fundamental to understand dynamic organizational life as they study the temporal order of the antecedents and consequences of changes in organizations over time (Van de Ven & Huber, 1990). Through multiple and complementary lenses, we thus provide an insightful study of unfolding change processes of organizational adaptation and strategic renewal.

Furthermore, this PhD research brings the qualitative study of organizational longevity to the next level by quantifying and measuring the key principles of self-renewing organizations. We propose to use metrics linking strategic renewal actions of firm to environmental selection and to managerial intentionality (cf. Flier et al., 2003). This is a contribution to the paucity of empirical research on sustained strategic renewal. Additionally, our methodological contribution lies on the research design of multilevel and comparative methods.

On a management level, we contribute to demonstrating the importance of the three key principles for sustained strategic renewal in strategic management of large incumbent firms. More specifically, we focus on the role of management in managing the three key principles. To that end, we investigate and substantiate the enabling antecedents of the three key principles that may give indications to managers at a large incumbent firm of how to advance the principles. We also investigate the extent to which changes in the composition of the Top Management Team (TMT) and their corporate governance perspectives may have an impact on

the speed of a firm's strategic renewal journeys (Volberda et al., 2001). Table 1.4 summarizes the type and description of contributions the study of this thesis aims to contribute.

Table 1.4: Linkage of the research contributions and the studies in this PhD thesis

Type of contribution	Description of contribution	Related study in this thesis
Conceptual contribution	<ul style="list-style-type: none"> • Advancement of corporate longevity as sustained strategic renewal • Based on and built upon the existing literature, conceptualization of three key principles of sustained strategic renewal • Development of a framework of the three key principles based on two combined perspectives: selection and adaptation perspectives • Development of propositions of the three key principles 	<ul style="list-style-type: none"> • Chapter 3: From the selection perspective, we explore the three key principles through the strategic renewal trajectories of two long-lived firms that are guided by the firms' coevolutionary competence in response to environmental selection • Chapter 4: Based on adaptation perspective, we explore the three key principles by conceptualizing how firms learn and adapt in the changing context of knowledge environment • Chapter 5: Incorporating two perspectives, we developed a conceptual framework and propositions of the three key principles
Methodological contribution	<ul style="list-style-type: none"> • Development of a multilevel study (industry and firm levels) and comparative method (Shell and BP) • Operationalization of constructs of strategic renewal and the three key principles 	<ul style="list-style-type: none"> • Chapter 6: A proposal of suitable longitudinal and comparative research design, selection of industry and incumbent firms • Chapter 8-10: Development of empirical studies of the three key principles by using a longitudinal, multilevel and comparative research design
Empirical Contribution	<ul style="list-style-type: none"> • Measurement of the three key principles by using data from multiple sources • Providing evidence on propositions through a comparative study of Shell (investigation of three principles, 1907-2008) and BP (investigation of two principles, 1970-2008) 	<ul style="list-style-type: none"> • Chapter 8: Operationalization and measurement of internal vs. external rates of change through a multilevel (industry and firm levels) and a comparative study of Shell (1907-2008) and BP (1970-2008) • Chapter 9: Operationalization and measurement of self-organization through a study of Shell (1985-2007) • Chapter 10: Operationalization and measurement of exploitation and exploration through a comparative study of Shell (1907-2006) and BP (1970-2006)
Managerial contribution	<ul style="list-style-type: none"> • Importance of the three key principles for sustained strategic renewal in strategic management of large incumbent firms 	<ul style="list-style-type: none"> • Chapter 10: Empirical longitudinal research on the influence of top management team's corporate governance perspective on strategic renewal trajectories • Chapter 11: Highlights of main managerial implications from the key findings of the PhD research

1.6 Outline of the PhD Thesis

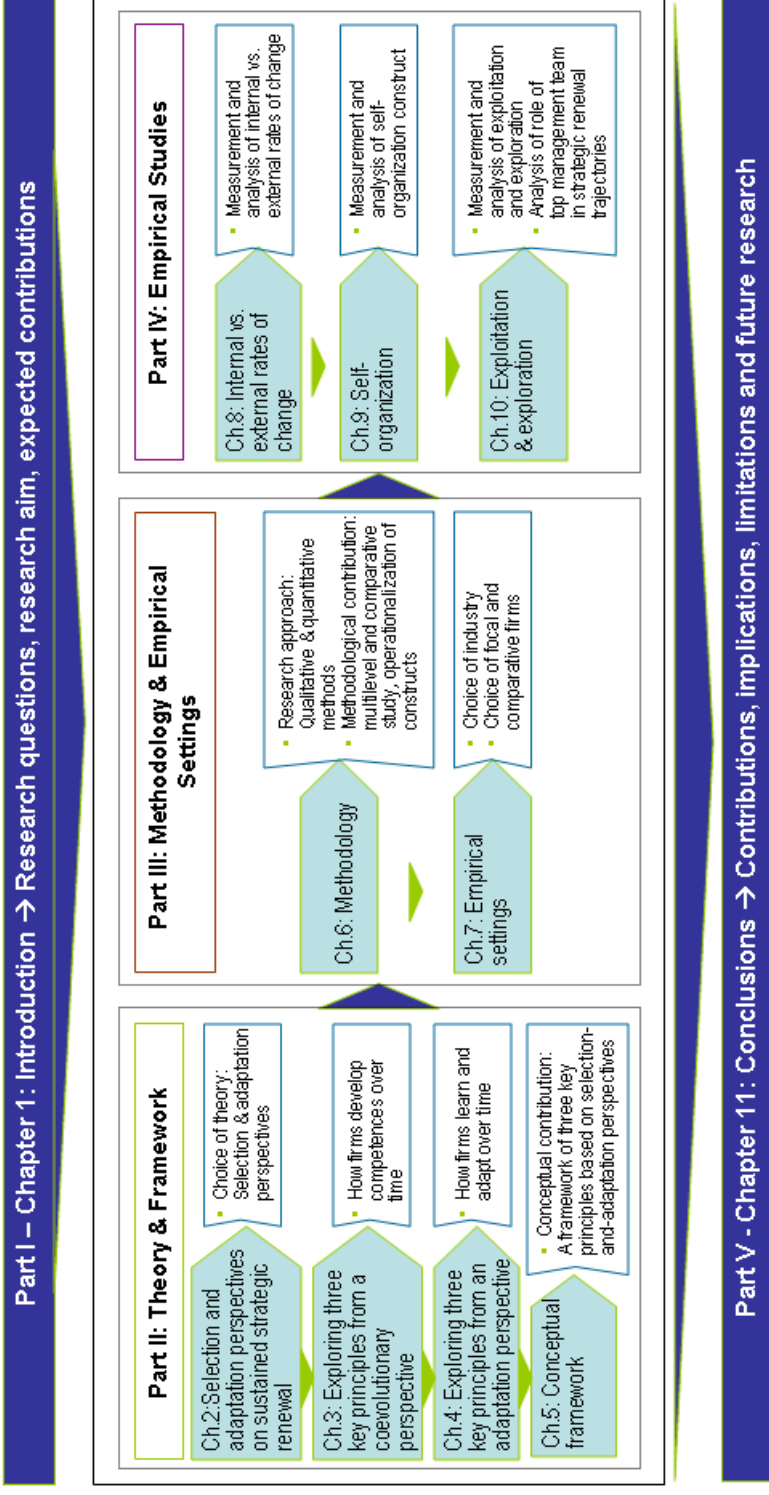
To facilitate the line of inquiry of the PhD research, this thesis is outlined as follows (see Figure 1.1). Part II of this thesis comprises theory and framework. In Chapter 2, we present our theoretical foundations of strategic renewal from two perspectives: environmental selection and adaptation perspectives. The incorporation of the two perspectives leads us to the discussion of the three key principles of sustained strategic renewal (Volberda and Lewin, 2003). Chapter 3 explores the three key principles based on a selection-and-adaptation (coevolutionary) perspective by looking at the coevolutionary competence of two long-lived firms, i.e. The Hudson Bay Company and Royal Ten Cate, both during 1800-2000. Chapter 4 is a follow up of Chapter 3 by exploring the three key principles, focusing in more depth on an adaptation perspective. Here we address how firms learn and adapt over time by studying stages and phases of organizational learning. Subsequently, we illustrate the three key principles through the types of organizational learning that match certain types of knowledge environment. In Chapter 5, we develop a conceptual framework and propositions of the three key principles by advancing on the enabling antecedents of the principles introduced by Lewin and Volberda (2004). The antecedents are categorized into strategy, structure, managerial process and leadership.

In Chapter 6 (Part III), we start with elaborating the research methodology and research design that used in this research. We also point out how we selected our case industry and case companies, data collection methods, and data analysis techniques. Next in Chapter 7, we describe our empirical settings. Our empirical studies in part IV of the thesis are based on the oil industry with two sample firms: Royal Dutch Shell plc (further: Shell) as our focal firm of the study and British Petroleum plc (further: BP) as our comparative firm of the study.

Part IV of this thesis covers the empirical studies conducted in this PhD research. The empirical studies consist of the analyses of the three key principles. In an attempt to operationalize and measure the three key principles, we develop some measurement indicators. Chapter 8 consists of the empirical study of the first key principle, i.e. an investigation of how large incumbent firms manage their internal rate of change to match or exceed external rate of change. To this end, we use a multilevel method (at the industry and firm levels) and a comparative study of Shell and BP. Chapter 9 analyzes the second key principle, managing self organization. To investigate self-organization, firm-specific data that can only be obtained from an internal access to a firm is required. Since we only have the access to Shell, for the second key principle, we use a single case study of Shell. Chapter 10 focuses on the issue of how to synchronize exploitation and exploration concurrently. Besides that, we also incorporate the managerial intentionality by investigating the role of top management team in guiding a firm's strategic renewal trajectories over time.

We conclude our study in Part V (Chapter 11) by summarizing the key findings of the three key principles and by presenting our research contributions, managerial implications, research limitations and accordingly suggestions for future research.

Figure 1.1: PhD thesis outline



Part II: Theory and Framework

2. Selection and Adaptation Perspectives on Strategic Renewal

2.1 Introduction

Theoretical foundation plays a fundamental role insofar as it provides a frame of reference and a set of sensitizing concepts and constructs. We integrate three parallel research streams of selection perspective, adaptation perspective, and a combined selection-and-adaptation, i.e. coevolutionary, perspective that build up the strategic renewal theory. The combined selection-and-adaptation perspective further leads to the advancement of the three key principles of self-renewing organizations (Volberda & Lewin, 2003). We begin this second chapter with a broad overview of prior research on organizational longevity. In essence, Chapter 2 serves as a foundation to further develop our conceptual framework of this PhD study.

2.2 Prior Research on Corporate Longevity

Much of the existing research in the strategy field is intimately bound up with questions such as why firms differ, how they behave, how they choose strategies, and how they are managed (Porter, 1991). Yet, the question of what makes firms differ in the length and brevity of life – or what the longevity enablers are – raises a still broader question. The quest to explain why firms differ in their longevity has thus long been a fundamental issue in organizational study. Accordingly, mounting research has been conducted to explain this complex phenomenon.

The traditional answer to the existence of firms was mainly based on a set of largely economic-driven assumptions. Traditional economic analysis of the firm assumes that firms will make choices to maximize lifetime profits. A British economist, Ronald Coase (1937) in his article called “The Nature of the Firm” argued that the main reason why company exists is because it minimizes the transaction costs of coordinating a particular economic activity. The economic argument has also deepened since Coase (1937), with some economists preferring to look at the firm as a network of contracts and others seeing it as a bundle of organizational capabilities.

Contrary to this assumption that high profitability or high performance matters the most for the continuance of firms, Meyer and Zucker (1989) argued that high performance is *not* a prerequisite for longevity. De Geus (1999) and Collins and Porras (1999) supported this proposition in which they also argued that the profitability of a company was a symptom of corporate health, but not a current predictor or determinant of corporate health and thus cannot guarantee the future survivability of a firm. In brief, they propounded that the profitability is a means to an end. Subsequently, the performance-based approach to study longevity has also been criticized by Aldrich (1979) and Hannan and Freeman (1989) who argued that good performers might have certain features which differentiate them from poor performers; however, these features might not be responsible for the survival of an organization.

Although the approaches in investigating firm survival vary, there is a high degree of commonality in the organizational characteristics that are believed by many researchers to the relative longevity of firms. Based on this line of thought, the foregoing research places a major emphasis on ascertaining which characteristics explain the longevity of firms (e.g., Collins and Porras, 1999; De Geus, 1999; Volberda, 1998; Hall, 1997; Huygens et al., 2001; Kwee, 2004, Stadler, 2007). Their approach has been to a large extent inductive (except for Hall) and was performed by including multiple companies and subsequently investigating processes mainly *inside* the organizations. Their work pointed out a number of common organizational characteristics that are vital to firm survival.

The large volume of existing research conducted by other researchers in the field has also resulted in findings akin to the above common organizational characteristics of long-lived firms. One of the prominent studies is that performed by De Geus (1999) which identified four major traits of long-lived firms: (1) a strong sense of identity; (2) a decentralized organization or a tolerant management style; (3) sensitivity towards the environment; and (4) conservative financing. In a more recent study, Stadler (2007) put forward four principles of enduring success. In another study, Van Zanden et al. (2007) took the descriptive and historical approach to study the long-term success of Royal Dutch Shell that they described as an “intricate organization” (Volume I, p. 6). Likewise inspired by longitudinal field research of a single firm, Burgelman and Grove (2007) conducted their study at Intel Corporation. Their study indicates that balanced cycles of induced and autonomous strategy processes are at the heart of corporate longevity. They further emphasized the critical role of alert strategic leadership at the top management team level in balancing these processes in strategy-making.

Table 2.1 summarizes some of the antecedents or longevity enablers of long-lived firms resulted from the previous study on corporate longevity. However, these enablers encompass, in particular, internal dimensions and are less clearly related to the environmental context. Understanding the idiosyncrasy of long-lived firms requires a more comprehensive analysis than the analysis of the firms’ internal characteristics. Environmental factors have to be embedded in the analysis.

Moreover, explaining longevity demands a dynamic perspective to study how a particular firm develops over time through its capability to adapt to and influence the environment, including the role played by managerial intentionality (Lewin & Volberda, 1999). This research project intends to bridge these gaps by integrating both environmental and firm dynamics.

Table 2.1: Prior research on corporate longevity

Authors	Focus	Study Sample	Longevity enabler
Meyer and Zucker (1989)	Permanently failing organizations	4 illustrative case studies	Diversity of interests of stakeholders
Collins and Porras (1994)	Successful, visionary companies	18 paired case studies	Strong sense of identity, bold missions, tolerant management style, home-grown management, continuous self-improvement
Pascale (1990)	Successful companies	6 case studies	Continuous self-improvement, adaptive tension, self-organization and emergence (edge of chaos)
Konz and Katz (1996, 2000)	Hyper-longevity (over 250 years)	276 male religious orders (historical)	Strong sense of identity, sensitivity to the environment
De Geus (1999)	Successful, long-lived firms	27 case studies	Strong sense of identity, tolerant management style, sensitivity towards the environment, conservatism in finance
Hall (1997)	Long term survivors (over 200 years)	214 companies in UK (questionnaire)	Tolerant management style, conservatism in finance
Stadler (2007)	Enduring successful companies	9 paired case studies (among others, Shell - BP)	Exploit before explore, diversification, remember mistakes, be conservative about change
Burgelman and Grove (2007)	Strategic dynamics, induced and autonomous strategy processes, strategic leadership	1 longitudinal field research of Intel Corporation (1968-2005) combined with executive experience	Matching cycles of autonomous and induced strategy processes, alert strategic leadership
Van Zanden et al. (2007)	Successful, intricate organization	1 case study (Shell)	Clear sense of objective, tolerant management style, close financial controls, strength in technology, global character (networks)

2.3 Strategic Renewal Theory: Selection and Adaptation Perspectives

To what extent is sustained strategic renewal an indispensable capacity for a firm's long-term survival? Huff et al. (1992, p. 55) conjectured that "the need for renewal is never ending. Viable organizations must have the capacity to frequently improve its alignment with internal and external demands." Likewise from a strategic standpoint, companies must become efficient and effective at renewal simultaneously. Renewal must be the natural consequence of an organization's innate resilience (Hamel & Välikangas, 2003).

Volberda et al. (2001a, p. 160) defined strategic renewal as "the activities a firm undertakes to alter its path dependence." By definition, this implies that managerial theories on renewal are mainly built upon two main perspectives, i.e. selection and adaptation perspectives (Lewin & Volberda, 1999). Selection perspectives view renewal as highly restricted by resource scarcity, convergence to industry norms, and structural inertia. In other words, the strategic activities of successful firms are very similar and limited to strengthening and exploiting their existing core competencies. In contrast, adaptation perspectives suggest that firms are able to and do change, overcoming their rigidities. Firms learn to behave differently and explore new competencies.

Furthermore, both adaptation and selection theories and their related empirical studies rely on same survival outcome measure in support of their theory. From the adaptation perspective, theories interpret survival as a result of a firm's unique resources and capabilities or superior regimes of routines or optimal resource allocation strategies that account for competitive advantage. Whilst from the selection perspective, theories interpret survival as evidence that new entrants are the surviving organization form when incumbent firms have been selected out.

Combining several degrees of selection and adaptation perspectives allows us to develop a coherent managerial framework of sustained strategic renewal. In the subsequent sections, we elaborate on all three perspectives, i.e. selection perspective, adaptation perspective, and a combined selection-and-adaptation perspective. Drawing from the three literature streams, we aim to expand on the theoretical foundations by bringing together the various theories from both selection and adaptation perspectives to develop a framework for discussing firm competitiveness and survival.

Selection Perspective

A selection perspective assumes that organizations are not able to change easily and quickly. Theories residing in this camp include among others organizational or population ecology (Hannan & Freeman, 1977, 1989) and, on occasion, evolutionary economics (Nelson & Winter, 1982).

With regard to organizational survival, organizational ecology researchers have provided empirical evidence (e.g., Hannan and Freeman, 1989) and deductive theoretical support (Hannan, Polos, and Carroll, 2004) of the value of inertia for

firm survival. Organizational ecologists have suggested that selection processes tend to favor organizational forms exhibiting levels of structural inertia, i.e. forms that are less amenable to change (Hannan & Freeman, 1984, 1989). The theory of structural inertia has equated detrimental effects of core organizational changes to a renewed “liability of newness” – the higher mortality rate that new organizations experience (Hannan & Freeman, 1984).

Questioning the selection perspective, Wischnevsky (2004) asked if structural inertia assumptions are appropriate to explain the relationship between organizational change and survival in the context of a drastically changing environment. Unlike early population ecology formulations that embraced the notion that organizations were subject to absolute inertia (i.e. the inability to change due to internal and external constraints), the theory of structural inertia explains the detrimental effects of core changes on survival using the concept of relative inertia (Hannan & Freeman, 1984, 1989). While conceding that organizations can change, the theory contends that they rarely do so in a way in which organizational changes match environmental ones at the necessary speed. Relative inertia is defined in terms of timing, which is a function of three variables: “the temporal pattern of changes in key environments,” “the speed of learning mechanisms,” and “the responsiveness of the structure to designed changes” (Hannan & Freeman, 1984: 151).

Besides the concept of liability of newness, there is also the concept of liability of smallness. This thesis stems from the idea that selection processes favor large organizations’ structural inertia (Hannan & Freeman, 1977, 1984) access to capital and trained workers (Aldrich & Auster, 1986), and legitimacy with external stakeholders (Baum & Oliver, 1991). Furthermore, empirical findings from evolutionary studies in both ecology (Freeman et al., 1983; Hannan & Freeman, 1984) and economics (Audretsch, 1997; Sutton, 1997) indicate that mortality rates decline with increased size.

Despite the growing studies of selection perspective, it has been criticized for their lack of attention to time-variant effects (Baum, 1996). To address this critique, Barley (1990) suggested that an evolutionary perspective is especially important if one wishes to analyze transformation of action rather than merely identify and examine historical trends. According to the evolutionary perspective, the evolutionary process changes the source of competitive advantage in an industry, especially the knowledge and scale resources associated with barriers to entry and survival (Anderson & Tushman, 1990; Gort & Klepper, 1982; Nelson & Winter, 1982). Evolution thus introduces a dynamic element into selection processes, since firms face very different competitive environments before and after transformations. This evolutionary observation, then, suggests the need for a time-variant approach to investigating various organizational and environmental characteristics and firm survival. This suggestion brings in the need of adaptation perspective that observes the dynamic of organization-environment alignment over time through organizational adaptation.

Adaptation Perspective

An adaptation perspective assumes that through the adaptive responses to the changing environment, organizations are able to change to align with their environmental changes. Theories typically placed in adaptational camp include contingency theory (Woodward, 1965; Lawrence & Lorsch, 1967), resource dependence theory (Pfeffer & Salancik, 1978; Burt, 1983, 1992), institutional theory (Meyer & Rowan, 1977; DiMaggio & Powell, 1983), and transaction cost economics (Williamson, 1975; 1985).

On one research stream, resource dependence and organizational learning theorists have suggested the view that organizational changes are undertaken for their adaptive value, thus implying that improvements in organizational survival rates and performance can be expected from such changes. On another research stream, some researchers who view organizations as open rational systems (cf. Scott, 1992) have emphasized that the degree of fit between organizational features and external environment influences organizational effectiveness. Thus, contingency theorists have argued that organizational effectiveness will benefit from the adoption of specific organizational structures that are best suited for particular task environments (Lawrence & Lorsch, 1967; Mintzberg, 1979; Thompson, 1967).

Furthermore, the adaptation perspective (Child, 1972) suggests that smallness is a virtue in highly uncertain, dynamic environments. The issue of significance in a time-variant model is whether and how the advantage of size changes over time as an industry evolves. The argument is that the degree to which organizational size facilitates survival is likely to be conditioned by changing competitive conditions accompanying the structural discontinuity in an industry's life cycle. Accordingly, the advantage of size is substantial during an industry's growth period, since empirical regularities indicate a positive relationship between firm size and survival for any given growth rate (Sutton, 1997). Largeness enhances firms' ability to shield themselves from uncertain winds of change during the growth phase, thereby reducing mortality rates.

Teece, Pisano and Shuen (1997) indicate that, in a rapidly changing business environment, the ability of a firm to achieve competitive advantage depends on its dynamic capabilities – its ability to recreate competencies required to establish adequate organization-environment fit. They indicate that dynamic capabilities are instrumental in the renewal of competences to match environmental requirements. Organizations that possess such capabilities would achieve competitive advantage in the face of significant environmental variation. In the same line of thought, Gibson and Birkinshaw (2004) conjectures that achieving long-term success requires a dynamic capability enabling firms to satisfy current demands while simultaneously being prepared for tomorrow's developments. Building upon the literature, Jansen et al. (2009) conceptualize organizational ambidexterity as an

organizational-level dynamic capability and argue that structural differentiation and integration play a crucial role in a firm's ability to pursue exploratory and exploitative innovation concurrently (which later refers to the third key principle of sustained strategic renewal).

Altogether, Table 2.2 summarizes respectively the diverse theories of mainly the selection perspective and the theories of mainly the adaptation perspective.

Table 2.2: Diverse theories of mainly selection and mainly adaptation perspectives

Selection Perspective	Adaptation Perspective
<ul style="list-style-type: none"> • <i>Population ecology</i>: environments select organizations through resource scarcity and competition; long-lived firms accumulate structural and procedural baggage until they get selected out (Hannan and Freeman, 1977, 1984). 	<ul style="list-style-type: none"> • <i>Strategic choice theory</i>: organizations have the capacity to adapt themselves and reshape their environment; organizations should achieve a dynamic fit with their environment (Child, 1972; Miles and Snow, 1978).
<ul style="list-style-type: none"> • <i>Institutional theory</i>: firm survival and longevity is achieved through maintaining congruence with shifting industry norms and shared logics; long-lived firms resist change and adopt fast follower strategies (DiMaggio and Powell, 1983; Greenwood and Hinings, 1996). 	<ul style="list-style-type: none"> • <i>Learning theories</i>: organizations can use their unique skills for learning, unlearning and relearning to align themselves with their environments; organizations should remain vital by balancing the exploration of unknown futures and the exploitation of known pasts (Argyris and Schon, 1978; Levinthal and March, 1993; March, 1991).
<ul style="list-style-type: none"> • <i>Evolutionary theory</i>: longevity and survival are achieved through accumulation of know-how and tacit knowledge in the course of action; long-lived firms reinforce incremental improvements and routines (Nelson and Winter, 1982). 	<ul style="list-style-type: none"> • <i>Dynamic capability theory</i>: firm survival and longevity is achieved through knowledge creation and integration; organizations should retain its capacity to renew, augment, and adapt their core competencies over time (Teece et al., 1997).
<ul style="list-style-type: none"> • <i>Resource-based theory</i>: environments select organizations through competition; long-lived firms exploit and sustain their competitive advantage through barriers to imitation by investing in inimitable idiosyncratic capabilities (Penrose, 1959; Wernerfelt, 1984) 	<ul style="list-style-type: none"> • <i>Behavioral theory of the firm</i>: longevity and survival is directly related to the availability and control of organization slack; organizations should have the strategic intent to allocate slack to innovation (Cyert and March, 1963).

Source: Adapted from Volberda et al. (2001a, p.162)

In the next section, we move beyond purely selection or adaptation perspectives by viewing both perspectives as an interrelated, combined perspective. This means we consider joint outcomes of environmental selection and adaptation perspectives by drawing on the literature of coevolutionary theory.

Coevolutionary Theory: Selection-and-Adaptation Perspective

No single theory of purely selection or adaptation can fully explain how and why firms coevolve and develop over time (cf. Dooley & Van den Ven, 1999; Van de Ven & Grazman, 1999: 186; Van de Ven & Poole, 1995). While selection theorists view change and renewal as highly restricted by resource scarcity, convergence to industry norms, and structural inertia; adaptation theorists suggest that organizations can and do change by learning and exploring new competencies to overcome their rigidities (Volberda et al., 2001a). In other words, the major difference between the two perspectives is a thoroughly researchable topic pertaining to the rates and conditions of change in organizations and the outcomes change generates.

Rather than focusing on the broader controversy between selection and adaptation views, we sought to comprehend the implications of a particular type of organizational transformation in a particular external context for organizational survival through a combined selection-and-adaptation perspective: coevolutionary theory. The coevolutionary perspective is an integrative framework for studying organizational evolution as a joint function of managerial intentionality and selection pressures imposed by the environment (Lewin and Volberda, 1999). According to Volberda and Lewin (2003, p.2108), “for coevolution to occur, the population must consist of heterogeneous firms that have adaptive learning capability and are able to interact and mutually influence each other.” This is in line with the growing need in the field of strategy research which is to take interdependence and dynamism into consideration. This view has highlighted especially the internal processes by which firms in their regimes of rapid change renew their capabilities and strategies and adapt to meet the challenges for the future (e.g. Baden-Fuller and Stopford, 1992; Baden-Fuller and Volberda, 1997; Sanchez and Heene, 1996; Teece et al., 1997; Volberda, 1998; Volberda et al., 2001a).

While firms in dynamic environments are challenged to renew themselves to survive in the long term, it is understood that these firms at the same time are confronted with short-term competitive forces, influencing their present profitability. However, these long- and short-term requirements seem to conflict. While renewing to adapt for tomorrow requires change, flexibility and creativity of firms, profits for today requires order, control and stability (Volberda, 1998). March (1991) conceptualized this tension as the exploration/ exploitation trade-off firms face. He associates exploration with search, variation, experimentation and innovation; whereas exploitation is associated with refinement, efficiency and application. Additionally, Levinthal & March (1993), Lewin et al. (1999), and March (1991) suggested that maintaining a balance of exploration and exploitation activities in a firm is a primary factor in its survival and prosperity. As such this “exploration / exploitation theory”, as Lewin et al. (1999, p. 537) suggest, “takes

dynamism into consideration by advancing an explanation for why and how organizations survive over time or fail to do so”

In this context, the basic problem for most firms is “how to engage in enough exploitation to insure the organization’s current viability and engage in enough exploration to insure its future viability” (Levinthal and March, 1993: 105). To address this issue, the theory of coevolution has been introduced by many scholars to bridge the selection-adaptation or exploitation-exploration chasm (e.g. Lewin and Volberda, 1999; Murmann, 2003). Consistent with the coevolutionary framework, Sidhu et al. (2004), for instance, found that both environmental pressures and managerial intentions influence an organization’s exploration behavior. Additionally building upon March’s idea of exploration-exploitation as a metric for progress, Volberda et al. (2001b) asserted that multi-level coevolutionary processes taking place over time and leading to adaptations are essential for strategic alignment of firm competencies with the environment. In short, the inability to coevolve with the environment would be detrimental to organizational survival (Rindova & Kotha, 2001).

Lewin and Volberda (1999, p. 526) emphasized the importance of the coevolution perspective defining coevolution: “as the joint outcome of managerial intentionality, environment, and institutional effects.” Coevolution assumes that change may occur in all interacting populations of organizations. Hence, coevolution indicates that adaptation and selection are not orthogonal forces but are fundamentally interrelated. Correspondingly, Volberda and Lewin (2003) proposed three key principles of self-renewal (Table 1.2) that are necessary for enabling managed selection, coevolutionary adaptation processes. The three key principles, which we consider as a prerequisite of corporate longevity or sustained strategic renewal, reiterate that adaptation and selection are not completely opposite forces but are fundamentally interrelated: organization and environment coevolve (Lewin and Volberda, 1999; Murmann, 2003). We are now going to elaborate in detailed on the three key principles of self-renewing organizations in the following section.

2.4 Key Principles of Self-Renewing Organizations

The various theories from both selection and adaptation perspectives are brought together to develop a framework for discussing firm competitiveness and survival. In this respect, coevolutionary theory brings together the joint perspectives of both selection and adaptation. In the coevolutionary theory, how organizational factors interact with environmental factors and how such joint outcomes affect organizational longevity is of great interest to organizational scholars. Such organizational factors include the organization’s market entry timing, founding leader characteristics, and type of products or services that the organization sells. Similarly, environmental factors (such as business climate, competitive pressures,

and legal and regulatory issues) that could interact with organizational strategy need to be studied.

To advance on the coevolutionary theory, Volberda and Lewin (2003) derive three higher order principles from complexity theory (Anderson, 1999a, b; Axelrod & Cohen, 2000; Brown & Eisenhardt, 1998; Gell-Mann, 1995; Holland, 1999; Kauffman, 1995) and practitioner-oriented writings (e.g. Clippinger, 1999). The three key principles of self-renewing organizations, they argue, underlie any theory of self-renewal and its associated enabling managerial routines and capabilities involving strategy, structures, processes and leadership. The following sections will discuss each of the three key principles.

Principle 1: Managing internal rate of change

The role of environment in organizational dynamics has long been studied in the various streams of organizational theory (e.g., Barnett & Carroll, 1995; Hannan & Freeman, 1989; Lawrence & Lorsch, 1967; Perrow, 1979; Pfeffer & Salancik, 1978; Scott, 1992). The traditional premise is that firms seek to align organizational resources and capabilities with external opportunities and challenges (cf. Andrews, 1971; Hofer & Schendel, 1978) and that an effective alignment has positive performance implications (Ketchen et al., 1997; Powell, 1992; Van de Ven & Drazin, 1985; Venkatraman & Prescott, 1990).

Organization-environment coalignment process that entails the need to scan and assess the environment for subsequent matching of opportunities with organizational capabilities and managerial discretion is at the heart of the adaptation of organizations over time. It delineates strategic actions a firm, through its managers, undertake by scanning the firm's environment to seek opportunities that could be matched with the firm's capabilities.

To stimulate further empirical development and understanding of the concepts of strategy and environment, Porter (1991, p. 97) refers to strategy as "the act of aligning a company and its environment". This line of inquiry propounds that long-lived organizations have to cope with acceleration of change in the business environment in order to adapt to the environment and to stimulate renewal and innovation processes. This implies that there is a need for organizations to match their internal rate of change with the external rate of change of environments within which the organizations are embedded. This is the first key principle of self-renewing organization (Volberda and Lewin, 2003). The principle implies a keen awareness that organizations regulate their internal rate of change to equal or exceed the external rate of change over time for their long-term viability.

By definition, organizational change itself involves a transformation of an organization between two points in time that is triggered by a substantial internal or external event. Barnett and Carroll (1995) conceptualize organizational change in terms of both its process and its content. Process refers to how change occurs. Content describes what actually changes in the organization and what key events

trigger the changes. On the basis of content, major changes consist of transformations that involve many elements of structure or those that entail radical shifts in a single element of structure. Most scholars regard the key aspect of change comes from comparing the organization before and after the transformation. Making such a comparison constitutes an analysis of the content of organizational change. It assesses what actually differs in the organization at the second point in time.

Changes, however, have various kinds of definitions depending on the level of strategy one focuses on. On one research stream, those focusing on changes in corporate-level strategy define strategic change as a realignment of a firm's selection of product/market domains and allocations among them (Ansoff, 1965). On another research stream, those focusing on changes in business-level strategy define strategic changes as alterations in competitive decisions within particular product/market domains, for instance alterations in price, or quality associated with a product (Rumelt, 1974).

With respect to environmental changes, every firm has an environment that places constraints on the way it operates – e.g., an industry group has certain technical characteristics that must be attended to. The external environment in which success and failure are ultimately evaluated is a highly variegated environment. Organizations are required to find a way of mapping the rich multidimensionality of the external environment onto the organizationally-legitimated internal environment. Timely and swiftly matching organizational transformation to environmental shifts is therefore key to organizational survival. The key question in this case is that how firms should regulate the internal rate of change with respect to the external rate of change. Not only is this questioned in the academic world, but also in the business world. For instance, Jack Welch (GE's 2000 annual report, p. 4) – the CEO of General Electric – is among the others who has long believed that: “when the rate of change inside an institution becomes slower than the rate of change outside, the end is in sight.”

Likewise, Volberda and Lewin (2003) propounded that a firm should regulate its internal rate of change to match or exceed the external rate of change. This, according to them, is consistent with idea that organizations must maintain requisite variety (Ashby, 1964). The principle of requisite variety states that the internal regulatory mechanisms of a system must be as diverse as the environment with which it is trying to deal. Ashby (1964) further contended that for only by incorporating required variety into internal controls can a system deal with the variety and challenge posed by its environment.

By the same token, Volberda and Lewin's (2003) argument was that this principle recognizes the need for organizations to match or exceed the coevolution rate of the external systems (society, institutions, and industries) within which the firm is embedded. The internal variety of firm routines and capabilities must match the external variety of the environmental landscape on which the firm is prospecting. In short, self-renewing organizations develop routines, capabilities,

and measures which monitor and track rates of change in all aspects of their environment (e.g. rate of new product improvements made by competitors, changes in customer expectations, etc.) and adjust the applicable internal processes to match or exceed these rates.

Principle 2: Optimizing self-organizing

The term "self-organizing" seems to have been first introduced in 1947 by the psychiatrist and engineer named W. Ross Ashby. Self-organization as a word and concept was used by those associated with general systems theory in the 1960s (Ashby, 1964), but did not become commonplace in the scientific literature until its adoption by physicists and researchers in the field of complex systems in the 1970s and 1980s.

Since then, the concepts of emergence and self-organization have been used to explain various elements of strategic decision-making (Bettis & Prahalad, 1995; Stacey, 1995; MacIntosh & MacLean, 1999), entrepreneurship (Stevenson & Harmeling, 1990; Gartner, 1993), organizational learning (Nonaka, 1988, 1994), leadership (Senge, 1990; McKelvey, 2000), and organizational change and transformation (Leifer, 1989; Dooley, 1997). The concept of self-organizing is also mentioned in the complexity theory. Complexity theory suggests that self-organization is the natural "default" behavior. Maguire and McKelvey (1999), for instance, argued that when organizations move away from stability and into the "region of complexity," adaptive tensions give rise to emergent self-organization. In fact, most argue that it is only as organizations move into far-from-equilibrium states (Kauffman, 1995; Prigogine and Stengers, 1984) that emergent ideas are possible, giving rise to innovation and creativity (Anderson, 1999a; Chiles et al., 2004; McKelvey, 1999).

Self-organization is the process by which organizations always find order no matter how complex or convoluted the structure of the organization (Nonaka, 1988; Volberda and Lewin, 2003). This principle encourages the idea of delegating decision making to the lowest possible level and it implies maximizing capabilities of scope at every level of the organization (Prahalad and Ramaswamy, 2003). In self-organizing systems, order comes from the actions of interdependent agents who exchange information, take actions, and continuously adapt to feedback about others' actions rather than from the imposition of an overall plan by a central authority (Chiles et al., 2004).

In the same line of thought, Volberda and Lewin (2003) conjectured that guided self-organization is a primary process by which organizations find fitness on rugged landscapes. They further propound that self-organization, however, does not mean that individuals or units can pull in all directions at will or break all rules. It does not mean that managers are not necessary or that they have diminished roles. It means that no central controller is necessary and it requires fundamental departure from command and control philosophy of traditional hierarchical bureaucratic organizations.

At the related vein of research, Van den Bosch and Volberda (2006) studied the condition of self-organization at the Shell Research and Technology Centre in Amsterdam, The Netherlands. In particular, they investigated how the knowledge integration capacity may contribute to the development of self-organization in a knowledge-intensive firm like Shell. Their results indicate that the knowledge integration capacity contributes to self-organization. Furthermore, their results indicate that self-organization requires key enablers such as a transformational leadership (Edmondson et al., 2003, Smith and Tushman, 2005) that can guide the self-organization processes rather than traditional hierarchical structure.

Guided self-organization also implies that managers function as stewards of the evolutionary process and focus their managerial role on devising and articulating critical values and on establishing boundary conditions that enable and guide decision making at lower levels of the organization (Nonaka, 1988; Volberda and Lewin, 2003). Guiding and enabling lower level decision-making and action also requires substituting process controls (i.e. devising processes that produce desired and acceptable outcomes) for outcome controls. In summary, self-organization is fundamentally different from classical command and control management practice. It implies that management commits to guiding the evolution of behaviours that emerge in the course of interaction of independent agents and invests in implementing process controls whenever possible instead of relying on outcome controls.

Principle 3: Synchronizing concurrent exploitation-exploration

The third higher-order principle involves balancing concurrent innovation and knowledge creation (exploration) with improvements in productivity, process improvements, efficiency and product extensions and enhancements (exploitation). Levinthal and March (1993, p.105) further contended that the long-term survival of an organization depends on its ability to ‘engage in enough exploitation to ensure the organization’s current viability and engage in enough exploration to ensure its future viability’.

March (1991) introduced the dichotomous concept of exploitation and exploration. He described exploitation as ‘the refinement and extension of existing competencies, technologies, and paradigms.’ (p.85). Exploitation is needed for organizations to achieve short-term order, structure, and stability (Volberda, 1998). Exploration is related to ‘search and variation: experimenting with technologies, ideas, paradigms, knowledge, and strategies trying to find new ways to age old problems’ (March, 1991, p.85). Exploration that is based on a longer-term horizon is needed as it provides the basis for new technologies and breakthrough inventions (Ahuja and Lampert, 2001). Table 2.3 highlights the key differences between exploration and exploitation.

Table 2.3: Key differences between exploitation and exploration

Attribute	Key terms	Performance
Exploration	search, variation, risk taking, experimentation, change, play, flexibility, discovery, innovation, stress, adaptation	less certainty, more diffuse, longer time horizon
Exploitation	refinement, choice, production, efficiency, stability, continuity, inertia, implementation, execution, selection	certainty, speed (short-term), proximity, clarity

Source: March (1991)

Although firms are often confronted with balancing exploitation and exploration concurrently, most firms seem to exhibit an asymmetric preference for short-term exploitation improvements. Studies show that in highly competitive environments over exploitation can result in a competence trap (Levitt & March, 1988, 1993). The consequence of asymmetric preference for exploitation results in the development of core rigidities and highly specialized resources that enhance short-term performance at the expense of reduced flexibility (Volberda, 1996, 1998). Exploration can also have dysfunctional effects. Over sensitivity to short-term variations and local errors, becoming too responsive to fads and fashions as well as never ending tinkering with routines and procedures may waste resources on ‘noise’ embedded in environmental signals (Volberda, 2003). The resulting chaotic organization cannot retain “a sense of identity and continuity over time” (Weick, 1979, p. 215). Random and chronic exploration creates a vicious circle that results in a renewal trap characterized by conflict about authority, unclear responsibilities, inadequate controls, lack of direction and shared ideology. Thus over exploitation of existing opportunities as well as over exploration of new opportunities are dysfunctional for the firm and lead to competence trap or renewal trap (Volberda, 1998). This is also indicated by March (1991, p.71) who argued that “systems that engage in exploitation to the exclusion of exploration are likely to find themselves trapped in suboptimal stable equilibria while adaptive systems that engage in exploration to the exclusion of exploitation are likely to find that they suffer the costs of experimentation without gaining many of its benefits”.

Self-renewing organizations synchronize and balance concurrent exploration for new opportunities and exploitation of existing capabilities. Both attributes are accepted and present. Both operate simultaneously. Existing studies suggested that organizations pursuing exploration and exploitation concurrently obtain superior financial performance (Gibson and Birkinshaw, 2004; He and Wong, 2004; Lubatkin et al., 2006). Over time, balancing exploration and exploitation not only helps firms to overcome structural inertia that results from focusing on exploitation, but also refrains them from accelerating exploration without gaining benefits (Levinthal and March, 1993).

Antecedents of three key principles

In their study of mobilizing the self-renewing organization, Lewin and Volberda (2004) further advanced the three key principles of self-renewing organizations by substantiating key antecedents of the three key principles. These antecedents, they argue, are considered as enabling heuristics of sustained strategic renewal. They help managers to guide strategic renewal trajectories of their firms. In this respect, Lewin and Volberda (2004) developed a range of enabling design variables or antecedents involving strategies, structures, managerial processes and leaderships. Table 2.4 shows the antecedents of the three key principles introduced by Lewin and Volberda (2004). We will explain these antecedents in more detailed in Chapter 5.

In conclusion, we conjecture that altogether managing internal rates of change to match or exceed external rates of change, nurturing and maintaining self-organization and sustaining concurrent exploration and exploitation are three complementary principles necessary for sustaining strategic renewal (Volberda and Lewin, 2003). Chapter 11 of this thesis will further demonstrate how the three key principles complementarily contribute to sustained strategic renewal. To achieve this complementary result, managers need to pay continuous attention. This is the particular feature that distinguishes second-order renewal capabilities of successful long-lived organizations from the non-coevolving organizations with short-term exploitation focus only.

There is, however, a paucity of empirical work. By far, cross-sectional survey-based studies and economic time series modeling (firm is treated as a black box) dominate empirical research landscape (Lewin & Volberda, 1999). More long-term studies of how industries and firms coevolve and emerge over very long periods of time are ultimately needed. Unfortunately, the number of such studies is very small (cf. Barr et al., 1992; Huygens et al., 2001; Jones, 2001; Jenkins & Floyd, 2001; Van den Bosch et al., 1999; Van de Ven & Grazman, 1999). By employing a longitudinal approach, this thesis aims to contribute to the small number of long-term studies.

Table 2.4: Three key principles and antecedents as enabling heuristics of sustained strategic renewal

Key principle	Enabling strategy	Enabling structure	Enabling managerial process	Enabling leadership
Regulate internal rate of change to match or exceed external rate of change	<ul style="list-style-type: none"> Driving momentum, early mover (Eisenhardt, 1989a) Escalating competition/leapfrogging: long jumps (Beinhocker, 1999) 	<ul style="list-style-type: none"> Implementing modular structures that maximize external customer interactions and minimize internal customer interactions (Pascale, 1990, 1999) 	<ul style="list-style-type: none"> Establishing rhythms for change (Eisenhardt, 1989a) Establishing stretch goals (Maira & Thomas, 1999) Structure benchmarking processes Utilize dynamic selection rules 	<ul style="list-style-type: none"> Guiding organization interpretation of environment Detecting emergence of new dominant logics (Prahalad & Bettis, 1986) Managing adaptive tension (Pascale, 1990) Selecting comparison groups; benchmark
Optimize self-organization	<ul style="list-style-type: none"> Managing rate of internal growth through innovation Building readiness for change through: probing future; varied low-cost experiments; scenario planning (Eisenhardt, 1989a; Beinhocker, 1999; Pascale, 1990, 1999; Schoemaker, 1995) 	<ul style="list-style-type: none"> Semi-structures/ breaking large structures into patches/changing chargers (Kauffman, 1995; Eisenhardt, 1989a) Optimizing cross-function interfaces (Maira & Thomas, 1999) Implementing communication-centric structures 	<ul style="list-style-type: none"> Facilitating emergent processes (Pascale, 1990, 1999) Balancing density of strong and weak ties Minimizing number of rules/ simplicity over complexity (Eisenhardt, 1989a) 	<ul style="list-style-type: none"> Choosing arenas of competition Determining performance criteria Designing selection rules Accepting equifinality Managing dysfunctional stress Managing agency problem Identifying critical values (Maira & Thomas, 1999)
Synchronize concurrent exploration and exploitation	<ul style="list-style-type: none"> Allocating slack to exploration; latent potential and redundancies (Maira & Thomas, 1999) Pursuing multiple strategies; parallel exploring (Beinhocker, 1999) Exploring to create real options 	<ul style="list-style-type: none"> Implementing venturing structure and selection rules Spinning off autonomous new ventures 	<ul style="list-style-type: none"> Incorporating venture capital metrics (Beinhocker, 1999) Adjusting rules for scale 	<ul style="list-style-type: none"> Articulate strategic intent of passion for exploration and exploitation; mindfulness and intention (Pascale, 1990) Avoid oscillating between strategic extremes (Pascale, 1990)

Source: based on Lewin and Volberda (2004)

2.5 Conclusion

Organizations are social inventions (Greenfield, 1973). They exist, at least in part, because of the benefits of coordination they provide. Organizations are fluid and dynamic: they move in time and in space; they act and react. In this view, we need a framework that allows us to integrate both the selection as well as the adaptation perspectives. The coevolutionary perspective is viewed as an important overarching framework for an enquiry into organizational actions and outcomes as a joint function of adaptation due to managerial efforts and selection pressures imposed by the environment (Lewin & Volberda, 1999).

Firms that build organizational capabilities that foster flexibility and change may indeed need to invest in a crucial resource for survival in a shifting industry context. We need to examine a diverse set of principles that may help top management to guide sustained strategic renewal over time. Building on the coevolutionary theory in this chapter, we propose to use the three key principles of self-renewing organizations (Volberda and Lewin, 2003) to explain the construct of sustained strategic renewal.

The first principle deals with managing the internal rate of change of a firm to match or exceed the external rate of change of the firm's environment. Firms through their managers need to better identify the associated challenges and match the dynamics of the internal context of strategy making with the dynamics of the external ecology in which the company operates. The second key principle is concerned with the emergent process of self-organization. Self-organization suggests that firms need to depart from command and control philosophy of traditional hierarchical bureaucratic organizations and encourage guiding and enabling lower level decision-making. The third principle emphasizes the importance for firms to pursue exploitation and exploration simultaneously. Additionally by building on Lewin and Volberda (2004), this chapter has also substantiated key antecedents of the three key principles (Table 2.4).

Altogether the three key principles are regarded as complementary principles that are necessary for sustained strategic renewal, the key construct in this thesis. Our studies in this thesis aim at providing a better understanding of the three key principles as a means to explain the sustained strategic renewal construct. To begin with in the next chapter, we explore the three key principles based on a coevolutionary perspective which is a combined selection-and-adaptation perspective.

3. Exploring Three Key Principles from a Coevolutionary Perspective^{*)}

3.1 Introduction: Idiosyncrasy of Long-Lived Firms

In this chapter, we address the first research question in this thesis, i.e. how firms develop their competences to strategically renew themselves. Here we use a combined selection-and-adaptation, i.e. a coevolutionary, perspective in studying how the environmental selection plays a role on the managerial intentionality and vice versa how managerial intentionality influences environment through a construct of coevolutionary competence. By doing this, we aim to explore the three key principles of sustained strategic renewal from a coevolutionary perspective.

We start by querying why firms vary so widely in the length and brevity of life. This question hardly crosses our minds. Perhaps this is because firms are all around us and thus we tend to take their existence for granted (Aldrich, 1979). We all have some interest in the survival of commercial firms since such organizations are necessary and important in our lives as purposive systems that enable us to accomplish collectively what cannot be accomplished by each of us as individuals acting on our own (Parsons, 1956; Aldrich, 1979). Hence, the existence of organizations plays an important role in our society and well-being.

However, the following facts regarding the average lifespan of firms highlight our research problem:

- The average life expectancy of *Fortune 500* firms, from birth to death, is only 40 to 50 years. Their first 10 year is a period of high corporate ‘infant mortality’. In addition, a full one-third of the 1970 *Fortune 500* companies had been acquired or broken into segments, or had merged with other companies by 1983 (De Geus, 1999).
- In the past two decades, of the 20 largest US companies’ bankruptcies, ten occurred in the last two years (Hamel & Välikangas, 2003).

^{*)} This chapter is based on Kwee, Z., Van den Bosch, F.A.J., and Volberda, H.W. (2008). ‘Coevolutionary competence in the realm of corporate longevity: how long-lived firms strategically renew themselves’. in Sanchez, R. (Ed.), *Research in Competence-Based Management*, 4, 281-313, UK: JAI Press.

- Among the companies on the original *Forbes 100* list in 1917, 18 remained in the top 100 by 1987 and 61 had ceased to exist (Mackey & Välikangas, 2004).
- The average life expectancy of all firms investigated, *regardless of size*, in Japan and much of Europe, is only 12.5 years (De Rooij, 1996).
- In the case of family companies, between first and second generations only about one-third of family businesses survive and, of those survivors, only 12 percent reach a third generation. An exclusive 3 to 4 percent of third generation survivors make it to a fourth (O'Hara, 2004).

Several researchers (e.g. De Geus, 1999; O'Hara, 2004; Kwee, 2004; Van Driel et al., 2004) identified a number of long-lived firms, ranging from family firms to large firms. Table 3.1 presents a few of these from many different countries around the world listed in an ascending order based on their year of origin. Two of the aforementioned long-lived firms, The Hudson's Bay Company (HBC) and Royal Ten Cate (RTC), are discussed in detail as the empirical case studies in the third section. Both companies are selected as they exemplify how a company is confronted with the regulatory, technological and other changes throughout their lifetime. They may, therefore, help to illustrate the construct of coevolutionary competence in the context of organizational longevity.

Table 3.1: List of several long-lived firms

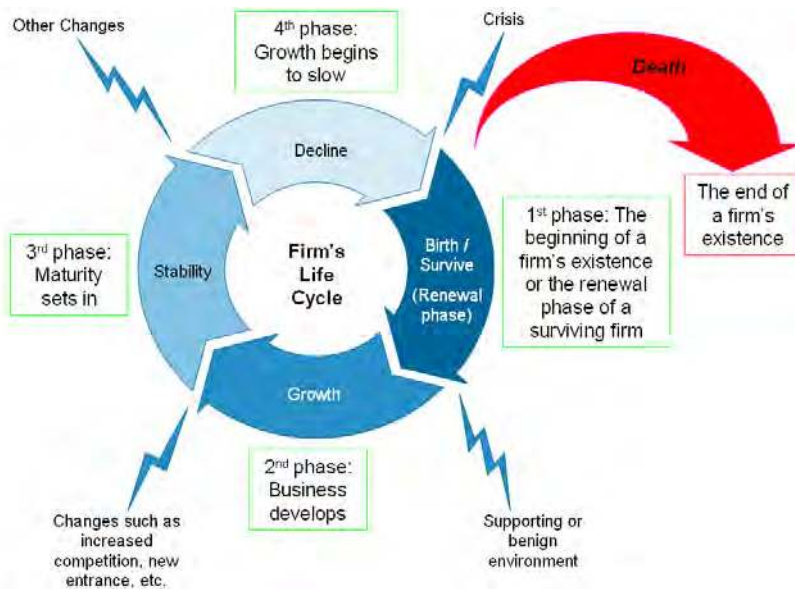
Company Name	Year of Origin	Country	Current Line of Business
Kongo Gumi*	578	Japan	Temple restoration and construction
Stora (present: Stora Enso)	1288	Sweden	Integrated paper, packaging, and forest products
Cambridge University Press	1534	U.K.	Printing and publishing
Royal Pakhoed (present: Vopak)	1600	The Netherlands	Transport, logistics (warehousing), and distribution
Van Eeghen	1662	The Netherlands	Food products and food ingredients
Saint-Gobain	1665	France	Producer, processor, and distributor of materials (glass, ceramics, plastics, and cast iron)
The Hudson's Bay Company	1670	Canada	Department store retailer
Royal Ten Cate	1704	The Netherlands	Technical textiles and technical components
The Royal Bank of Scotland	1727	U.K., Scotland	Bank and Financial Services
DuPont	1802	USA	Chemicals, materials, energy, and science-based solution provider

* In January 2006, after almost 1,428 years of existence, Kongo Gumi went bankrupt. The company was acquired by Takamatsu Corporation. Prior to that, it had over 100 employees and annual revenue of ¥7.5 billion (\$70 million) and had still specialized in building temples.

How can these companies live for such a long time? Do they coincidentally pass the tests of survival through some Darwinian process of natural selection? Aldrich (1979) argued that the notion of “survival of the fittest” in natural selection is unable to explain what makes firms long-lived. The natural selection model refers to a tendency for those species and organizations most fit vis-à-vis their environments to survive. Equating organizational “fitness” with “survival” would rob the model of any claim to scientific status and reduce it to a tautology in that it would provide only a post hoc explanation of why a firm failed but no a priori predictive base for assessing which ones will not in the future. However, in terms of likelihoods and probabilities, the presumption remains that a thriving organization is adaptable to its environment.

Evolution in Biology is often adopted as an approach to understanding corporate longevity just as the former is used to ascertain the longevity of human and other living organisms (e.g., Meyer & Zucker, 1989; De Geus, 1999; Konz & Katz, 1996, 2000). Analogously, many researchers (such as De Geus, 1999) regard firms as living entities. A firm has a life, with birth, all kinds of changes and death. The date of birth is the date of founding, and death or exit is considered to be the dissolution of the organization (Meyer & Zucker, 1989: 70). Figure 3.1 illustrates our interpretation of a firm’s life cycle. With respect to this cycle, long-lived firms are considered to be idiosyncratic: they seem to be able to relentlessly and reflectively renew themselves and thus make their life cycles last for centuries.

Figure 3.1: Firm’s life cycle



Within this framework, the foregoing research places a major emphasis on ascertaining which factors explain the longevity of firms (Collins & Porras, 1999; De Geus, 1999; Hall, 1997; Huygens et al., 2001; Kwee, 2004). Their approach has been to a large extent inductive (except for Hall) and was performed by including multiple companies and subsequently investigating processes mainly *inside* the organizations. Their work pointed out common organizational characteristics that enable these long-lived firms to strategically renew themselves and adapt to the environment. However, these characteristics encompass, in particular, internal dimensions and are less clearly related to the environmental context.

Understanding the idiosyncrasy of long-lived firms requires a more comprehensive analysis than this analysis of their internal characteristics. Environmental factors have to be embedded in the analysis. In fact, explaining longevity demands a dynamic perspective to study how a particular firm develops over time through its capability to adapt to and influence the environment, including the role played by managerial intentionality (Lewin & Volberda, 1999).

3.2 From Selection to Coevolutionary Perspective: Principles of Self-Renewing Organizations

How do long-lived firms sustain their existence over time? Under which conditions do firms adopt strategies for survival (and even, quite often, fail) as circumstances change? And how are disruptive or unwanted influences dealt with? These illustrative questions are the extended version of the early research like De Geus's (1999) that posed the question of 'what makes long-lived firms?' They are also formulated since many scholars and business practitioners have observed that environmental change outstrips organizational competence change. Barnett and Hansen (1996) elaborated such conditions known in evolutionary theory as the 'Red Queen' effect, a principle which was introduced by Van Valen (1973) suggesting: "For an evolutionary system, continuing development is needed just in order to maintain its fitness relative to the systems it is co-evolving with.". Very often, organizational transformation or adaptation is derailed due to difficulty in making strategic transitions. Bate (1994), for instance, pointed out that although organizations are always changing, the natural pace of change may be too slow, particularly in a hypercompetitive environment or one facing technological shifts (D'Aveni, 1994).

Several theories have been introduced by researchers in the context of studying the long-term transformation of organization. We briefly elaborate on a few of them. In the first place, the population ecology theory suggests that management makes little if any difference and firms should focus on what they do best until they are selected out (Aldrich, 1979; Lewin & Volberda, 1999) as the market selects out firms which have the wrong competencies (Barnett et al., 1994; Barney & Zajac, 1994). The idea here is that for the most part, organizations act on a simple principle: "If a given routine works, let's do more of it; if it does not work, let's do less" (March, 1999). Next, the resource-based view of the firm supports the idea that idiosyncratic resources are the basis of a sustained competitive advantage and management should maximize unique core competencies (Lewin & Volberda, 1999). Alternatively, organizational learning theory states that variation in performance results from environmental changes and from the firm's ability to adapt through learning (Lane et al., 2001; Crossan and Bedrow, 2003). The Royal Dutch Shell's scenario planning (Schoemaker et al., 1992; Schoemaker, 1995), for instance, is viewed as a strategic learning media to help the company discern the relevant signals for (future) change and to understand how innovations were generated and how the transitional period was managed.

The increasing turbulence of the business environment has also changed the competitive game substantially and focused attention on knowledge as a dominant source of competitive advantage (Grant, 1996; Kogut & Zander, 1992; Nonaka & Takeuchi, 1995). Firms should access new outside knowledge, integrate it flexibly across different firm boundaries, and apply it to commercial ends (Cohen & Levinthal, 1990). This dynamic capability, referred to as absorptive capacity, is seen as a promising explanation of innovation (Jansen et al., 2005; Stock et al., 2001; Tsai, 2001), the exploration / exploitation trade-off (Jansen et al., 2009; Lewin, Long & Carroll, 1999; March, 1991), business performance (Lane et al., 2001; Tsai, 2001), intra-organizational transfer of knowledge (Szulanski, 1996) and inter-organizational learning (Lane & Lubatkin, 1998).

Firms with higher levels of absorptive capacity tend to outperform other firms in that they are more proactive and exploit current opportunities (Cohen & Levinthal, 1990; Van den Bosch et al., 1999). However, inability to opportunely adapt to the changing environment is one of the big hurdles of firms. Ossified firms have difficulty in facing the new challenge with their ill-fated strategies that tend to routinely maintain what they have been doing well. Hence, to absorb new knowledge and to develop new skills are important requisites for firms facing changing environments.

Moreover, there is also a need to reconcile the paradox of conflicting forces for change and stability (Volberda, 1998). These conflicting pressures have also long been recognized (e.g., Burns & Stalker, 1961) and many scholars have explicitly discussed the dilemma (Poole & Van de Ven, 1989; Handy, 1995; Kanter, 1988; Hampden-Turner, 1990). On the one hand, organizations tend to preserve their core competencies. But they should realize that if they preserve the

stability, core competencies can become core rigidities (Leonard-Barton, 1992; Burgelman, 1994; Barnett et al., 1994) or a ‘competence trap’ (Levitt & March, 1988; Levinthal & March, 1993). On the other hand, although adaptation is needed as the pressure to change comes not just from threats to survival but also the desire to grow and be more successful, too much change will lead to chaos, loss of cultural glue, fatigue and organizational break-down (Volberda, 1996) or the ‘renewal trap’ (Levitt & March, 1988; Levinthal & March, 1993). Freeman et al. (1983) pointed to the fact that learning and adjusting structure enhance the chance of survival only if the speed of response is commensurate with temporal patterns of relevant environments. In Lewin’s (1951) terminology, there is a cycle of unfreeze, move, refreeze, which is often repeated.

Furthermore, Lewin and Volberda (1999: 526) emphasized the importance of the coevolution perspective defining coevolution: ‘as the joint outcome of managerial intentionality, environment, and institutional effects’. Coevolution assumes that change may occur in all interacting populations of organizations. In other words, change can be recursive and need not be an outcome of either managerial adaptation or environmental selection but rather the joint outcome of managerial intentionality and environmental effects. Hence, coevolution incorporates the premise that adaptation and selection are not orthogonal forces but are fundamentally interrelated.

Correspondingly, Volberda and Lewin (2003) proposed three key principles of self-renewal that suggest how organizations can manage sustained strategic renewal. These key principles are elaborated in Chapter 1.4 (Table 1.2) and Chapter 2.4. The three key principles, which we consider as a prerequisite of corporate longevity, reiterate that adaptation and selection are not completely opposite forces but are fundamentally interrelated: organization and environment coevolve (Lewin & Volberda, 1999). Besides, long-lived firms have adapted to the environment and have shaped the environment through their actions over a long period of time. The appropriateness of the adaptation, or a dynamic fit with the environment, is found in the right proportion of exploitation and exploration actions that change with the environment. Additionally, the coevolutionary perspective has the potential to bridge the selection-variation-adaptation chasm to further develop insights into the mutation process of firms. This perspective addresses the less frequently examined questions of how organizations systematically influence their environments and how organizational environments, in turn, influence those organizations. In short, coevolution demonstrates how the interplay between managerial intentionality and environmental role may reinforce the renewal process in organizations. This concept, therefore, contributes to an encompassing understanding of corporate longevity.

3.3 Competence-Based Management and Construct of Coevolutionary Competence

Sanchez, Heene and Thomas (1996) introduced a competence-based management framework that aims to incorporate and integrate dynamic, systemic, cognitive, and holistic aspects of organizations. Extending the model of the firm as an open system (Sanchez et al., 1996) recently Sanchez and Heene (2002) and Sanchez (2004) develop a taxonomy of five competence modes, each of which is distinguished by specific forms of flexibility it brings to an organization to respond to the changing circumstances in the environment. Each mode is further distinguished by the kinds of strategic options it creates for an organization.

The left hand side of Table 3.2 provides a summary of the five competence modes in which competence is defined as ‘the ability to sustain the coordinated deployment of assets in ways that help a firm achieve its goals’ (Sanchez et al., 1996: 8). This definition was derived by taking into account the four aspects of organizational competence: dynamic, systemic, cognitive, and holistic. We briefly reiterate these four aspects of organizational competence as follows:

1. *Dynamic*: for a firm’s competence to be sustainable, it must respond to the dynamic changes of the external environment and of its own internal processes. To explain the essential feature of such sustainability, Sanchez (2004: 521) introduced the notion of organizational entropy which suggests that managers provide continuous inputs of energy and attention to maintain or improve the order and structure in a firm’s value-creation process.
2. *Systemic*: a firm’s competence must be able to manage the coordination of the firm-specific assets (within the boundaries of the firm) and the firm’s addressable assets (assets that are beyond the boundaries of the firm through the interactions with other firms).
3. *Cognitive*: a firm’s competence in enabling managers to be able to ascertain and assure that the deployment of a firm’s assets needed to carry out the strategies of the firm and to create value in targeted markets are managed effectively and efficiently.
4. *Holistic*: a firm’s competence in recognizing a firm’s goal achievement through the collective coordination of the interest of its multiple stakeholders.

Built upon the above competence notion and the framework of five competence modes, this section highlights how the environmental selection influences the managerial intentionality, how the managerial intentionality in turn influences the environmental selection, and how these combined forces influence the five competence modes (the right hand side of Table 3.2). The measures of competences are built upon the five competence modes developed by Sanchez and Heene (2002) and Sanchez (2004). The arrow of *managerial intentionality*, for

instance, suggests that the impact of managerial intentionality on building a firm’s coevolutionary competence increases from competence mode 5 (operating flexibility) to competence mode 1 (cognitive flexibility regarding alternative strategic logics). Due to the nature of the first competence mode i.e. cognitive flexibility to define alternative strategic logic, managerial intentionality is most clearly associated with competence mode 1. Likewise, the arrow of the *impact of environmental selection* on the respective competence modes indicates the increasing impact of environmental forces in selecting organizational competence from competence mode 1 to competence mode 5. Environmental selection pressures are most clearly revealed in, and will have the most direct impact on competence mode 5. The interplay between both impacts (arrows) will enable the development of coevolutionary competence over time.

Table 3.2: Coevolutionary competence and a firm’s competence modes

Source: Competence Modes: Sanchez and Heene (2002) and Sanchez (2004)		This Chapter	
Competence mode	Source of competence mode	Impact of managerial intentionality increases from competence mode 5 to competence mode 1; while Impact of environmental selection increases from competence mode 1 to competence mode 5	
1	Cognitive flexibility regarding alternative strategic logics	H ↑	↓ L
2	Cognitive flexibility regarding alternative management processes	↑	↓
3	Coordination flexibility regarding resource chains	↑	↓
4	Resource flexibility regarding range of uses in operations	↑	↓
5	Operating flexibility regarding the skills and capabilities of resources	L ↓	↓ H

Note:

- **H (high):** increasing influence of either the managerial intentionality or the impact of environmental selection on respective competence modes.
- **L (low):** decreasing influence of either the managerial intentionality or the impact of environmental selection on respective competence modes.

Still in the context of the competence-based approach, Sanchez and Heene (2002) and Sanchez (2004) highlighted the importance of using an adaptive open system – a system that promotes strategic options of how competences are built or can be changed within an organization. It also results in a form of flexibility that

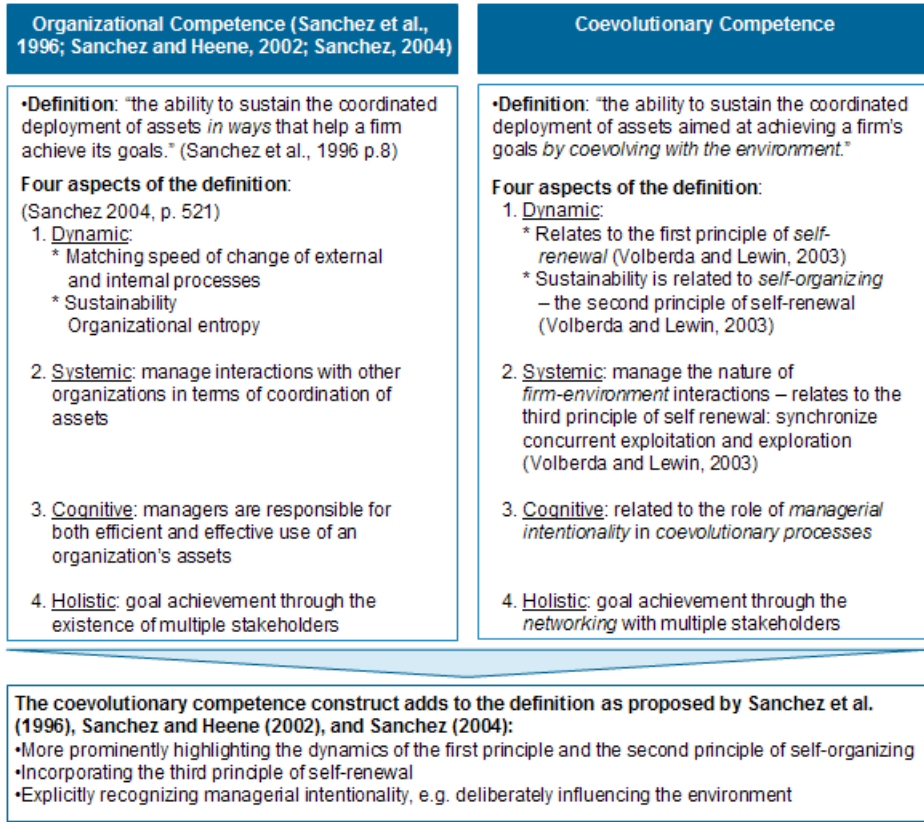
allows an organization to respond to the changing opportunities and threats in its environment. As we shall see later in the discussion of the empirical case studies, long-lived firms seem to exhibit such characteristic of an adaptive open system through their dynamic adaptability.

Similarly, Thompson (1967) pointed out that a truly open- or natural-system model does not take the environment as given, and does not assume a completely known or controllable internal structure. Instead, organizations are loosely coupled systems and thus it is possible for them to change at the level of specific activities or components. Sometimes organizations merely react to environmental selection, whereas in other instances organizational members are active in managerial intentionality with the purpose of challenging the environment and perhaps even reshaping it. This is the key notion of coevolution which is defined as “the joint outcome of managerial intentionality, environment, and institutional effects” (Lewin & Volberda, 1999, p. 526).

Altogether, long-lived firms need not only possess competences as defined by Sanchez et al. (1996). To understand these firms, we suggest extending the definition of competence as a result of a distinctive kind of organizational flexibility to respond to changing and diverse environmental conditions, such as evolving market demands, technological change and competitive developments in an industry. The extended definition also has to address how collective action on the part of the firms molded the social and institutional environment in which firms operate (Murmann, 2003). The interaction between managerial intentionality and environmental selection as depicted in Table 3.2 in combination with the definition of competence introduced by Sanchez et al. (1996: 8); inspires us to coin the construct of *coevolutionary competence* defined as: the ability to sustain the coordinated deployment of assets aimed at achieving a firm’s goals by coevolving with the environment. In a sense, a coevolutionary competence enables sustained strategic renewal i.e. longevity. Figure 3.2 depicts a coevolutionary competence framework.

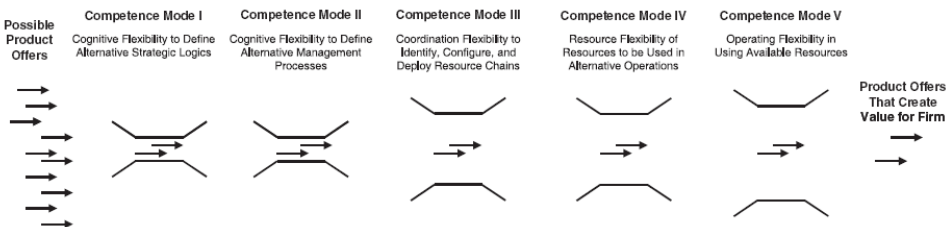
Coevolutionary competence includes the ability to respond to the dynamic nature of an organization’s external environment and of its own internal processes. Firms must carefully manage their activities that collectively contribute to achieving organizational competence, interactions of different kinds and levels of these activities that are critical to the process of competence building (exploration) and leveraging (exploitation). To achieve this, they can use various organizational means, among others strategic architecture, concepts, tools, techniques and models a firm uses in combining resources and capabilities to build and leverage organizational competences (Hamel & Heene, 1994). Accordingly with respect to these arguments, we suggest that firms developing coevolutionary competence use the joint impact of both managerial intentionality and environmental selection on their competence modes to implement the three key principles of self renewal (Volberda & Lewin, 2003).

Figure 3.2: The coevolutionary competence framework



Developing a coevolutionary competence enables a firm to continuously *balance* the adequate strength of each competence mode. This ability is of paramount importance since as suggested by Sanchez (2004, p.528) any competence mode whose flexibility is not actually used is likely to diminish over time to a level that can cause a potential *bottleneck*. This bottleneck may limit the overall competence of the organization. To illustrate this bottleneck effect, we recaptured one figure from Sanchez (2004: 529 - Figure 2(b)) in Figure 3.3 below.

Figure 3.3: Competence profile with “bottleneck” in competences modes I and II



Source: based on Sanchez (2004, Fig. 2(b), p.529)

As depicted in Figure 3.3, firms having cognitive inflexibility at the top managerial level in competence modes I and II are confronted with bottlenecks that constrain the firm's overall potential for creating value. We assume, therefore, that in long-lived firms, due to the joint impact of both managerial intentionality and environmental selection on the competence modes, they are likely to be able to overcome such bottlenecks limiting their overall competence. This suggests that firms developing coevolutionary competence are able to decrease bottlenecks in organizational flexibility in their competence modes.

3.4 Illustrating Coevolutionary Competence: How Two Long-Lived Firms Strategically Renew Themselves

We conducted two case studies of The Hudson's Bay Company (HBC) and Royal Ten Cate (RTC) to exemplify how long-lived firms develop and deploy a coevolutionary competence as part of their life-sustaining and sustained strategic renewal strategy. Among the long-lived firms mentioned in the introductory part of this chapter, we eventually selected these two companies as our case study since they epitomize the long-lived firms that have confronted fundamental changes throughout their lifetime, such as regulatory changes or technological changes. In dealing with such changes, they are confronted with the two aspects of coevolution: managerial intentionality and environmental selection (refer back to Table 3.2). Nevertheless, the experience of both companies is not impeccable. Obviously, there were frictions between environmental selection forces and the firms' adaptation, but management took the lessons and reshaped their firms to refit with the dynamic changes in their environments.

Case Study Method

The case study method has been selected because in this chapter, we do not test existing theories and want to highlight the process dimension and the multi-directional causalities. This research approach aims at preserving the chronological flow to see which historical events are likely to lead to which consequences. By doing so, we illustrate how coevolutionary competence may contribute to new integrations beyond the initial conceptions. The two case studies of HBC and RTC have resulted from our study of the longitudinal historical data of the two companies ranging from 1800 to 2000 (Kwee, 2004). Both companies were established before the year 1800. However, we considered the wide range of the period (1800-2000) as substantial enough for our early attempt to retrieve the long list of historical data that is either unavailable or incomplete during some of the periods. To start with, we briefly present the company profile of HBC and RTC as shown in Table 3.3.

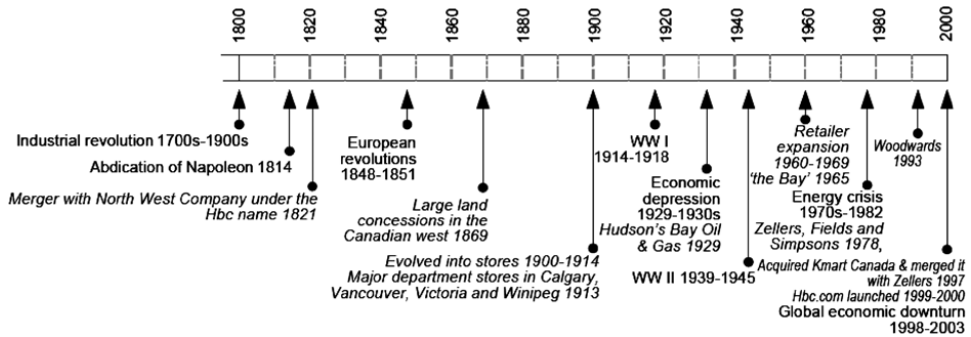
Table 3.3: Brief company profiles of HBC and RTC

Company	Year of Origin	Brief Profile
The Hudson's Bay Company (HBC) – www.hbc.com	1670	Founded in 1670 as a fur trading company, HBC is Canada's oldest corporation. Today, it is also Canada's largest department store retailer. The Company provides Canadians with the widest selection of goods and services available through numerous retail channels including more than 500 stores led by the Bay and Zellers chains. Hudson's Bay Company is Canada's fifth largest employer with 70,000 associates and has operations in every province in Canada. Its 2003 annual revenue was USD 4,830.5 million.
Royal Ten Cate (RTC) – www.tencate.com	1704	The earliest written announcements concerning the activities of Royal Ten Cate date from 1704 as one of the Dutch textile producers. Today, Ten Cate is active in two sectors: Technical Textiles and Technical Components. Operating in 15 countries and four continents, the company creates textiles and materials that people use for a wide range of purposes, from strong and light aerospace materials to antiballistic fabrics and flame-retardant fabric coatings. The company also manufactures textiles and other materials used in civil engineering, agriculture, fashion, and artificial turf. As of the fiscal year which ended in December 2002, the company had around 3,278 employees and USD 631.1 million of annual sales.

At first, the historical data was mainly collected from the archive section of the company's website. For a cross-check and verification purpose, this is then followed by a contact with the archive departments at HBC and RTC. Our contact persons at the archive departments at both HBC and RTC then read and verified the existing data as well as provided us with additional historical data. The subsequent analyses are thus based on the historical case studies, guided by the five competence modes.

Strategic Renewal of The Hudson's Bay Company (HBC)

The Hudson's Bay Company (HBC) states explicitly in its Corporate Statement that it exists to provide Canadians with the widest selection of goods and services. HBC, which just celebrated its 338th anniversary on May 2, 2008, has been a name Canadians can trust. It has a unique position in the country and a unique relationship with its customers. It is committed to building that relationship and earning that trust every day. Figure 3.4 below presents the company's timeline.

Figure 3.4: HBC's company time line

Note: *Italic fonts: firm-specific historical events*; regular fonts: global historical events

Early Years

For many centuries since its incorporation on May 2, 1670, the Hudson's Bay Company (HBC) enjoyed the stability of its monopoly. With the fur trading going well and its monopoly secured, HBC had settled into somewhat complacent daily routines – trapping, shipping and selling (its core competence at that time) – it no longer had ambitions in the field of exploration. This complacency caused the company to become less sensible to business signals from the environment in its early years (*Competence trap*). The company could not, for instance, take cognizance of the threat of other parties who were not satisfied with its privilege of the Royal Charter and could not adopt a good approach of negotiation and compromise. This situation continued until the company was forced to change by the Deed of Surrender in 1870 where it had to transfer much of its lands back to the Crown. HBC was *forced* to make the transition from being “absolute Lords” with exclusive trading rights to merchants in a newly opened pioneer land. The Deed of Surrender opened the company's eyes to the many new opportunities that it could exploit, such as the increasing demands from the Canadian settlers that opened up many channels to supply and deliver goods to them. Being able to learn from this situation, HBC took the appropriate action to fulfill this new demand.

The 1800s

The company's situation in the 1800s was changing since there was an emerging need to cooperate with external parties. One example is the union of HBC and the North West Company (previously HBC's most vigorous competitor), which later resulted in a merger in 1821. This union brought about a stronger and more complete Hudson's Bay Company with the additional valuable resources from the North West Company: its traders and voyageurs.

In the 1840s, a series of problems foreshadowed the beginning of the end for the HBC Charter. Despite being under the attack of pressures and protests, the company still showed its willingness to cooperate with the British Parliament for the review of its Charter that began in May of 1859. This situation persisted until the Deed of Surrender in 1870.

Immediately after the Deed of Surrender, the Hudson's Bay Company established a Land Department to sell its land holdings to settlers, farmers, and developers. This is an indication of the company's willingness and ability to start building its network of cooperative relationships and further *co-evolve* with these stakeholders (cf. Sanchez, 2004) in the changing circumstances of Canadian inlands at that time. From the 1870s period onwards, HBC collaborated with Canadian Pacific Railway to build better delivery nodes to reach its customers in a step towards the realization of its ambition to be a closely-linked, stable commercial enterprise. This gradually caused HBC to begin to evolve into its present form as a consumer retailer. This started with the company's emergence into the early telecommunication business, as when over two million people settled to the west of the Great Lakes, Canada used the telegraph wires provided by HBC and the famous Canadian Pacific Railway. This strategic movement stretched HBC's way across the country through the former rich fur-trading lands of the company. Furthermore, the described changing signals also made it realize that it needed to expand its interests to meet the demands of a new breed of customer – the settler. It then began a wholesale department along with a large chain of HBC retail stores that became an important part of the daily lives of the settlers in the Canadian west.

The 1900s onwards

With the outbreak of World War I in 1914, the Hudson's Bay Company was called upon to engage in the most important duties in its history. This call made the company adjust its business models to become a vast system of steamship services for the transportation of food and munitions to France and later Russia.

When the War ended in 1918, HBC resumed its plans and actions exceptionally well in establishing a network of cooperative relationships. Some evidence: in 1925, HBC opened the great fur trade headquarters and auction house named Beaver House in London England; it opened wholesale offices in Paris and New York and accordingly built more supply chain partners; in 1927 the HBC collaborated with Continental Oil to investigate the very profitable business of oil exploration, via shared and received intelligence.

In the 1940s, HBC's adaptability decreased. This was mainly because of the inability of the company to sense the changing environment of the Depression in the 1930s and hence it decided not to be too aggressive as in the previous benign period. The outbreak of the Second World War, however, did not influence the company as much as in the first war as it had gained experience from the previous war. After the war ended and the situation was restored to normal, HBC continued

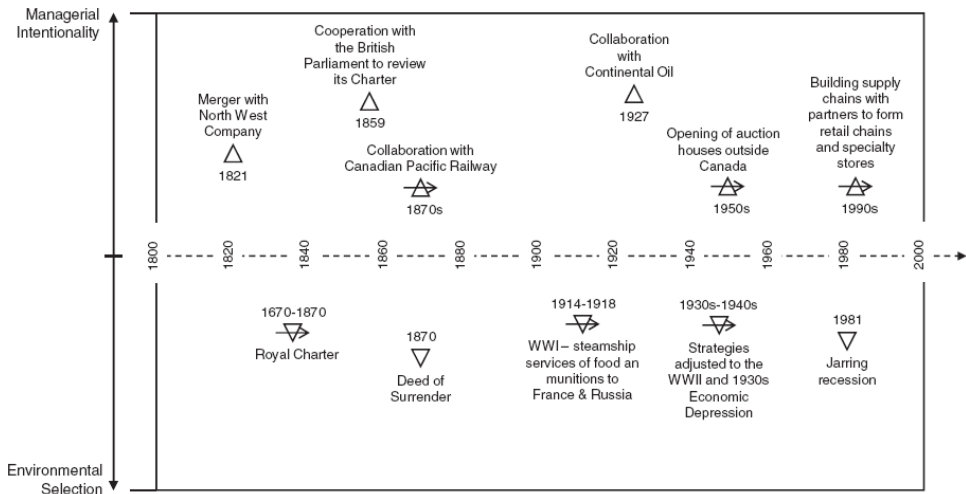
to undergo major changes. The evidence showed, for instance, that it exploited its experience in interpreting the demand for fur outside Canada and consequently formulated its strategy to open the Company's auction houses in Montreal, New York and London. The auction houses enabled the large quantities of furs, which were collected by the Fur Department, to be sold on consignment.

The jarring recession of 1981 derailed the company's ability to reinvent its business model as required by the signal of change it received. Nevertheless, the company was able to recover from the recession. Since then, it has managed to build a strong supply chain with its partners to support its largest department store retail chains and specialty stores. The other lesson the company kept in mind is not to be too aggressive in expansion as it could be both costly and risky. In the twenty first century, HBC is a thriving company, as it was back in the seventeenth century.

HBC's Strategic Renewal Trajectory: Interactive Forces of Managerial Intentionality and Environmental Selection

Reflecting on the chronological history of HBC, we summarize the strategic renewal trajectory of HBC in terms of the company's coevolutionary competence as the dual role of managerial intentionality and environmental selection as presented in Figure 3.5. The diagram in the figure shows how HBC has developed its coevolutionary competence over time as a joint outcome of intentional adaptation directed by its management and environmental selection.

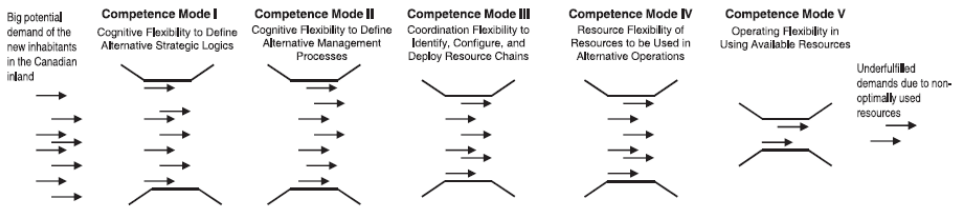
Figure 3.5: HBC's strategic renewal trajectory snapshot



In the early 1800s, for instance, when the company was still operating under the Royal Charter, through the initiative of its management, HBC made a significant decision to merge with its strongest competitor – the North West Company – in 1821. This was then followed by the managerial movement to

cooperate with the British Parliament to review its Royal Charter which led to the Deed of Surrender in 1870. Soon afterwards, HBC's top management collaborated with the Canadian Pacific Railway to explore the big potential demand of the new inhabitants in the Canadian inland and this signifies its first managerial movement after the company gave up its Royal Charter. In realizing this initiative, however, the company experienced a bottleneck effect at the operating flexibility level (please refer to Figure 3.6) in using its resources to cater for the new demand.

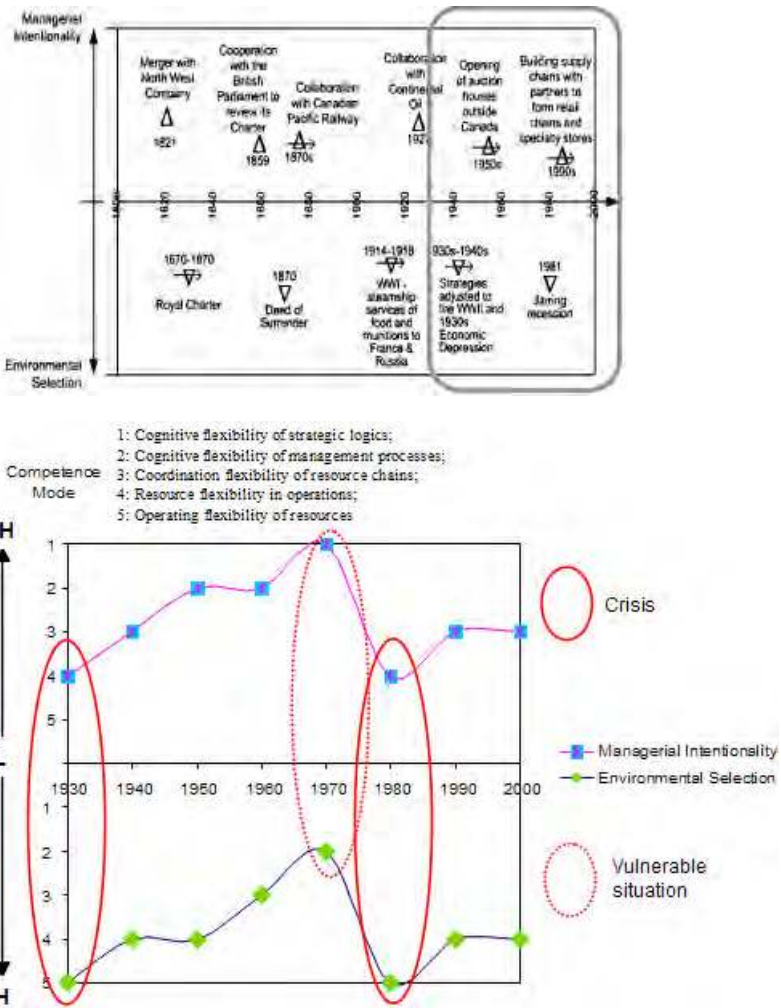
Figure 3.6: Bottleneck in the operating flexibility level during the HBC's management initiative in exploring new market through the collaboration with the Canadian Pacific Railway in the 1870s



Nevertheless, the company's management eventually managed to solve this bottleneck issue through the gradual improvement it made due to its experiential learning throughout the partnership periods with the Canadian Pacific Railway. This brings us back to one of the essential feature of coevolutionary competence that a firm developing the coevolutionary competence realizes the importance of balancing each competence mode over time to decrease the bottleneck effects when dealing with changes in the environment.

In the 1900s, HBC managed to navigate through the ebb and flow of external selection forces related to the First and Second World Wars, the Economic Depression in 1930s, and the Jarring recession in 1981 through the strategic directions of its management such as the collaboration with Continental Oil in 1927, exploring fur markets outside Canada by opening auction houses in the 1950s that further led to the company's transformation into a retail chain nowadays. Such success, however, was not easily achieved. If we take a closer look at HBC's renewal trajectory by zooming in on the joint outcomes of managerial intentionality and environmental selection from 1930 to 2000 as depicted in Figure 3.7, we can notice that the crises happened when HBC did not perform well in balancing its managerial intentionality with the environmental forces. The scales in Figure 3.7 are based on the five competence modes. As depicted in Figure 3.2 previously, due to the nature of the first competence mode, the impact of managerial intentionality is increases from the competence mode 5 (low) to 1 (high). On the contrary, the impact of environmental selection increases from competence mode 1 (low) to 5 (high).

Figure 3.7: Zooming-in on HBC's renewal trajectory (1930-2000)



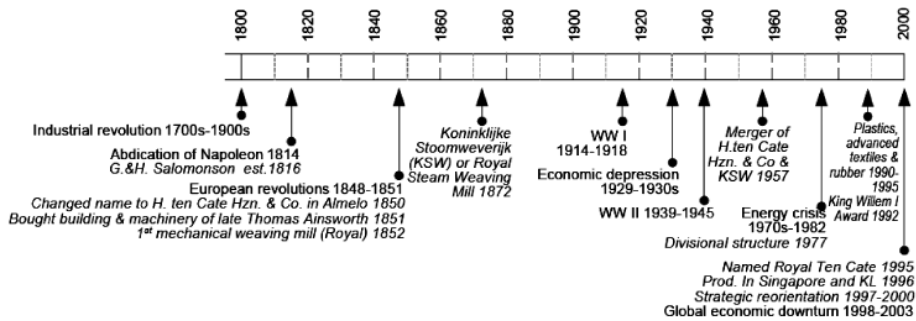
For instance, during the Economic Depression in the 1930s and the Jarring recession in the 1980s when the environment became disruptive, HBC encountered turbulences that were difficult to counterbalance with its strategies. By almost the same token, during the 1970s HBC was in a vulnerable situation where it was too aggressive in its strategic acquisitions that exacerbated the crisis of 1981. Noticeable is that other than the crises and vulnerable periods, i.e. when HBC managed to balance its managerial intentionality with environmental forces, it experienced positive changes and growth. From the 1990s onwards, for instance, HBC continued to strategically establish strong supply chains with its partners and the efforts seem to have paid off as HBC nowadays has become one of the largest retail chains in Canada.

In conclusion, our analysis indicates that during significant changes bottlenecks (Sanchez, 2004) occurred in HBC's competence modes when the firm was not able to streamline the strategic initiatives at each level of the competence mode. Balancing the level of flow at each competence mode is of importance in helping the company to sustain its survival and its renewal trajectory. Moreover, when the environmental changes became disruptive there were periods when HBC's management restrained its intentionality or, when the level of its managerial intentionality was too aggressive in times of less turbulent environment, the company were in a critical or vulnerable situation. This situation suggests that it is essential that the company balance its managerial intentionality with environmental selection over time.

Strategic Renewal of Royal Ten Cate (RTC)

In its Corporate Statement, Royal Ten Cate states that it seeks to achieve international leadership in niche markets on the basis of technological commitment and innovative capacity. The company focuses on materials with functional characteristics in the field of safety and protection (people and the environment), durability and specific technological and/or quality features. It values its employees by investing in their development potential for the transfer of expert knowledge (Kwee, 2004). The company timeline is presented in Figure 3.8.

Figure 3.8: RTC's company timeline



Note: *Italic fonts: firm-specific historical events*; regular fonts: global historical events

Early Years

The historical archive of RTC in the early years is incomplete. Thus, the explanation of the company's experience during its early years is very limited. However, it is indicated that the company started with a small steam weaving mill with a trial-and-error method, *do-first-and-see-what-will-happen* approach. This helped it learn to become stronger as it moved forward.

The 1800s

The period of 1800-1820 was still an explorative period for RTC in which it was only a commercial agent in the linen industry. At that time, the company was uncertain of the boundaries of its existence and even its *raison d'être*. It kept trying and using the traditional and conventional methods of the textile business without having a clear long-term vision. The operation was more or less static – it purchased yarns, distributed them among peasants (who processed them at home) and then sold the linen fabrics both at home and abroad. Such a pattern of repetitive actions suggests that the company simply presumed that its business environment was more or less static. During this period, the company's cooperative relationships were limited only to the peasants, a few trading partners, and the local authority such as the *Provincial Council of Overijssel*. This network was a narrow one with no commitment to sharing knowledge. Thus, being in the routine daily operation, the company was not very keen on learning.

The period after 1830 was the beginning of change for RTC. In 1834, it was named H. ten Cate Hzn. & Co and in 1841 the firm switched to industrial textile production. During this early development, the company learned a lot (from the past) about weaving mills and further started up the Holland Steam Weaving Mill in 1860 (took effective actions based on past lessons).

The period 1840-1860 was a period of increasing sensibility at RTC. Specifically in 1841, the firm was able to receive a signal regarding the potential need for industrial textiles with the advancement of weaving equipment at that time. Based on this signal, the firm switched to industrial textile production when it took over the almost bankrupt weaving mill of J.P. Lorey. Beginning around the 1850s, RTC became more cooperative with other stakeholders. The company joined forces with Twente entrepreneurs to eliminate the disadvantages of their region's geological barriers to trade and expansion. Together they contributed money for building canals (1855) and a rail network (1866) in their region. The company also joined the lobbying forces in the NV *Twentsche Stoombleekerij* (Tweente Steam Bleaching Works) in Goor (1857) to cut out the bleaching plants in Haarlem. Eventually, these partnerships did not continue and were not very relevant for its next phase of development.

The first mechanical weaving mill was set up in 1852 and RTC (at that time, its name was *H. ten Cate Hzn. & Co.*) was conferred with the designation of 'Royal'. With this progress, it had a stronger resolve to forge ahead. This was then followed by the creation of *Koninklijke Stoomweverij* (KSW) or Royal Steam Weaving Mill in Nijverdal in 1872. Later on, the industrial textile initiative was expanded into the Holland Steam Weaving Mill (with about 160 power looms) the building of which had begun earlier. In 1891, the Tubantia Weaving Mill was opened and in 1898, the Java Weaving Mill was taken over.

The 1900s onwards

In 1912, when the *Indië* (East Indies) complex was started up, the company was adapted to the industrial textile environment in Almelo which was indicated by its opening of the Tubantia Weaving Mill and Java Weaving Mill. However, in the period after 1910 to the second half of the 20th century (1950s), the decline of the Dutch textile industry went unnoticed by RTC. At this time, markets became more demanding and a number of formidable competitors appeared on the scene. Cut-throat competition grew both at home and abroad, mainly as a result of international supply capacity. There was also the need to increase work productivity by means of ongoing automation and to conquer new markets. Due to being less sensitive, RTC suffered as a result. In the 1950s, RTC became less adaptable because it could not learn from the changing environment of tougher competition. The company was not fast enough to adopt ongoing automation to increase its work productivity and conquer new markets.

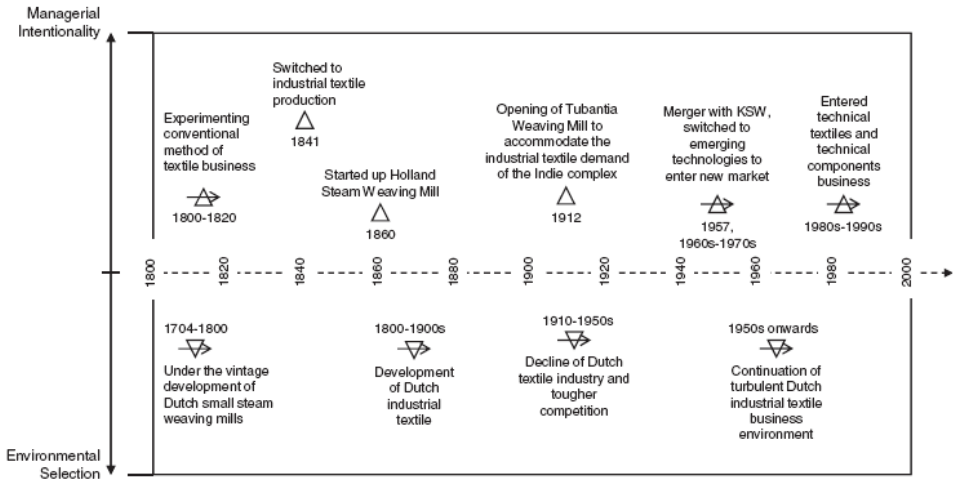
Fortunately, at the end of the 1960s and the beginning of the 1970s, the company was able to create a new perspective through the extensive restructuring of its industry. RTC made a timely switch-over to other technologies, raw materials and applications which enabled it to manage the entry to new markets. Moreover, prior to that, RTC demonstrated a fairly new ability to benefit from interdependencies in the 1950s when its partnerships with KSW became stronger which further led to the merger in 1957. At that time, the businesses of both KSW (*Koninklijke Stoomweverij*) and H. ten Cate Hzn. & Co. resembled each other, in both production processes and products. Therefore, their paths kept crossing. The co-evolution at this stage was not yet fully apparent since it had just begun.

In 1977, the divisional structure was introduced and later even transformed to a decentralized group structure in 1990. Although the company continued to face a turbulent period in the industrial textile business environment, through ongoing internationalization and differentiation, it grew in the 1980s and 1990s into an industrial company in technical textiles and technical components. One of its technical components named *Bryte* materials was later used in NASA's satellite for the *Beagle II* and the *Mars Exploration Rover* missions.

RTC's Strategic Renewal Trajectory: Interactive Forces of Managerial Intentionality and Environmental Selection

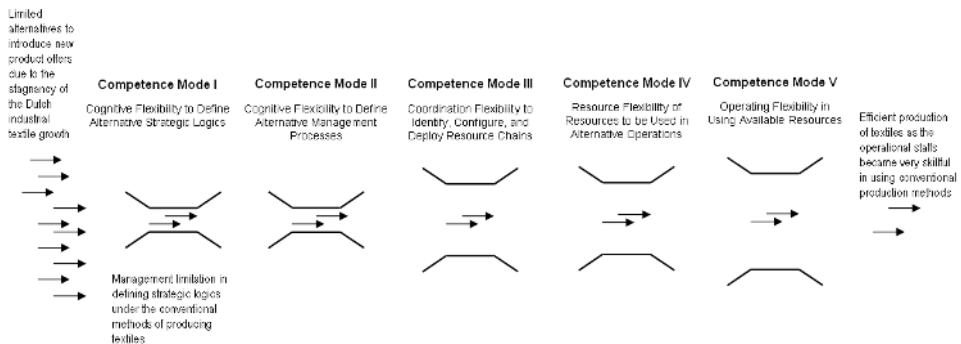
Likewise the previous summary of HBC's strategic renewal trajectory, illustrates the strategic renewal trajectory of RTC as a result of both managerial intentionality and environmental selection which shows the development of its coevolutionary competence.

Figure 3.9: RTC’s strategic renewal trajectory snapshot



As we can see in the diagram, when RTC was still operating under the traditional environment of the Dutch steam weaving mills industry in the early 1800s, to a large extent its management took the initiative to experiment with various conventional methods of textile production. The workers became very skillful and could produce textiles in an efficient way. The management, however, faced the limitation and continued to perceive strategic opportunities to create new product offers as the company was operating in a relatively stable and even stagnant environment. As a result, the bottleneck occurred at the top management level in terms of the cognitive flexibility to define strategic logics. Figure 3.10 below illustrates this bottleneck effect.

Figure 3.10: Bottleneck in the cognitive flexibility at the RTC’s top management level due to the Stagnancy of the Dutch Industrial Textile Growth during 1800s-1900s

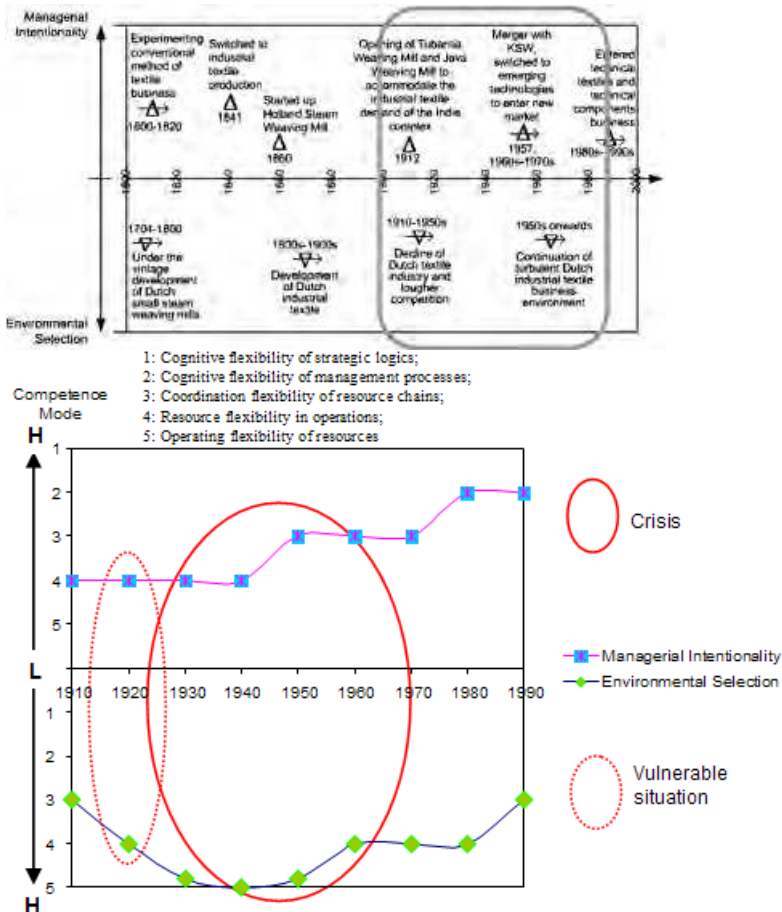


When the company underwent changes in the development of Dutch industrial textiles in the 1800s to 1900s, RTC subsequently took strategic action to switch to industrial textile production and establish three weaving mills – the Holland Steam Weaving Mill, the Tubantia Weaving Mill, and the Java Weaving Mill. This is an indication of the timely adaptation of RTC to the changing

circumstances in the Dutch textile business and the potential textile demand when the Indie complex was opened. Simultaneously, such strategic adaptation also enabled the company to tackle the previous bottleneck effect and thus managed to move the company to the next stage of development.

Starting from 1910, the Dutch textile industry experienced declining growth and turbulent competitive environment. By zooming in on the period 1910 to 1990 (as shown in Figure 3.11), we can see that RTC started experiencing difficulties at the end of the 1910s as the environment became harsh. The situation worsened when it could not increase the level of its managerial intentionality. This led to a crisis from 1930s until the end of 1950s. Starting at the end of the 1960s the company managed to counterbalance the environmental forces with its strategic actions. Among other reasons through its management initiative, RTC merged with KSW, adopted new technologies to extend its competence to the manufacturing of technical textiles and technical components. This reiterates the importance of a firm to dynamically balance its managerial intentionality with environmental forces to its sustained strategic renewal.

Figure 3.11: Zooming-in on RTC’s renewal trajectory (1910-1990)



To sum up, the abovementioned analysis leads to the conclusion that like HBC, RTC also encountered a period when bottlenecks (Sanchez, 2004) occurred in its competence mode flows, i.e. during the stagnancy of the Dutch industrial textile growth. The difference here is that RTC experienced the bottleneck in the cognitive flexibility (i.e. competence mode 1) rather than operating flexibility (i.e. competence mode 5) as in HBC's case. The experience of RTC afterwards reiterates that streamlining the flow at each competence mode is crucial for the firm's strategic renewal. In comparison to HBC, whose environmental turbulence is more varied across periods, RTC was in a relatively constant turbulent environment during the 1900s. Due to the slow adjustment of its level of managerial intentionality with the level of environmental selection, RTC experienced critical situations during longer periods (Figure 3.11: 1920s-1960s) than HBC. However, when the company managed to match the level of environmental selection, it emerged to move to the new renewal stage.

3.5 Discussion and Conclusion

The idiosyncrasy of long-lived firms lies in their puzzling ability to strategically renew themselves over time. Conjoining the three key principles of self-renewal from the coevolutionary framework (Lewin and Volberda, 2003) and the five competence modes in the competence-based management framework (Sanchez et al., 1996; Sanchez & Heene, 2002; Sanchez, 2004), this chapter contributes to a more encompassing perspective on corporate longevity that takes into account both internal and external aspects of long-lived organizations and how these organizations cope with the forces in their environments.

Focusing on the competence of long-lived firms, we coin the construct of coevolutionary competence in this chapter. We define this construct as 'the ability to sustain the coordinated deployment of assets aimed at achieving a firm's goals by coevolving with the environment.' Based on a coevolutionary framework (Figure 3.2), we propounded two major themes. The first one deals with the importance of the interaction between managerial intentionality and environmental selection for firms to develop coevolutionary competence in the implementation of the key principles of self-renewal. Second, we also suggest that firms developing coevolutionary competence are able to decrease bottlenecks in the organizational flexibility of their competence modes.

To illustrate the coevolutionary competence construct, we employed two longitudinal case studies: The Hudson's Bay Company (HBC) and Royal Ten Cate (RTC) in the period 1800-2000. Figure 3.5 and Figure 3.9 illustrate how both companies have developed their coevolutionary competence through the interactive forces of managerial intentionality and environmental selection. In investigating and illustrating bottlenecks in organizational competence of both firms, Figure 3.6 and Figure 3.10 show, for example, that when HBC encountered a bottleneck regarding its operating flexibility in the 1870s or when RTC encountered a bottleneck regarding its cognitive flexibility during the 1800s-1900s, both companies managed to solve the bottleneck problems by re-balancing each competence mode over time.

In this chapter, we have also looked at the five competence modes introduced by Sanchez & Heene (2002) and Sanchez (2004) from the coevolutionary perspective (Lewin & Volberda, 1999). The levels of analysis, however, can take place beyond the firm-level analysis as demonstrated by what we have done in this chapter. While this chapter presents two longitudinal case studies, we have not fully addressed the influence of the institutional environment or other macro-level environmental forces. This requires research examining the macro environmental influences on the coevolutionary competence of long-lived firms (cf. Flier et al., 2003). We will incorporate the analysis of environmental dynamism in chapter eight when we investigate the first key principle, i.e. managing the internal rate of change to match or exceed the external rate of change.

In sum, we have demonstrated that the construct of coevolutionary competence can be useful for investigating sustained strategic renewal of long-lived firms. The longitudinal illustration of the two long-lived firms (HBC and RTC) posits that firms that continually renew themselves have a better chance to last for a long time. What is more, coevolutionary competence empowers firms to undergo significant internal long-term transformations. As a result, long-lasting firms stay vital by resisting decay. Coevolutionary competence raises the awareness of management to focus on the three principles of self-renewal. This is because the construct suggests that firms developing coevolutionary competence use the joint impact of both managerial intentionality and environmental selection on their competence modes to implement the three key principles. To achieve this, firms need to focus on managing requisite variety by regulating internal rates of change to equal or exceed relevant external rates of change. This will be discussed in Chapter 8. Furthermore, firms should constantly strive to optimize self-organizing. Chapter 9 will investigate the self-organization construct. Finally, coevolutionary competence also means that firms are required to manage the tension between innovation (exploration) and adaptation (exploitation) through a dynamic adaptation to the changing environments, i.e. maintaining a balance between both. We will investigate this in Chapter 10. Lacking managerial

intentionality to cope with such challenges will result in not being able to coevolve with the environment. Obviously, these challenges are not easy.

To conclude, in this chapter we have addressed the first research question of how firms develop their competences to strategically renew themselves over time by illustrating the coevolutionary competences in the two long-lived firms. In the next chapter, we explore the three key principles of self-renewing organizations from an adaptation perspective. In this case, we focus in more depth on the organizational learning perspective to understand how large incumbent firms learn and adapt over time through learning stages and processes within the context of changing knowledge environments.

4. Exploring Three Key Principles from an Adaptation Perspective^{*)}

4.1 Introduction

In Chapter 3, we have explored the three key principles of self-renewing organizations from a coevolutionary perspective. In this chapter, we further explore the three key principles by focusing in more depth on an adaptation perspective, i.e. through the organizational learning perspective. By the same token, we also address the second research question in this PhD research of how firms learn and adapt in the context of changing knowledge environment. We start with a brief discussion of the prior research on organizational learning.

The diverse theories of organizational learning (e.g. Cyert & March, 1963; Duncan, 1974; Argyris & Schön, 1978; Jelinek, 1979; Miles & Snow, 1978; Shrivastava, 1983) demonstrate that learning has been an extant concept. As pointed out by Fiol and Lyles (1985), no theory or model of organizational learning has widespread acceptance. The subject is studied from different perspectives, leading to more divergence and confusion. Apparently, several constructs such as distinctive competence (Selznick, 1957), organizational routines (Nelson & Winter, 1982), absorptive capacity (Cohen & Levinthal, 1990; Van den Bosch et al., 1999; Jansen et al., 2005), architectural knowledge (Henderson & Clark, 1990), combinative capabilities (Kogut & Zander, 1992), dynamic capabilities (Teece et al., 1997; Eisenhardt, 2000; Jansen et al., 2009), competence-based management (Sanchez et al., 1996), and coevolutionary competence (Kwee et al., 2008) are among others introduced in this related line of research.

Furthermore, scholars' examination of organizational learning literature shows that this research landscape is "sparsely populated" (Huber, 1991, p. 107), "fragmented and multidisciplinary" (Shrivastava, 1983, p. 9) and has not led to "research-based guidelines for increasing the effectiveness of organizational learning" (Huber, 1991, p. 108). The prior review of Levitt and March (1988, p. 327) also adds that "relatively little is known about the details by which organizational experience is accumulated into a structure of routines".

^{*)} This chapter is based on Kwee, Z., Van den Bosch, F.A.J., and Volberda, H.W. (2006). 'Conceptualizing learning principles of long-lived firms'. Paper presented at the 2006 Academy of Management Conference.

Despite the various approaches in studying organizational learning and adaptation, the results of the foregoing studies indicate that organizational learning is, to a large extent, vital to the long-term survival of firms particularly in the emerging and turbulent knowledge-intensive environments. Quite paradoxically though, Levinthal (1991) pointed out that only a small number of possible exemplars of research linking models of organizational learning with ecological analysis of organizational survival have been discussed. This issue indeed merits thorough investigation as the research on firm survival or corporate longevity has also increasingly drawn scholars' attention to the quest for understanding how long-lived firms have managed to sustain renewing themselves over time (e.g. Meyer & Zucker, 1989; Hall, 1997; Collins & Porras, 1999; De Geus, 1999; Huygens et al., 2001; Kwee, 2004; Stadler, 2007; Burgelman & Grove, 2007; Kwee et al., 2008).

This chapter attempts to address and mitigate the two abovementioned underexplored area in research on organizational learning resulting in two main contributions. First, we provide a more comprehensive understanding of learning processes and stages. In this respect, we attempt to address the issue of how an organization can become adaptive through all the connected learning behaviours and activities that it professes with respect to its environment (Fiol and Lyles, 1985; Huber, 1991). Second, building on this line of thought, we develop a framework that incorporates the contexts of knowledge environment and the types of action learning. By doing this, we focus on an adequate repertoire of learning that may provide a clearer linkage between organizational learning and organizational longevity.

This chapter is structured as follows. We start the first section with the purpose to clarify the issues of definitions by providing sound definitions of organizational learning and organizational longevity particularly since we refer to long-lived firms in this study. Chapter 4.3 captures the key contextual factors of time and environments as the interfaces between organizational learning and organizational longevity. In Chapter 4.4, we expound theories of organizational learning and the related notions of absorptive capacity, dynamic capabilities, competence-based management and coevolution. This is followed by a study of stages of organizational learning processes in Chapter 4.5. Subsequently, Chapter 4.6 discusses how firms learn and adapt over time considering the types of knowledge environment and action learning. Finally, we conclude this chapter by summarizing key findings and indicating possible directions for further study.

4.2 Organizational Learning Re-defined

Organizational scholars (e.g. Pfeffer, 1982; Mohr, 1982) view learning as holding a great theoretical promise in the organization science. They also hold the same assumptions that learning will improve future performance (Fiol & Lyles, 1985). By then, numerous definitions of organizational learning have been put forward in foregoing studies. For instance, Duncan and Weiss (1978, p. 84) define organizational learning as “the process within the organization by which knowledge about action-outcome relationships and the effects of the environment on these relationships is developed.” Likewise, Fiol and Lyles (1985, p. 803) suggest that organizational learning means “the process of improving actions through better knowledge and understanding”.

In an attempt to moderate the diverse definitions of organizational learning, which are too a large extent analogous, we propose the following definition of organizational learning: *the process by which an organization takes into account environmental and its internal conditions to abstract, create, and develop knowledge and subsequently assimilate, implement, evaluate, and reconfigure the knowledge based on the action-outcome relationships.*

The notion of knowledge is profound in the definitions of organizational learning. Organizations accumulate knowledge by learning from their members, their customers, their suppliers and business partners, and even in some cases from their competitors (March, 1991) which, to re-emphasize, demonstrates a process. The accumulated knowledge is stored as organizational sources/stocks of knowledge in the format of procedures, norms, rules, and forms.

4.3 Temporal and Environmental Contexts of Organizational Learning and Adaptation

Explaining both organizational learning and longevity demands a *dynamic* perspective to study how a firm learns and develops over time to adapt to the *environment* (cf. Lewin & Volberda, 1999). The content of learning is profoundly connected to the timing and environmental conditions when and in which it is learned. Therefore, *time* and *environments* are inseparably linked as two contextual factors that are also essential for understanding organizational longevity across different historical periods and different social and physical environments.

Temporal Context

Penrose (1959) points out that “history matters”; growth is essentially an evolutionary process and based on the cumulative growth of collective knowledge, in the context of a purposive firm. Over time, firms age. Organizational age represents, on the one hand, accumulated stocks of knowledge and experience (Aldrich, 1999) and on the other hand, the increased organizational inertia (Hannan & Freeman, 1977; 1984; 1989). Inertia is a two-edged sword: (1) it is a prerequisite

for intelligent adaptation (Holland, 1975); and (2) it is a potential causality of firm rigidities (Leonard-Barton, 1992). In short, the temporal dimension implies long-lived firms are experienced but are also exposed to challenges of overcoming inertia and sustaining renewal.

To sustain renewal and increase the likelihood of survival, learning plays a crucial role. This assertion, according to Levinthal (1991), may stem from two basic properties of organizational learning. First, learning is typically reflected in the enhancement of an organization's competence at its current activities and in the accumulation of skills and knowledge (Nelson & Winter, 1982; Cohen & Levinthal, 1990). Over time, greater competence and knowledge should lead to a lower risk of mortality. Second, learning reduces variation in performance and increases a firm's reliability. Reliability, in turn, forms the basis of continuity in an organization's behavior over time (Nelson & Winter, 1982). This is also the basis of Hannan and Freeman's (1984, 1989) argument for the declining of organizational mortality with age due to the increasing reliability of organizational behavior over time.

The significance of time is also emphasized by Romanelli and Tushman (1986) in which they argue that if past organizational strategies have bearing on the present, the logical place to begin an investigation of the determinants of strategic change is the earliest phase of an organization's existence: its founding. The problem here is to map the past experience of long-lived firms into actions appropriate to the novel present. Organizational learning studies focus on this mapping process and provide structure insight into how a sequential stream of experience becomes the basis for action (Cohen & Sproull, 1991).

Environmental Context

Besides the temporal context, the sources of learning and longevity also lie on the interface between organizations and their environments. The amount of environmental change experienced by a firm, which is roughly coincided with its age, enhances the firm's learning experience (Caroll, 1983). Furthermore, to the extent that environmental changes are temporal, the age of a firm offers some indication of the amount of environmental variation it may have experienced (Boeker, 1989). Learning occurs in relation to the structuring resources of local conditions (Lave, 1988). Exogenous environmental change makes adaptation essential, but it also makes learning from experience difficult (Weick, 1979). Again, time is the challenge here: in particular the challenge to conjecture the right timing of changes in environmental characteristics like uncertainty, munificence, and concomitant changes (Boeker, 1989). To deal with this issue, learning tools such as environmental scenarios planning are introduced to create perception and differentiation and to see new environmental patterns (Van der Heijden, 1996).

Equally important, environmental dynamics is one of the key determinants in understanding the idiosyncrasy of long-lived firms since a more comprehensive analysis than the analysis of internal organizational characteristics is required. The

metamorphosis of long-lived/ self-renewing firms brings not only a different firm context but also a different environmental context (cf. Penrose, 1959). Thus, environmental factors have to be embedded in the analysis to lend a dynamic perspective on the subject of how a particular firm develops over time through its capability to adapt to and to influence the environment, including the role played by managerial intentionality (Lewin & Volberda, 1999).

4.4 Adaptation Perspective on Organizational Learning

In the context of learning, organizations are repositories of knowledge and can be explained as communities of shared knowledge and identity (Grandori & Kogut, 2002). A major rethinking of the sources of firm heterogeneity and competitiveness has also been endorsed based on the related theories of learning such as capabilities, competence, and knowledge (Coase, 1937). These characteristics are mentioned to make organizations become flexible and adaptive to changes (Volberda, 1998), even in turbulent conditions, and hence increase the likelihood of survival. Contemporaneously, mounting research on these integrated constructs of capabilities, competence and knowledge-related has proliferated, diverged at some issues and converged at other issues. Based on the review of the literature, we discuss three important theoretical constructs.

Absorptive Capacity and Dynamic Capabilities

Cohen and Levinthal (1990) define absorptive capacity as the firm's ability to recognize the value of new external knowledge, assimilate it and apply it to commercial ends. Since then, researchers (e.g. Van den Bosch et al., 1999, p. 551) have been intrigued by the question of "how does absorptive capacity influence the knowledge environment?" Building upon this question, the construct of absorptive capacity is later seen as a promising explanation of innovation (Jansen et al., 2005; Stock et al., 2001; Tsai, 2001), the exploration / exploitation trade-off (Lewin et al., 1999; March, 1991; Van den Bosch et al., 1999; Jansen et al., 2005; Mom et al., 2007), business performance (Lane et al., 2001; Tsai, 2001), intra-organizational transfer of knowledge (Szulanski, 1996), and inter-organizational learning (Lane and Lubatkin, 1998). Moreover to survive selection pressures, firms need to develop and improve its absorptive capacity. Firms with higher levels of absorptive capacity tend to outperform other firms in that they are more proactive and exploit current opportunities (Cohen and Levinthal, 1990; Van den Bosch et al., 1999).

Following the growing interest in the research of absorptive capacity, a conceptual distinction has also been made between potential and realized absorptive capacity (Zahra & George, 2002; Jansen et al., 2005). Potential absorptive capacity, which includes "knowledge acquisition and assimilation, captures efforts expended in identifying and acquiring new external knowledge and

in assimilating knowledge obtained from external sources” (Zahra & George, 2002, p. 189). Realized absorptive capacity, which includes “knowledge transformation and exploitation, encompasses deriving new insights and consequences from the combination of existing and newly acquired knowledge, and incorporating transformed knowledge into operations” (Zahra & George, 2002, p. 190). To sum, in their study of absorptive capacity, Van den Bosch et al. (2003) conclude that this construct, in both theory building and empirical research, is able to bridge and to enrich various related literatures, such as organizational learning and knowledge-based view of the firm.

In addition to the construct of absorptive capacity, scholars such as Teece, Pisano and Shuen (1997) and Eisenhardt and Martin (2000), suggest that the mechanisms by which firms accumulate and dissipate new skills and capabilities are crucial for their survival and are also the source of competitive advantage. They further propose the construct of dynamic capabilities defined as the firm’s latent abilities to renew, augment, and adapt its core competence over time. This idea leads to the view that knowledge is the most strategically distinctive resource of the firm (Leonard-Barton, 1992; Grant, 1996). Sharing the same line of thought, Lewin and Volberda (1999) propound that variation in performance results from environmental changes and from the firm’s dynamic ability to adapt through learning (Lewin & Volberda, 1999).

In an attempt to capture the richness and multidimensionality of the above concept, Cohen and Levinthal (1990) emphasized the importance of organizational mechanisms. These mechanisms may link dynamic capabilities with absorptive capacity (Jansen et al, 2005). Kogut and Zander (1992) proposed the construct of combinative capabilities which are path-dependent in their emergence and idiosyncratic in detail while simultaneously exhibit common features (Eisenhardt & Martin, 2000) that provides specific ways of dealing with dimensions of absorptive capacity. Jansen et al. (2005) discussed three types of combinative capabilities: (1) coordination capabilities; (2) system capabilities; and (3) socialization capabilities (cf. Van den Bosch et al., 1999, p. 556). Besides the absorptive capacity construct, the related construct of dynamic capability will be used in the subsequent analyses of this chapter.

Competence in Sustained Strategic Renewal Context

Senge (1990) and Hamel and Prahalad (1994) were among the first to define capability as a core competences of the learning organization. Competence is further defined by Sanchez, Heene and Thomas (1996, p. 8) as “the ability to sustain the coordinated deployment of assets in ways that help a firm achieve its goals”. They also introduce a competence-based management framework that aims to incorporate and integrate dynamic, systemic, cognitive, and holistic aspects of organizations through taxonomy of five competence modes (Sanchez & Heene, 2002; Sanchez, 2004). The model of the firm, in this case, is regarded as an open

system distinguished by specific forms of flexibility to respond to the changing circumstances in the environment. Analogously, long-lived firms seem to exhibit such characteristic of an adaptive open system through their dynamic adaptability.

Building on the competence-based management construct, Kwee, Van den Bosch, and Volberda (2005) coin the construct of coevolutionary competence defined as: the ability to sustain the coordinated deployment of assets aimed at achieving a firm's goals by coevolving with the environment. They argue that coevolutionary competence enables sustained firm renewal or longevity. This construct matches the growing need in the field of strategy research that focuses on the tension between the internal processes by which firms in their competitive regimes of rapid change renew their capabilities and strategies and simultaneously have to adapt to meet the challenges for the future (e.g. Baden-Fuller & Stopford, 1992; Teece et al., 1997; Volberda, 1998). March (1991) conceptualizes this tension as the exploration/ exploitation trade-off firms face. He associates exploration with search, variation, experimentation and innovation; whereas exploitation is associated with refinement, efficiency and application.

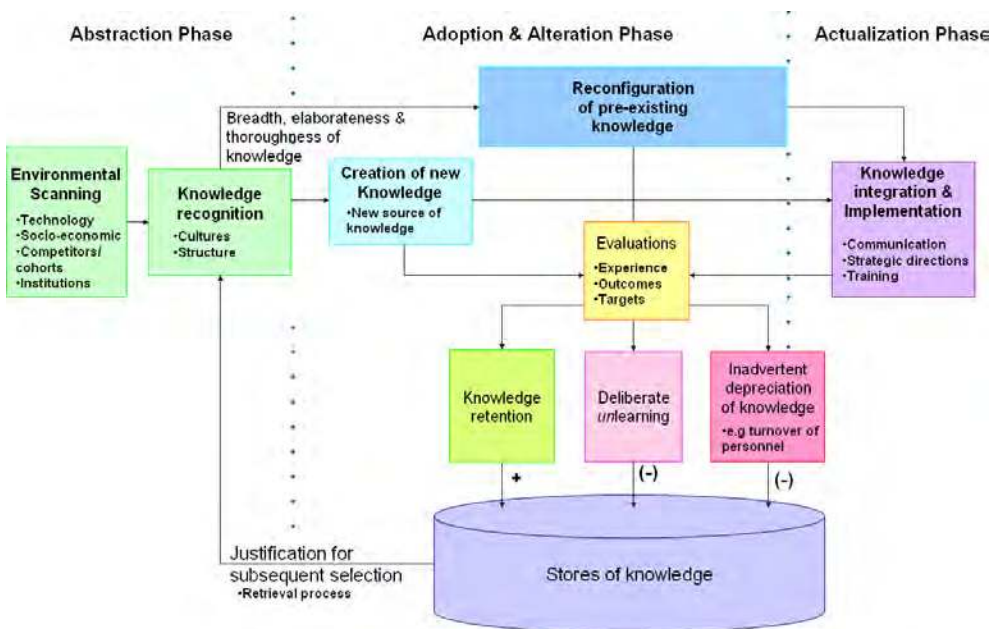
Additionally, Levinthal & March (1993), Lewin et al. (1999), and March (1991) suggest that maintaining a balance of exploration and exploitation activities in a firm is a primary factor in its survival and prosperity. The basic problem here is "how to engage in enough exploitation to insure the organization's current viability and engage in enough exploration to insure its future viability" (Levinthal and March, 1993, p. 105). To address this issue, the theory of coevolution has been introduced to bridge the selection-adaptation or exploitation-exploration chasm (e.g. Lewin and Volberda, 1999; Murmann, 2003; Volberda and Lewin, 2003).

Using March's idea of exploration-exploitation as a metric for progress, Volberda et al. (2001b) depict strategic renewal journeys as multi-level coevolutionary processes taking place over time and leading to adaptations designed to align competencies with the environment and increase competitive advantage. Lewin and Volberda (1999, p. 526) further emphasize the importance of the coevolution perspective defining coevolution as: "the joint outcome of managerial intentionality, environment, and institutional effects". This perspective reiterates that adaptation and selection are not completely opposite forces but are fundamentally interrelated: organization and environment coevolve (Lewin & Volberda, 1999; Murmann, 2003). Correspondingly, Volberda and Lewin (2003) proposed three key principles of self-renewal that are necessary for enabling managed selection and coevolutionary adaptation processes (Table 1.2, this thesis). We will further explore the three key principles in the subsequent sections.

4.5 Stages of Organizational Learning Processes

More recently, researchers have begun examining the transfer of knowledge across different organizations (Argote, Beckman & Epple, 1990; Joskow & Rose, 1985; Zimmerman, 1982). Organizations are thought to have learning systems as “the mechanisms by which learning is perpetuated and institutionalized in organizations” (Shrivastava, 1983, p. 7). Hargadon and Fanelli (2002) further suggest that the phenomena of interest in this approach involve how organizations and their participants acquire, store, retrieve, process, distribute, learn, unlearn, encode, and in other ways replicate existing knowledge. Building on these ideas and the definition of organizational learning that we stated before, “the process by which an organization takes into account environmental and its internal conditions to abstract, create, and develop knowledge and subsequently assimilate, implement, evaluate, and reconfigure the knowledge based on the action-outcome relationships”, we characterize and develop a conceptual framework of organizational learning processes that generate business and social values through actionable knowledge of organizations. As illustrated in Figure 4.1, the framework consists of three main phases.

Figure 4.1: Phases of organizational learning processes



Abstraction Phase

The existence of learning in organizations starts from the abstraction phase in which organizations abstract information and give meaning to the flow of experience (Drazin & Sandelands, 1992). The abstraction phase is inextricably intertwined with the two processes of environmental scanning and of knowledge recognition. While environmental scanning has a more exploratory emphasis, knowledge recognition is more exploitative as it utilizes the prior knowledge of an organization.

Environmental scanning

From the environmental dynamics standpoint, learning is prompted by environmental complexities and uncertainties (Shrivastava, 1983). In line with this thought, learning theorists such as, Lave (1988) and Lave and Wenger (1990), have also rejected knowledge or information transfer models which isolate knowledge from practice. Instead, they develop a view of learning as social construction that puts knowledge back into the contexts in which it has meaning (Brown et al., 1989; Brown & Duguid, 1992). From this perspective, ambient historical, social and physical circumstances are included as part of the key constructs to understand how organizations start conceiving new ideas.

Depending on the level of environmental complexity in which a firm operates, driving forces such as technology, socio-economy, competition (competitors and cohorts), and institution need to be taken into consideration during the environmental scanning process. Additionally, during the process, organizations adaptively learn to attend to some parts of the environment and ignore others according to their own selection criteria of which parts of environment is important or relevant to their goals, attention rules and search rules (Cyert & March, 1963; Sidhu et al., 2004). To help organizations appropriately search or scan the environment for knowledge abstraction, the use of strategic organizational learning tools may come in useful. Tools such as scenario forecasting is one perceived reason for companies such as Royal Dutch Shell to be known as a premier learning organization in its pursuit of understanding of trends in the global business/economic environment. Through the use of scenario forecasting and planning, organizations have even begun to view planning as learning and learning as planning (De Geus, 1999; Brenneman et al., 1998). The environmental scanning will further stimulate the process of knowledge recognition or awareness.

Knowledge recognition

When interpreted, the results from the environmental scanning prompt organizations to recognize potential knowledge that may be absorbed in the subsequent stage. As shown in Figure 4.1, this recognition process is also justified by organizational prior experiences retrieved from the organization's memory (further explanation is provided in the "Stores of knowledge" subsection). This is

coupled with the shared assumptions and cognitive maps (March & Simon, 1958) that are formed by organization's culture. Additionally, organizational structure also influences the way it sees, organizes, constructs, and directs the elements of knowledge moving towards a shared understanding of them. Effective knowledge recognition among new knowledge, past routines or practices is sensitive to the links between organizational turbulence and organizational diversity. A challenge for organizations, in this case, is to regulate such sensitivity.

Adoption and Alteration Phase

The abstraction phase is followed by the process in which new and unknown facts or information are acquired and are turn into new knowledge or are re-configured into an organization's existing stores of knowledge. Several dimensions of organizational learning, such as the breadth, elaborateness and thoroughness of knowledge (Huber, 1991) or the efficiency, scope, and flexibility of knowledge absorption (Van den Bosch et al., 2003) may be assessed. Conjointly, hinging on the existing organizational stores of knowledge, the previously abstracted knowledge may become new sources of knowledge that need to be initiated or may become the accumulated or modified version of the existing knowledge. We refer to the first possible subprocess as creation of new knowledge and the second one as reconfiguration of pre-existing knowledge. It should be noted that new knowledge may also be the product of a firm's combinative capabilities to generate new applications from existing knowledge components (Kogut & Zander, 1992). In either possibility, the knowledge will be adopted and subsequently be assimilated, integrated and implemented (refer to the "Actualization phase").

Evaluations

Learning occurs in stepwise, incremental, progression of small adjustments (Shrivastava, 1983). This means evaluations must be embedded in organizational memory, i.e. the stores of knowledge, for a comprehensive learning to occur. Evaluations are also the process that bridge organizational stores of knowledge with the knowledge justification and assessment subprocesses occurred at almost all learning phases. Following the "Enactment-Selection-Retention model" described by Weick (1979), evaluations may as well occur after the new or reconfigured knowledge are put into actions in the actualization phase. Under such circumstances, the basis of evaluations is focused on monitoring objective measures such as assessing the availability of accumulated experiences, adherence to prior plans, and the targeted outcomes or performance. Three possible outcomes may be resulted from evaluations:

1. *Knowledge retention*: In principle, knowledge is retained if it is considered to be useful or potentially useful in the forthcoming organizational activities. This will add to the organizational stores of knowledge.
2. *Deliberate unlearning*: There is no reason to assume that the new knowledge and services will be useful all the times (Penrose, 1959); on the

contrary, they may well be useless or not suitable for organizations although they may still provide a foundation which will give the firm an advantage in some entirely new area. However, it may be costly to keep exploring or exploiting such knowledge. Another possibility is that some knowledge may become obsolete after some time. Thus after going through some considerations, organizations may decide to drop such knowledge. We refer to this possibility as deliberate unlearning which will decrease the stores of knowledge either directly or indirectly.

3. *Knowledge depreciation*: Besides deliberate unlearning, organizations may also lose knowledge due to inadvertent depreciation. This occurs if, for instance, due to the turnover of personnel some knowledge may erode possibly because of knowledge is not well communicated, distributed and integrated into the working procedures and administrative structures of the organization.

Stores of knowledge

As Levinthal and March (1993, p. 97) argue, “learning presumes interpretation of experience”, all organizational experiences resulting from actions must be encoded in a kind of cognitive maps, transmitted, and shared to organizational members. These encoded cognitive maps are accumulated over time and stored in organizational stores of knowledge. The stores of knowledge are, in turn, used by organizations to convert their experiences into possibilities for future actions. Under this process, organizational knowledge derived from the experiences of organizational members is stored in organizational memories and is concretely embodied in the ongoing routines, products, processes and other replicable actions of the organization (Huber, 1991).

At the time of founding, the organizational stores of knowledge might not start from zero. At least the founders, the individuals or organizations, have knowledge about the initial environment and the processes to carry out the initial business and they make such knowledge available to the new organization’s members (Huber, 1991). Additionally, there is also some prevailing institutionalized knowledge (Meyer and Rowan, 1977). Both kinds of knowledge are referred to by Huber (1991) as the “inherited knowledge.” Moreover, prior to organizational birth, some additional knowledge may also be acquired resulted from, for instance, the searching of organizational mission and resources. The combination of both inherited knowledge and such additional knowledge is called “congenital knowledge” (Huber, 1991). Presumably, congenital knowledge has a strong influence in determining future directions of organizational learning.

In short, organizational stores of knowledge are accumulated and modified along with the learning processes and are simultaneously used to justify the subsequent abstraction and selection of knowledge. The challenge here is to facilitate an effective retrieval process, i.e. the retrieval of the right knowledge when it is needed.

Actualization Phase

Learning sharpens an organization's ability to solicit new ideas within and outside it. What has been learned by a company will be further translated into effective actions that generate social and business values. Knowledge and actions are two indispensable elements of organizational learning. On the one hand, by acting, reflecting, and interpreting, organizations learn what they are. By observing their own action, they learn what they want (Weick, 1979). On the other hand, knowledge provides the organization with the potential for novel action, and the process of constructing novel actions often entails finding new uses or new combinations of previously disparate ideas (Schumpeter, 1934; Weick, 1979; Kogut & Zander, 1992).

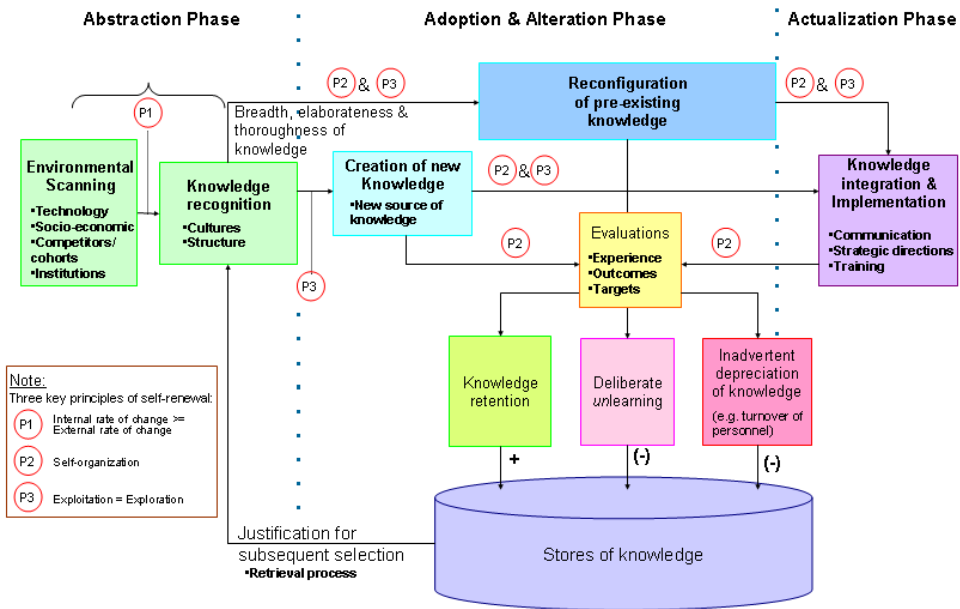
Following the above reasoning, action learning is the emphasis of actualization phase. During this phase, the key process is the integration of knowledge into an organization's existing routines and procedures through a concrete implementation. We refer to this process as knowledge integration and implementation. To expedite a transformation of learning process into concrete actions, organizational aspects such as communication, strategic directions and training plans are essential. First, effective communication through various forms of instruction, indoctrination, and exemplification is needed to diffuse knowledge to organizations' members (March, 1991). Second, the growing experiences of management shape the strategic directions that have implications to the firm's method in facilitating and maintaining the coherence of the learning process. Third, training is thought of as the transmission of explicit, abstract knowledge from members who know to members who do not (Brown & Duguid, 1992).

Through the process of integrating and implementing knowledge, the actual experience can be used as a basis for evaluations. It should be noted here as the consequences of actual experiences sometimes are not instantaneous; organizations need to confirm the pertaining experiences by retrospective sense-making of them (Salancik, 1977).

Incorporating Three Key Principles into Stages of Organizational Learning Processes

In the context of sustained self-renewal firms, we conjecture that the three key principles of self-renewal are the prerequisites of sustained strategic renewal. Furthermore, absorptive capacity and dynamic capabilities are both key constructs in learning. Following the above phased analysis of organizational learning processes, we aspire to incorporate all of them in the stages of organizational learning processes. We present this idea in Figure 4.2.

Figure 4.2: Incorporating three key principles into stages of organizational learning processes



When performing the environmental scanning during the abstraction phase, the first key principle rules implying that organizations should regulate internal rates of change to at least match the external rates of change. Additionally, the discernment of environmental signal into the recognition of knowledge has to do with a firm's potential absorptive capacity. Dynamic capabilities of a firm which encompass coordination capabilities, system capabilities and socialization capabilities are essential during the adoption, alteration and actualization phases. Coordination capabilities are needed to coordinate and manage the concerted efforts to put new knowledge and reconfigured knowledge into practice and to evaluate the results accordingly.

Simultaneously when new knowledge is created, the concurrent balance of exploitation and exploration (third principle) should be put as a safety valve. The reconfiguration of pre-existing knowledge, the use of it and the use of new knowledge should also be aligned to the second principle of self-organization besides to the third principle. The evaluation process should incorporate the principle of self-organization as firms organize what they have known and what they have experienced to justify which knowledge should be maintained in the stores of knowledge. System capabilities are needed here to organize the stores of knowledge.

Finally, socialization capabilities may help to create a more stimulating atmosphere to expedite managerial efforts in integrating and implementing knowledge throughout the firm. When knowledge is put into action and values are created, realized absorptive capacity of a firm is also actualized. The visualization in Figure 4.2 enhances the systemic way of conceptualizing the learning principles that may contribute to the sustained strategic renewal.

4.6 How Firms Learn and Adapt over Time in Changing Knowledge Environment

In addition to the conceptual analysis of stages of organizational learning, the second purpose of this chapter is to develop a framework that takes into account both the contexts of knowledge environment and the types of managerial action. The aim of the framework is to provide a link between organizational learning and organizational survival. For this purpose, we consider two types of knowledge environment: (1) stable knowledge environment and (2) dynamic knowledge environment (cf. Van den Bosch et al., 1999) which are analogous to the first and second order renewal introduced in Chapter 1.3 (Table 1.1). Stable knowledge environment means that knowledge is in a mature state with systematic orders; changes are less often, less intense, and less varied. On the contrary, dynamic knowledge environment is more turbulent with knowledge that may still be in a disorder state and may change unexpectedly and frequently in a significant degree.

In a reciprocal way, firms through their managers must actively set the proper learning tone for their team to balance the benefits of experimentation, innovation and renewal with the goal of sustaining long-term survival. To do so, however, is not that easy. Firms have to make explicit and implicit choices between exploitative and exploratory action learning. But both exploration and exploitation compete for scarce resources and maintaining an appropriate balance between exploration and exploitation is a primary factor in system survival and prosperity (March, 1991). In studies of organizational learning, the problem of balancing exploration and exploitation is exhibited in distinctions made between refinement of an existing technology and invention of a new one (Winter, 1971; Levinthal and March, 1981). Plotting together the type of knowledge environment and the type of action learning enable us to see the possible variety of organizational learning approach.

First, in a stable knowledge environment, organizations have a strong focus on exploiting their current knowledge base (Cohen & Levinthal, 1990). Under such conditions, organizations learn to refine their capabilities, apply current knowledge and focus on current activities in existing domains (Holmqvist, 2003: 99). Exploitation in a stable knowledge environment makes future exploitation in the same domain even more efficient (Lant & Mezias, 1992). Considering this

potential benefit, the aim is the refinement of existing organizational routines and capabilities towards efficiency (March, 1991). Therefore, we propound that when the knowledge environment is stable, exploitative action learning drives firm to adopt operational learning aiming at regulating and improving their operational activities. As a result, operational learning may drive and turn firms to be highly routinized firms.

Second, organizations may alternatively regard a stable knowledge environment as a more conducive atmosphere for organizational learning through experiments (Huber, 1991). This is because in times of stable condition, firms have more motivation to direct their strategic intents to allocate organizational slack for experimentations (Cyert & March, 1963). Such activities may involve probing for new organizational routines and the discovery of new approaches to technologies, businesses, processes, and products (McGrath, 2001). We thus suggest that when the knowledge environment is stable, explorative action learning drives firms to adopt experimental learning aiming at using their slack resources for experimentations. As a result, experimental learning may drive and limit firms to first-order renewal only.

Third, when knowledge environment becomes more turbulent, some organizations may still be unaware of the changing condition and continue exploiting the existing knowledge from their accumulated experience. This is because such organizations perceive the exploitative action learning display reliable and accountable structures. The presumption is that the surviving organizations are those retain the most stable structures (Aldrich, 1979; Hannan & Freeman, 1984). Firms increasingly maintain the status quo, exhibit the convergence and develop highly specialized competences that may become core rigidities (Leonard-Barton, 1992). However, exploitative action learning – that tends to routinely maintain things that organizations have been doing well – cannot match the environmental dynamism. As a result of the inert learning, they become ossified firms (Nelson and Winter, 1982) and have difficulty in facing the new challenge with their ill-fated strategies. Hence, we suggest that when the knowledge environment becomes dynamic, exploitative action learning drives firms to adopt inert learning that brings out their latent ossified characteristics and hampers adaptation. The more exploitative firms learn, the likelihood that inert learning drives firms to the competence trap increases.

Fourth, in contrast to inert learning, some organizations are more flexible and adaptable in responding to the dynamic knowledge environment. These organizations perceive that the dynamic knowledge environment offers abundant opportunities that need to be explored. This leads to preferences for innovations. Exploratory action learning under such circumstances is directed towards capturing the ability to innovate or to renew the company in the face of environmental changes (Teece et al., 1997; Eisenhardt and Martin, 2000) as such ability is considered to be an important capability for a firm to live long. Furthermore, these innovations also change the competitive dynamics within a market (D'Aveni,

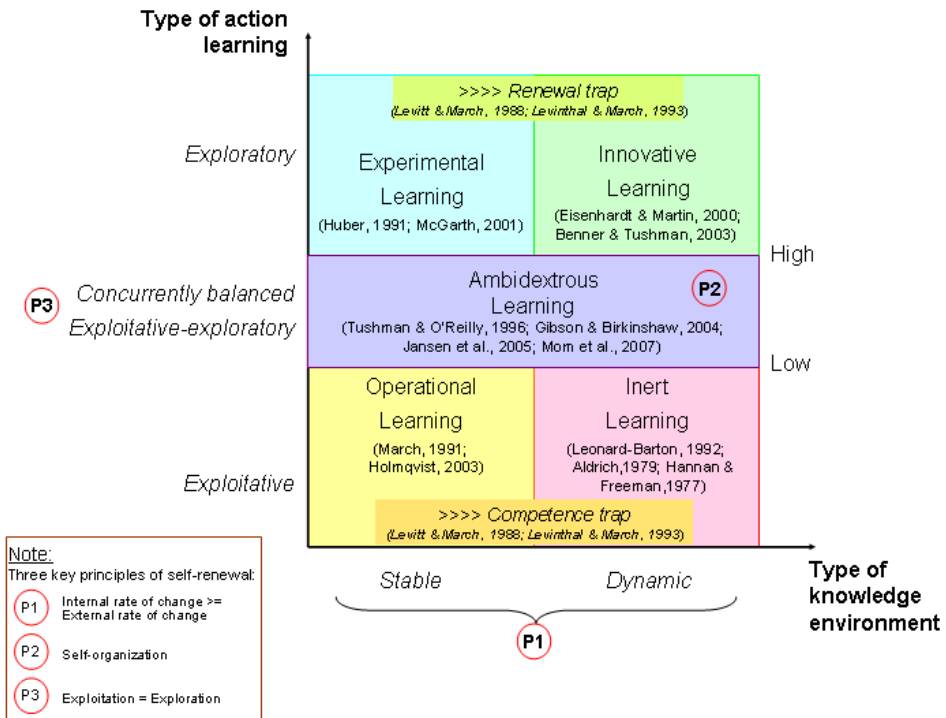
1999). In comparison with experimental learning, innovative learning involves more radical innovations designed to meet the needs of emerging customers and markets (Benner & Tushman, 2003) instead of stable market conditions. In this respect, we propose that when the knowledge environment becomes dynamic, exploratory action learning drives firms to adopt innovative learning aiming at exploring opportunities from emerging conditions for innovative ideas. The more exploratory firms learn, the likelihood that innovative learning drives firms to the renewal trap increases.

Finally, as literature on strategic management, organizational change and organizational learning has increasingly discussed the need for firms to achieve a balance between exploration and exploitation activities (Eisenhardt & Martin, 2000; Levinthal & March, 1993; Teece et al., 1997), there is a higher order of organizational learning on top of the previous four types. In either type of knowledge environment, be it a stable or a dynamic one, firms are required to explore and learn new ways while exploiting what they have already learned (Crossan et al., 1999). Accordingly, learning may not only drive organizations into dynamics of accelerating exploitation, but it may also force organizations into accelerating exploration. Researchers such as Tushman & O'Reilly (1996), Gibson & Birkinshaw (2004), and Jansen et al. (2005) refer to firms that are able to simultaneously balance the exploitative and exploratory action learning as "ambidextrous firms". Analogously, we refer to this type of learning as ambidextrous learning. It should be noted here that organizations are not only considered as ambidextrous when they have high levels of both exploratory and exploitative innovations but are also considered ambidextrous even when they have both low levels ones as long as they are balanced (Jansen et al., 2005). Here we propose that in time of either stable or dynamic knowledge environment, action learning that concurrently balances exploitation and exploration either in low or high levels of balance aligned with the pertaining knowledge environment, drives firms to adopt ambidextrous learning.

Ambidextrous learning has the characteristics implied by the three key principles of self-renewal (Volberda & Lewin, 2003). This is because firstly, ambidextrous learning incorporates the type of knowledge environment and consequently aligns the type of action learning with the type of knowledge environment (Figure 4.3). This corresponds to the first principle of regulating internal rates of change to align with the external rate of change. Secondly, ambidextrous learning encourages the non-hierarchical type of learning through self-organization. Mom et al. (2007), for instance, show that managers may engage in high levels of exploitation as well as exploration activities through a non-hierarchical structure. According to them, top-down knowledge inflows from persons at higher hierarchical levels than the manager are positively related to exploitation. Conversely, horizontal and bottom-up knowledge inflows from peers and persons at lower hierarchical levels are positively related to exploration. Mom et al.'s (2007) findings thus indicate that the more a manager acquires top-down

and horizontal or bottom-up knowledge flows, the higher the levels of exploration and exploitation in which the manager engages. This is an indication of the need of self-organization. Finally, ambidextrous learning requires firms through their managers to concurrently balance exploitation and exploration activities. The ambidextrous learning thus positively influences firms' sustained self-renewal efforts and may thus drive firms to second-order renewal. Through an illustrative framework, Figure 4.3 summarizes the repertoire of organizational learning and the three key principles as discussed above.

Figure 4.3: A repertoire of organizational learning and three key principles



4.7 Discussion and Conclusion

To contribute to a more comprehensive understanding of learning processes and stages, in this chapter we developed a framework of how firms learn and adapt over time. We categorize learning processes into three phases: abstraction phase, adoption and alteration phase, and actualization phase. These phases encompass the flows of several subprocesses stemming from how organizations conceive ideas, learn and put them into actions (see Figure 4.1). The framework also shows how the stores of knowledge in organizations are accumulated and reconfigured over time.

Also to investigate organizational learning in the context of long-lived or sustained self-renewal firms, we incorporate the constructs of the three key principles of self-renewal, absorptive capacity and dynamic capabilities in the procedural flows of learning. In this respect, we developed the second framework that takes into account both the contexts of knowledge environment and the types of action learning (see Figure 4.3). The mapping between types of knowledge environment and types of action learning enables us to identify five types of organizational learning: (1) operational learning; (2) experimental learning; (3) inert learning; (4) innovative learning; and (5) ambidextrous learning. Here ambidextrous learning is enabled by the three key principles of self-renewing organizations (Figure 4.3). It further equips firms with requisite ability to adapt for an effective transition from the first-order to the second-order renewal.

To conclude in this chapter, we have addressed the second research question of this PhD thesis, i.e. how firms learn and adapt over time in the changing context of knowledge environment. This chapter also explores the three key principles of sustained strategic renewal from an adaptation perspective, in particular the organizational learning perspective. Based on the three key principles, we proposed the notion of ambidextrous learning. First, ambidextrous learning demonstrates the need to align the type of knowledge environment with the type of action learning (first principle). Second, Nonaka (1988) propounds that a learning organization transforms the flow of information into a stock of knowledge and at the same time spreads it to other departments and stimulates the systematic self-organizing of information. By the same token, ambidextrous learning requires self-organization as a process to transform information into effective knowledge. Third, ambidextrous learning signifies the need to balance exploitation and exploration simultaneously.

Contemplating theories discussed in Chapter 2 and explorative studies presented in Chapter 3 and 4, in the next chapter we develop our conceptual framework and propositions. The framework and propositions further lead us into the development of our empirical constructs that we investigate in part IV of this thesis.

5. Conceptual Framework and Propositions of Three Key Principles

5.1 Introduction

In an overview of theoretical foundations that we put forward in the foregoing chapters, we have managed to conceptually shape a more insightful focus of the research topic. Yet we consider that an extended conceptual framework based on the three key principles of self-renewing organizations is required to incorporate both selection and adaptation perspectives and to identify important constructs and relationships. Accordingly, this chapter is organized as follows. We present our conceptual framework in Chapter 5.2. The framework also facilitates the development of propositions of the three key principles in Chapter 5.3 that are necessary for charting directions of our empirical studies. Chapter 5.4 is the conclusion of this chapter.

5.2 Conceptual Framework

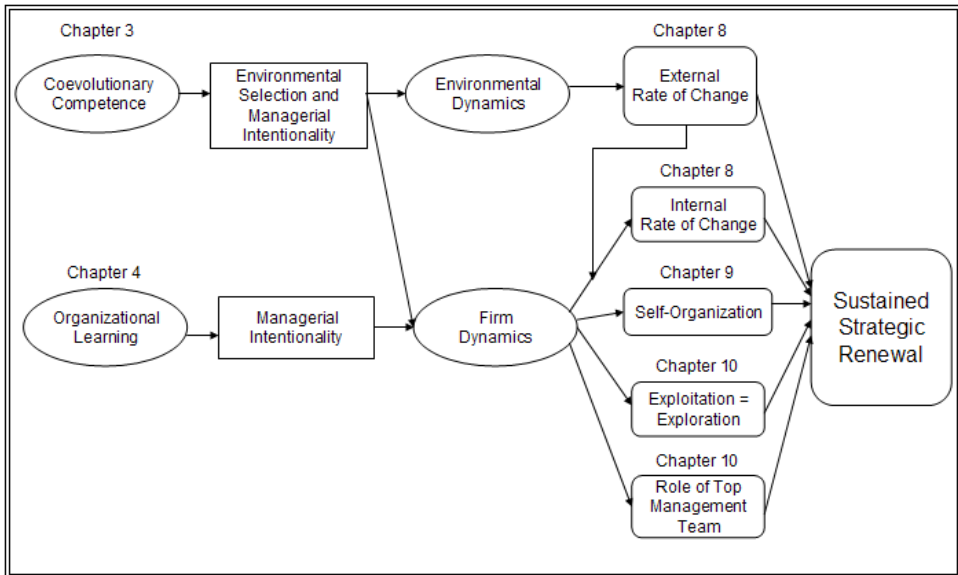
To keep things in perspective, we propose to capture and portray the connection between theoretical foundations and empirical studies of the three key principles. On the basis of this idea, we develop a framework for a foundational conceptualization. Embodied in this manner, we aim to identify and map demonstrable constructs into quantifiable indicators.

As demonstrated in Chapter 3 and 4, there are respectively two main conceptual constructs that we explored: (1) from a coevolutionary perspective, we looked at the coevolutionary competence construct; and (2) from an adaptation perspective, we built upon the organizational learning construct. Behind these two constructs lay deeper prerequisites that bring together both selection and adaptation perspectives.

On one research stream, in view of a combined selection-and-adaptation perspective, the construct of coevolutionary competence corresponds to an empirical inquiry of both environmental as well as dynamics and how these two dynamisms play a role on sustaining strategic renewal over time. On the other research stream, the construct of organizational learning appears to draw on the role of managerial intentionality in adapting the firm dynamics to the environmental dynamics. This signifies that an empirical inquiry of firm dynamics needs to be taken into account as well. As the research literature in Chapter 2 suggested, both research streams coalesce into the three key principles (Volberda and Lewin, 2003) that are essential to a firm's sustained strategic renewal.

Figure 5.1 shows the conceptual framework that we developed based on the previous line of thoughts. Rooted in this framework, we draw on measuring the external rate of change for our empirical inquiry of environmental dynamics. For this purpose, measurement proxies are developed and analyzed in Chapter 8. For our empirical setting, we focus on environmental dynamism of the oil industry and the firm dynamism by looking at our two case companies, Shell and BP.

Figure 5.1: Conceptual framework



By the same token, we develop a number of proxies based on firm characteristics to measure firm dynamics. First, in connection with external rate of change in the oil industry, we analyze and measure the internal rate of change in our case companies, i.e. Shell and BP. Besides multilevel (industry and firm levels) study method, the analyses are performed both longitudinally and comparatively. Second, we examine the second key principle by observing and developing proxies for the measurement of self-organization. This will be discussed in Chapter 9. In

Chapter 10, we build upon the previous research on exploitation and exploration (e.g. Volberda et al., 2001b; Flier et al., 2003) to calibrate the pertaining metrics for an extended analysis of exploitation and exploration. Additionally in Chapter 10, we incorporate the need to study the role of top management team in a firm's sustained strategic renewal trajectories. Altogether, we combine and summarize the key findings of the three key principles in Chapter 11.

In this respect, our central premise is that the ability of a firm to manage firm dynamics accounting for environmental dynamics contributes to sustained strategic renewal. In sum, sustained strategic renewal is a function of the three key principles of self-renewing organizations, i.e. managing internal rate of change to keep up or exceed the external rate of change, optimizing self-organization, and synchronizing concurrent exploitation and exploration.

5.3 Propositions of Three Key Principles

After circumscribing our conceptual framework in the previous section, we are now ready to move on to developing our propositions of the three key principles of self-renewing organizations (Volberda and Lewin, 2003). From a research standpoint, propositions are useful for crystallizing and exploring our notion to calibrate the demonstrable constructs of the three key principles into measurable proxies. In the remainder of this section, we develop and pose our propositions based on the three key principles respectively. The central premise is that the three key principles are antecedents to sustained strategic renewal and accordingly sustained strategic renewal is regarded as the dependent variable which is a function of the three key principles.

Proposition of the First Key Principle

Much of the literature in organization theory is fundamentally concerned with environmental changes and the resulting organizational changes and adaptation (e.g. Aldrich, 1979; Burns and Stalker, 1961; Lawrence and Lorsch, 1967; Levinthal, 1991; Miles, Snow and Pfeffer, 1974). In a similar vein, Duncan (1972) viewed organizational environments as external factors that managers need to take into account in their strategic activities. The central premise of the extant literature is that firms that can successfully incorporate the changing environments into their internal strategic decision processes may have the brightest prospects for long-term survival (Hedberg, Nystrom and Starbuck, 1976).

In fact, firms need to respond to the changing contexts of environments in which they are embedded. Of particular concern is further investigation of the issue of aligning organizational dynamism with environmental dynamism. In his study of hypercompetition, D'Aveni (1994) for instance, propounds that organizational success is often tied to speed. This suggests that as the external environment of a

firm changes, the firm needs to respond to the external forces by altering and adjusting its internal environment.

From the perspective of environmental selection and organizational adaptation theorists, the rate of change is a critical construct in addressing both environmental and firm dynamism. In an attempt to provide operational clarity to the term rate of change, Jurkovich (1974) suggests that the higher the change rate in the environment, the higher the number of organizational internal factors that must be altered. He further conjectures that the ability to time organizational changes to keep pace with environmental change rates is an important indicator of an organization's coping abilities. All the views discussed above indicate that rate of change is an important antecedent in studying sustained strategic renewal.

Firms need to be careful, however, in adjusting their renewal acceleration rate. They may be exposed to either the risk of being drifted into chaos or the risk of accumulating inertia. On the one hand, Dumaine (1989) and Stalk (1988) caution that overspeeding is counterproductive, as too short a reaction time can lead to overreaction and may even result in chaos (Volberda, 1998). In this respect, changing the environment by being the first mover to break the rules of the game, can be risky (Mintzberg and McHugh, 1985). This is because to initiate and implement internal change to beat the external change, large incumbent firms need to mobilize the resources that they have accumulated over the years and by the goodwill inherent in established long-term relationships with key stakeholders such as customers, partners, and suppliers. The results are, however, uncertain in their payoffs – they may or may not be advantageous to the firms.

On the other hand, if managers respond too cautiously that they wait until the impact of external turbulence exceeds a threshold (Ansoff et al., 1975), firms may run a risk to build up inertia (Hambrick and D'Aveni, 1988). For a long-term survival, it is essential that a firm should be in a well-balanced relationship with its environment. This is related to the first key principle of self-renewing organization that recognizes the need for firms to match or exceed the external rate of change within which the firm is embedded (Volberda and Lewin, 2003). This is to say that firms that are able to monitor and track rates of change in their environment and adjust their internal rates of change accordingly, they promote their ability to sustain strategic renewal over time – which is a proxy of corporate longevity.

The principal question that remains is that how firms should regulate the internal rate of change (IRC) with respect to the external rate of change (ERC). Of central issue are antecedents that enable firms to implement the first key principle. As discussed in Table 2.4 in Chapter 2, Lewin and Volberda (2004) have advanced the three key principles by substantiating fundamental antecedents of the three key principles. Referring back to these antecedents, in particular those that relate to the first key principle, we attempt to provide a more detailed explanation about what kind of generic antecedents that may enable firms to align their internal rates of change (IRC) with the external rates of change (ERC). Following Lewin and Volberda (2004), we categorize the generic antecedents of the first key principle

based on strategy, structure, managerial process, and leadership. Table 5.1 summarizes the enabling antecedents of the first key principle.

Table 5.1: Enabling antecedents of the first key principle

Type of enabling antecedents of the first key principle (IRC ≥ ERC)

Strategy	Pioneer/early mover (Eisenhardt, 1989a; Suárez & Lanzolla, 2007); leapfrogging (Beinhocker, 1999; Hackbarth & Kettinger, 2004); focus on internal growth (Hitt and Ireland, 1985; Hit et al., 1996)
Structure	Modular/flexible structures (Pascale, 1990, 1999; Volberda, 1998)
Managerial process	Pacing rhythms for change (Eisenhardt, 1989a); seizing benchmarking processes, promoting rapid learning, allowing room for experimentation, and stretching goals (Maira & Thomas, 1999)
Leadership	Facilitator/ context setter (Pascale, 1999); detector of new dominant logics (Pralhalad & Bettis, 1986)

Source: adapted from Lewin and Volberda, 2004

First with regard to the enabling strategy of the first key principle, firms need to be able to formulate strategies that can escalate their internal rates of change particularly in times of fast changing environments. The strategies can range from being a pioneer or an early mover (Eisenhardt, 1989a; Suárez and Lanzolla, 2007), for instance by introducing new services, products, or processes; to adopting a leapfrogging strategy (Beinhocker, 1999; Hackbarth and Kettinger, 2004) in times of intensified competition. Also to match or exceed with the external rate of change, strategy should be directed to foster internal growth (Hitt and Ireland, 1985; Hitt et al., 1996). Internal growth means growth and development of a firm through the use of internal resources within the firm's boundary.

Second to carry out such strategies, firms need to have modular structures (Pascale, 1990, 1999). Such structures promote flexibility (Volberda, 1998) to interact with their internal and external stakeholders effectively. Third, the first key principle also requires managerial processes that can detect and adjust a right rhythm for change (Eisenhardt, 1989a). Managers may need to try out dynamic processes such as seizing benchmarking processes, promoting rapid learning, allowing room for experimentation, and even stretching goals (Maira and Thomas, 1999).

Finally to facilitate the proposed enabling strategies, structures, and managerial processes, appropriate leadership qualities are needed such as leaders that act as facilitators, context setters that are able to guide their organizational members to scan and interpret signals from the environment. Leaders need to be able to detect emergence of new dominant logics (Pralhalad and Bettis, 1986), manage the adaptive tension of driving momentum for changes and actually engage in changes. Steve Miller, one of the members of Shell's committee of

managing directors in 1996, concurred such leadership characteristics this by saying:

*“Change your approach to strategy, and you change the way a company runs. The leader becomes a **context setter**, the designer of a learning experience – not an authority figure with solutions. Once the folks at the grassroots realize they own the problem, they also discover that they can help create and own the answers, and they get after it **very quickly, very aggressively, and very creatively**, with a lot more ideas than the old-style strategic direction could ever have prescribed from headquarters”.*

(Interview quote of Steve Miller, a former Shell’s CMD member, taken from Pascale (1999, p.93); emphasis in **bold italics** by the author of this thesis)

Furthermore, Friesen and Miller (1986) propose that the fit between the pace of change and external or internal conditions may be critical for the prediction of long-term survival. Likewise, Volberda and Lewin (2003) propound that a firm should regulate its internal rate of change to match or exceed the external rate of change. They base their argument on the notion introduced by Ashby (1964) that organizations must maintain requisite variety. In Ashby’s concept, the internal variety of firm routines and capabilities must match the external variety of the environmental landscape on which the firm is prospecting. This principle recognizes the need for organizations to match or exceed the coevolution rate of the external systems (society, institutions, and industries) within which the firm is embedded. Organizations that are able to monitor, track, and adjust their internal rates of change to be in line with their environments are regarded as having an innate ability to strategically renew themselves over time. Based on the above discussions, we conjecture the following proposition:

Proposition 1:

Aligning the internal rate of change of a firm with the external rate of change of the firm’s environment positively influences sustained strategic renewal.

Propositions of the Second Key Principle

The observations made by many of the authors writing on corporate longevity echo those made by authors who write on the application of complexity theory to organizational dynamics (Hall, 1997). By and large according to this line of research stream, self-organizing adaptability observed in long-term surviving companies is similar to that observed in ecosystems which are typically complex, non-linear, dynamic systems whose behavior may be better understood with knowledge of complexity theory (Allen, 1988, 1997; Anderson, 1999a; Holland, 1995; Kauffman, 1995; Nicolis and Prigogine, 1989; McKelvey, 1999; Stacey, 1995). Nevertheless despite such commonality between the complexity theory and organization science, there is a key difference that must be noted. Complexity

theory suggests that self-organization is the natural default behavior, while organization studies recognize barriers to such freedom in bureaucratic structure (Anderson, 1999a, b). More specifically, he notes that social entities always self-organize as long as their members contribute work; this is why informal structures emerge and persist in a way that that is remarkably robust to changes in the formal organization structure.

Built upon the notion of complexity theory, Nonaka (1988, p.57) suggests that self-organizing can be seen as “a process of dissolving an existing organizational order and creating a new one”. Consequently to create a new order, Weick (1987) and Prigogine and Stengers (1984) argues that it may be necessary for the organizational process to become chaotic in order to match accurately the chaotic nature of the environment for the new order to emerge. Build upon this line of thought, Volberda and Lewin (2003, p.2126) suggest that self-organization is “the process by which organizations always find order no matter how complex or convoluted the structure of the organization.” This implies that self-organization strives for autonomy (Kauffman, 1995; Nonaka, 1988).

The above view on self organization is somewhat in contradiction with the traditional view of organizations that is based on bureaucracy (Weber, 1946). Bureaucracy represents an organization from which chaos has completely been eliminated (Nonaka, 1988) and thus reduces autonomy considerably. The traditional view also regards an organization as an entity that consists of highly prescribed rule sets, formalized control and hierarchical authority structures, which are intended to simplify the organization’s ongoing operations. In this sense, a hierarchical authority structure is regarded as key in helping organization leaders determine proper actions and deploy instructions to the workforce (Pugh et al., 1968; Evan, 1963). Hierarchical positions are fundamental to create orders that lead to simple, well-defined and predictable responses to a changing yet knowable world (Capra, 1996; Stacey, 1995). Furthermore, the inherent hierarchy of organizations constrains the extent of variety than can be sustained within them (Michels, 1915).

From the perspective of self organizing, however, traits such as the absence of centralized control and bureaucratic hierarchies are shared by all self-organizing systems. In self-organizing systems, control of the organization is typically distributed over the whole of the system. Order thus comes from the actions of interdependent agents who exchange information, take actions, and continuously adapt to feedback about others’ actions rather than from the imposition of an overall plan by a central authority (Chiles et al., 2004). This is reiterated by Volberda and Lewin (2003) in which they describe self-organization as the process by which organizations always find order no matter how complex or convoluted the structure of the organization.

The central premise is that a self-organizing system may settle into a number of relatively autonomous, organizationally closed subsystems, but these subsystems will continue to interact in a more indirect way (Anderson, 1999a;

Kauffman, 1995; Nonaka, 1988; Von Foester, 1960; Von Foerster and Zopf, 1962). Since the subtle management determines the magnitude of the self organization, top management should steer and guide an autonomous self-organizing group in a firm. Self-organization also implies that managers function as stewards of the evolutionary process and focus their managerial role on devising and articulating critical values and on establishing boundary conditions that enable and guide decision making at lower levels of the organization. In this respect, guided self-organization is a primary process by which new orders in firms may emerge.

As in the first key principle, it is also necessary to substantiate the generic enabling antecedents of self-organization. Table 5.2 categorizes the generic antecedents of the second key principle based on strategy, structure, managerial processes, and leadership.

Table 5.2: Enabling antecedents of the second key principle

Type of enabling antecedents of the second key principle (self-organization)	
Strategy	Focus on internal growth (Hitt and Ireland, 1985; Hitt et al., 1996); long-term strategic planning (Schoemaker, 1992, 1995), knowledge integration (Van den Bosch & Volberda, 2006)
Structure	Semi-structures/ low hierarchy (Nonaka, 1988; Kauffman, 1995); cross-functional interfaces (Maira & Thomas, 1999; Gupta & Govindarajan, 2000)
Managerial process	Facilitating emergent processes (Pascale, 1990, 1999), reducing number of rules (Eisenhardt, 1989a) and encouraging freedom of new ideas (Child, 1984; Orton & Weick, 1990)
Leadership	Steward/ guided controller (Volberda & Lewin, 2003; Pascale, 1999), facilitator/ context setter (Pascale, 1999; Carroll, 1999), transformational leader (Van den Bosch & Volberda, 2006)

Source: adapted from Lewin and Volberda, 2004

First with regard to the enabling strategies, firms can promote self-organization by focusing on internal growth (Hitt and Ireland, 1985; Hitt et al., 1996) and long-term strategic planning such as scenario planning (Schoemaker, 1992, 1995). While focusing on internal growth may help to create firm distinctive competence (Hitt and Ireland, 1985), focusing on long-term strategic planning may help to extend the orientation window of firms so that firms can build readiness through change through probing future (Schoemaker, 1992, 1995). Our focal firm, Shell, is well known for its scenario planning (Schoemaker, 1992). Furthermore based on the study at the Shell Research and Technology Centre in Amsterdam, Van den Bosch and Volberda (2006) found that knowledge integration capacity contributes to self-organization.

Second in terms of enabling structures, firms need to design their structures not in traditional authority forms. Instead, they need to have low hierarchical structures to streamline the information flows (Nonaka, 1988; Kauffman, 1995). By having such structures, firms can also build cross-functional interfaces (Maira

and Thomas, 1999; Jansen et al., 2009) that may help to stimulate a more intensive and effective interaction among organizational members.

Third, self-organization requires managerial processes that are able to facilitate emergent processes (Pascale, 1990, 1999). The low hierarchical structure also enables the managerial process of reducing or minimizing the number of rules. Such process can also help to promote freedom of experimenting with new ideas (Child, 1984; Orton and Weick, 1990).

Finally, in encouraging self-organizing processes, leaders need to act as stewards or guided controllers (instead of as central controllers) (Volberda & Lewin, 2003; Pascale, 1999). Additionally, like in the first key principle, leaders act as facilitators or context setter rather than as authoritative commander (Pascale, 1999). Such leadership style has an important consequence: “it lets a lot of people make individual decisions about their behavior and the ways in which they conduct themselves” (Carroll, 1999, p.8). As Carroll (1999, p.11) contended that “devolving power is not about becoming undisciplined. Instead, it actually means putting strong disciplines in place so that people can act independently at lower levels and be clearly responsible for the results of their actions.”; it is necessary to let go of the traditional leadership of command-and-control. This is also reflected in the following interview quote:

“The properties of self-organization and emergence make intuitive sense to me. ... You don’t have the same kind of control that traditional leadership is used to. What you don’t realize until you do it is that you may, in fact, have more controls but in a different fashion. You get more feedback than before, you learn more than before, you know more through your own people about what’s going on in the marketplace and with customers than before. But you still have to let go of the old sense of control.”

(Interview quote of Steve Miller, a former Shell’s CMD member, taken from Pascale (1999, p.90,94))

In fact to facilitate guided self-organization, Volberda and Lewin (2003) further propound that self-organization, however, does not mean that individuals or units can pull in all directions at will or break all rules. It does not mean that managers are not necessary or that they have diminished roles. Contrarily, it means that no central controller is necessary. Guided self-organization requires fundamental departure from command and control philosophy of traditional hierarchical bureaucratic organizations. Therefore instead of acting as a central controller, managers function as stewards of the evolutionary process by enabling and guiding decision making at lower levels of the organization (Volberda and Lewin, 2003). To guide and facilitate lower level decision-making and action also requires substituting process controls, i.e. devising processes that produce desired and acceptable outcomes, for outcome controls.

In summary, self-organization is fundamentally different from classical command and control management practice (Nonaka, 1988; Volberda and Lewin,

2003). It implies that management commits to guiding and implementing process controls instead of relying on outcome controls. The efforts of managers to propel a process of self-organization in a firm are necessary for the firm to emerge from chaos into order. Self-organization is thus an indispensable process to long-term survival. Based on these discussions, we suggest the following proposition:

Proposition 2:

Self-organization positively influences a firm's sustained strategic renewal.

Propositions of the Third Key Principle

Since the study of March (1991), the constructs of exploitation and exploration have emerged as the dual concepts underpinning organizational adaptation and renewal research. Exploitation is primarily related to refinement and efficiency, which relates to environmental selection perspective. This is different from adaptation perspective which suggests that firms are able to explore new competencies through their adaptation to the changing environment. Reconciling the selection and adaptation perspectives, Levinthal and March (1993, p. 105) propounds that the long-term survival of a firm depends on its ability to “engage in enough exploitation to ensure the organization's current viability and engage in enough exploration to ensure its future viability”.

Drawing from the selection and adaptation literature streams, Lewin et al. (1999) further conjectures that in order to remain competitive in changing environmental circumstances, firms need to seek a balance between exploitation and exploration efforts over time. The efforts of balancing exploitation and exploration are ongoing processes that are reflected in a firm's legacy which encompasses firm-level knowledge, capital, technological platforms, capabilities, as well as characteristics of the industry in which firm is embedded (Lewin & Volberda, 1999). In this respect, exploitation and exploration processes are complementary means for optimizing organizational resources and design features in the face of multiple environmental and path dependent constraints.

According to Lewin, Long & Carroll (1999), as organizations adapt in highly dynamic environments, the successful ones will evolve to a critical balance point. This critical balance point, as suggested by Lewin et al. (1999, p.541), is processes “that balance between order (the pull of exploitation) and disorder (the pull of exploration) that is often called the edge of chaos”. This relates to self-organization, previously discussed in the second key principle. Yet the key question that remains is that how firms should balance their exploitation and exploration efforts over time.

Literature points out that the answer to this key question is reflected in the internal resource allocation process and the extent to which this process is designed to support a multiplicity of selection regimes. In other words, to achieve balanced exploitation-exploration, firms need to make a trade-off between exploitation and exploration. Such tradeoff is subject to both environmental conditions as well as management discretion. The exploration/exploitation trade-off captures a fundamental tension in evolutionary systems (Holland, 1975) and has become central in our thinking about the challenge of organizational learning and adaptation (March, 1991). Organizations must make uncertain investments to create the possibility of more promising futures while, at the same time, they must allocate resources to insure their survival in the face of short-run selection pressures (Levinthal & March, 1993).

The tension of exploration versus exploitation is a challenge for managers to justify their decision rights of synchronizing concurrent exploitation and exploration. For managers to be able to concurrently balance exploitation and exploration, they have to base their decisions contingent upon the environment their organization faces (Benner and Tushman, 2003; Gupta et al., 2006; Jansen et al., 2006). Nevertheless, in making the trade-off between exploitation and exploration, firms through their managers have their own preferences.

The preferences of the managers seem to draw on their strategic orientations (Venkatraman, 1989). On the one hand, exploitation can lead to positive short-term performance effects by reducing variety, increasing efficiency and improving adaptation to current environments. However, prior studies show that firms that focus on short-term exploitation may end up in a competence trap (Levinthal and March, 1993; Levitt and March, 1988). Although exploitation may enhance short-term performance, it results in the development of core rigidities and reduced flexibility (Volberda, 1996). On the other hand, exploration-oriented activities are more concerned with helping a firm to develop new competences and increase variety that are directed to long-run performance effects (He and Wong, 2004; March, 1991). Studies show that too much focus on exploration may result in a renewal trap which is dysfunctional for the firm (Volberda and Lewin, 2003).

Likewise in the first and the second key principles, it is also necessary to substantiate the generic enabling antecedents of the third key principle. Table 5.3 shows the generic antecedents of the third key principle categorized by strategy, structure, managerial processes, and leadership.

Table 5.3: Enabling antecedents of the third key principle**Type of enabling antecedents of the third key principle (exploitation=exploration)**

Strategy	Balancing slack resource allocation through ambidexterity (Jansen et al., 2008; Sidhu et al., 2004; Smith & Tushman, 2005), punctuated equilibrium (Burgelman, 2002)
Structure	Internal corporate venturing structure (Burgelman, 1983; Burgers et al., 2009), ambidextrous structure (Tushman & O'Reilly, 1996; Jansen et al., 2009), structural differentiation (Lawrence & Lorsch, 1967; Gilbert, 2005; Burgers et al., 2009; Jansen et al., 2009)
Managerial process	Incorporating venture capital metrics (Beinhocker, 1999; Burgelman, 1983; Burgers et al., 2009), encouraging ambidextrous learning (Gilbert, 2006; Westerman et al., 2006)
Leadership	Autonomous entrepreneurs (Burgelman, 1983), transformational leadership (Jansen et al., 2008)

Source: adapted from Lewin and Volberda, 2004

Concerning the enabling strategies of exploitation and exploration, firms through their managers need to balance slack resource allocation by establishing cross-fertilization across exploratory and exploitative strategic renewal actions (Jansen et al., 2008; Sidhu et al., 2004; Smith and Tushman, 2005). This refers to ambidexterity, i.e. the simultaneous pursuit and combination of exploratory and exploitative innovations within organizations (Tushman and O'Reilly, 1996; Gibson and Birkinshaw, 2004). In addition to ambidexterity, Burgelman (2002) contends that punctuated equilibrium is another way to balance exploration and exploitation simultaneously. To this end, punctuated equilibrium contends that the balance can be achieved through a sequential pattern of longer periods of exploitation and short bursts of exploration.

As far as enabling structures are concerned, to balance exploration and exploitation simultaneously, firms may benefit from an internal corporate venturing structure, ambidextrous structure, and/or structural differentiation. Internal corporate venturing structure refers to a structure that stimulates the creation of new business within existing firms (Sharma and Chrisman, 1999) through the creation of new competencies and capabilities underlying new products and services (Zahra et al., 1999). Through internal corporate venturing, scholars have suggested that an ambidextrous structure design by creating separate units within the corporate structure to facilitate new venture development (Tushman & O'Reilly, 1996; Jansen et al. 2009; Westerman et al., 2006). Such design corresponds also to structural differentiation which refers to "the state of segmentation of the organizational system into subsystems, each of which tends to develop particular attributes in relation to the requirements posed by its relevant external environment" (Lawrence & Lorsch, 1967, p.3-4). Structural differentiation may help ambidextrous organizations to maintain multiple

competences that deal with paradoxical demands such as exploration and exploitation (Gilbert, 2005; Burgers et al., 2009; Jansen et al., 2009).

Third, in consistent with the internal corporate and ambidextrous structures, managerial processes such as incorporating venture capital metrics (Beinhocker, 1999; Burgelman, 1983; Burgers et al., 2009) and encouraging ambidextrous learning (Gilbert, 2006; Westerman et al., 2006; Kwee et al., 2006/Chapter 4 of this thesis) are very relevant for the efforts of balancing exploitation and exploration concurrently. Venture capital metrics help to create relatively robust level for venture managers to manage the stages from pre-venture to commercialization fruitfully (Burgelman, 1983). Additionally, ambidextrous learning enables managers to action learning that concurrently balances exploitation and exploration either in low or high levels of balance aligned with the pertaining knowledge environment.

With reference to enabling leaderships, Burgelman (1983, p.241) contends that leaders who encourage autonomous entrepreneurial activities “may be one of the most important resources for maintaining corporate capability for renewal through internal development.” Likewise Jansen et al. (2008) argue that transformational leadership increases the effectiveness of senior team attributes in ambidextrous organizations through the moderating role of the effectiveness of senior team social integration and contingency rewards.

The need to balance exploration and exploitation concurrently for a firm’s long-term viability is also well recognized by Shell. This is reflected through one of our interviews with Shell’s top managers. The option theory that was mentioned by the interviewee also reflects the idea of requisite variety (Ashby, 1964) that relates to the first key principle.

“We recognize that it is fundamental to pay attention to the short-term and long-term focuses. On one hand, we are very keen to activities that are very much geared toward improving our existing technologies. On the other hand, we also seriously invest in exploring something new. I believe that Shell has always been adopting an option theory. In Jeroen van der Ver’s, our CEO’s, term, this option theory is called ‘pots on the fire’ basically means creating options for future. By generating many options, we direct our strategic orientation by thinking ‘what can this company be for the next 100 years?’ instead of thinking ‘what would this company be in the next 10 years?’”

(Interview with a Shell’s top manager at the planning department, 27 September 2007)

Altogether Levinthal & March (1993), Lewin *et al.* (1999), and March (1991) suggest that maintaining a balance of exploration and exploitation activities in a firm is a primary factor in its survival and prosperity. Maintaining a balance means that neither exploration nor exploitation should be conducted at the expense of the other: firms engaging in exploration at the expense of exploitation are likely to find that they suffer the costs of experimentation without gaining many of its

benefits, whereas exploitation at the expense of exploration threatens a firm's survival by creating a competency trap; a continual elaboration of increasingly obsolete capabilities. As such, this exploration / exploitation tension "takes dynamism into consideration by advancing an explanation for why and how organizations survive over time or fail to do so" (Lewin *et al.* 1999, p. 537).

The above discussions are in line with the sustained strategic renewal perspective, in particular from the third principle of self-renewal. In particular, Volberda and Lewin (2003) contend that firms should balance concurrent innovation and knowledge creation (exploration) with improvements in productivity, process improvements and efficiency, and product extensions and enhancement (exploitation). Their idea is that self-renewing organizations synchronize and balance concurrent exploitation of existing competences and exploration for new opportunities. This suggests the following proposition:

Proposition 3:

Balancing exploitation and exploration concurrently over time positively influences sustained strategic renewal.

5.4 Conclusion

Throughout this chapter, we have developed an extended conceptual framework that links our conceptual studies in the earlier chapters with our empirical studies in the upcoming chapters. We elaborated on the three key principles of self-renewing organizations (Volberda and Lewin, 2003). Additionally, we substantiated key antecedents of the three key principles by building on Lewin and Volberda (2004) that comprise enabling strategies, structures, managerial processes, and leadership associated with each of the three key principles. To sort out the potential constructs of the three key principles, we have also put forward three propositions related to each of the key principles. Table 5.1 summarizes the propositions with the respective chapters for further empirical investigation. The empirical studies will primarily focus on the three key principles. Before we present our empirical studies, we first explore several research methods that are relevant to conduct the empirical studies.

Table 5.4: Summary of propositions of the three key principles

Key Principle (KP)	Proposition	Chapter
KP1: Internal rate of change vs. external rate of change	<ul style="list-style-type: none"> Aligning the internal rate of change of a firm with the external rate of change of the firm's environment positively influences sustained strategic renewal. 	8
KP2: Self-organization	<ul style="list-style-type: none"> Self-organization positively influences a firm's sustained strategic renewal. 	9
KP3: Exploitation and exploration	<ul style="list-style-type: none"> Balancing exploitation and exploration concurrently over time positively influences sustained strategic renewal. 	10

Part III: Methodology and Empirical Settings

6. Methodology of Empirical Studies

6.1 Introduction

Edmondson and McManus (2007) argue that a good research project necessitates a methodology that is consistent with research questions one poses and theoretical contributions one attempts to make. We incorporate their suggestion when designing our research methodology. While theoretical foundations we described in Chapter 2 advocate us on theoretical ground rules of a conceptual frame of reference and a set of sensitizing concepts (Barley, 1990), research methodology described in this chapter advocates us on methodological ground rules of how the frame of reference can be put into research implementation and how the set of sensitizing concepts can be operationalized into measurable proxies.

On the basis of that, this chapter discusses why we chose a particular method in carrying out this PhD study. In outlining our research methodology, we focus on questions such as what approaches should be used to study sustained strategic renewal over long period of time, what data sources should be used and collected, and what type of analyses can be conducted given the approaches and data sources.

This chapter is structured as follows. We start with the research design. In this respect, we undertook longitudinal research by means of a comparative case study method. Time is embedded in our study through a longitudinal content analysis that covers a long period of time. We also chose the multilevel study method in doing the longitudinal study which occurs at the industry and firm levels. Subsequently, this chapter highlights choices about selection of case industry and case companies, data collection, and data analysis techniques. We then point out the methodological consequences resulted from the research design before we conclude the chapter.

6.2 Empirical Research Design

Methodological Approaches

There is a broad agreement among organizational researchers that major contributions in empirical work in organizations will be made on the basis of longitudinal research (Monge, 1990; Pettigrew, 1990). The underlying argument is based on the notion that organization science is moving in the direction of studying dynamic processes. This implies that organization studies will be dynamic rather than static and research will be based on longitudinal designs rather than single point-in-time designs. This view of organization studies generally takes a relatively long-term perspective and favors longitudinal designs in empirical research.

On the basis of the upshot of the above discussion, the methodological strategy that we chose to conduct our empirical study seems obvious. It is vital for us to incorporate a temporal analysis in studying dynamic processes of sustained strategic renewal over an extended period of time. In other words, our research should attend to longitudinal effects of organizational adaptation within a historical context of a firm and its environment. This study is, therefore, built on a longitudinal method.

Furthermore, since our study is built on a coevolutionary perspective, the longitudinal research approach also matches some of the requirements of a coevolutionary study as suggested by Lewin and Volberda (1999), among others: (1) studying organization adaptation over a long period of time by using longitudinal time series of microstate adaptation events and measures of rate of change or pace of change; (2) examining organizational adaptation within a historical context of the firm and its environment; and (3) incorporating changes occurring at the level of firm and industry.

In addition to the longitudinal method, because this study focuses mainly on the 'how' research questions of strategic renewal that are not yet thoroughly researched, a case study is also the logical methodology (Yin, 1984). In principle, a case study is a research strategy that focuses on understanding the dynamics past and presents drawn from multiple sources of evidence within certain settings (Eisenhardt, 1989b). Case studies that examine changes in strategy over long periods of time (e.g. Miles and Cameron, 1982; Mintzberg and Waters, 1982; Mintzberg and McHugh, 1985) indeed provide an important contribution to theory development.

Also due to the long time span covered in our study, we use a retrospective longitudinal approach. Retrospective longitudinal designs that built upon historical accounts, however, have been criticized for incorporating potential hindsight biases in the findings (Golden, 1992, 1997). Pettigrew (1990) counters this critique by arguing that history is not merely past events and retrospective chronology but it shows deeper pathways that lead to the present and may shape the future. History facilitates a broader longitudinal scope for investigating changes in a firm's strategy over time. We incorporate both concerns through a triangulated method by gathering different types of data that can be used as cross-checks. The triangulated method is possible here as case studies typically combine data-collection methods of qualitative, quantitative or both data from varying sources.

Finally, we also use a multilevel method when incorporating both selection and adaptation perspectives discussed in Chapter 2. In particular to study the complex and dynamic interaction among organizational and environmental forces, we chose to focus on an industry level as well as on a firm level. We elaborate on the selection of industry and case companies in the following section.

Selection of Case Industry and Case companies

With regard to research settings, selection of a case industry is an important aspect as it defines the set of entities from which the sampling firms are to be drawn. It also controls extraneous variation and helps to define the limits for generalizing the findings (Eisenhardt, 1989b; Yin, 1984). A single case study, in this sense, is subject to limits in generalizability and several potential biases such as the misjudgment of the representativeness of a single event (Tversky and Kahneman, 1986). Therefore besides doing our case study on a focal company, we also take into account such concern by employing a comparative case study.

In the first place at the industry level, we selected the oil industry as our central case industry. Why is the oil industry then relevant for studying sustained strategic renewal over a long period of time? There are at least three reasons that we considered during the selection process. First, the oil industry is relevant for this PhD study as it has experienced critical events or changes (see Table 6.1) that have reshaped its competitive landscape over time (Grant, 2003). More specifically, they had experienced a radical transformation of their industry environment from one of stability and continuity to one of uncertainty and turbulence (Grant, 2003). Consequently, the oil industry provides a propitious background for studying organizational transformation and survival (Pettigrew, 1987; Wischnevsky, 2004). Jacoby (1973) mentions four distinguishing characteristics of the oil and gas industry. The industry is characterized by (a) high levels of technical, economic, and political risk, (b) the need for continuity of operations, (c) a complex environment of governmental regulations, and (d) relative difficult conditions to entry. These characteristics are also very relevant for studying how changes in key environmental events may influence changes in

firms' internal events (cf. the first key principle of self-renewal). Second, since our study focuses on sustained strategic renewal of long-lived firms, we need to select a large incumbent industry that has existed for a long period of time. The oil industry is one of the very few large incumbent industries that has been in existence for centuries (Yeomans, 2004; Yergin, 1993). The oil majors were among the world's largest industrial corporations (Grant, 2003). Third, the selection of a single large long-lived industry also allows us to control for industry effects that may confound the results (Dess, Ireland, & Hitt, 1990). The oil companies were unusual in their complexity; they were vertically integrated, diversified, and multinational. They were confronted with complex coordination problems (Grant, 2003). Because of the size and complexity of large oil companies, we can see that "the transition from a stable to turbulent environment in this industry sector is more apparent than in any other industries" (Grant and Cibin, 1996, p.167).

Table 6.1: Summary of world oil industry critical event

Year	World oil industry critical event
1928	Red line agreement that marked the creation of an oil monopoly or cartel
1937	Nationalization of Mexican oil fields
1951	Nationalization of Iranian oil fields
1960	Formation of Organization of the Petroleum Exporting Countries (OPEC)
1967	Yom Kippur War, Arab oil embargo
1973	First oil / energy crisis
1974	Formation of International Energy Agency (IEA)
1979	Second energy crisis
1980s	Oil glut, a surplus of crude oil due to falling demand following the 1973 and 1979 energy crises
1982	First OPEC quotas
1986	Oil price collapse
2006-2007	Prices spike on supply disruptions, rapid demand increases, constrained OPEC capacity, low inventories

Source: Yergin, 1997; Energy Information Administration (EIA)

In the second place at the firm level, we selected two large, long-lived firms in the oil industry which have experienced transition as the result of technological or other environmental changes. As a result, we chose respectively Royal Dutch Shell plc (Shell) as our focal firm and British Petroleum plc (BP) as our comparative firm.

Why is Shell suitable for studying the evolvement of strategic renewal trajectories? As far as type of organization is concerned, we based our selection on at least three main reasons. First, the long history of Shell's company records provides us with a rich data set and a full account to observe the firm's longitudinal strategic renewal trajectories. Second, until 2004 Shell embodied a dual-ownership structure through the board compositions of "Committee of Managing Directors" (CMD). The CMD composition was in existence from 1959 until 2004. This dual ownership structure matches with our intention to study the role of top management in influencing a firm's strategic renewal (Chapter 10). Third, Shell's competitiveness in the oil industry (Brenneman et al., 1998; De Geus, 1999; Grant, 2003; Schoemaker and Van der Heijden, 1992) increases the accessibility to rich sources of publicly available information (e.g. Cummins and Beasant, 2005; Gabriels and Jongmans, 1990; Gerretson, 1959; Howarth, 1992, 1998; Jones, 1977; Van Zanden et al., 2007; Yergin, 1993). In addition, both retired as well as active top managers of Shell provided us with supplementary archival data. Through in-depth interviews, they also provided us with key historical strategic events that are more insightful than the ones reported in the public and archival data.

Alternatively, we asked why we chose BP as the comparative firm for our empirical study. First of all, we chose to have a comparative analysis as it is an appropriate initial boundary-setting approach to general organizational theory (Udy, 1965). Without it, case studies remain haphazard and generalizations remain dubious. Second, Shell and BP have somehow a comparable background. Both Shell and BP are big oil majors that were at the top 5 list of the Global 500 four years in a row (Source: 2005-2008 Fortune Global 500; see Table 7.2 in Chapter 7). Both are the major competitors for Exxon, Chevron and other oil majors. And both manage to survive as long-lived firms albeit of the intense competition in the oil industry over the years. However unlike other big oil majors that have the American origins, Shell (founded in 1907) and BP (founded in 1909) both have the British origin in combination with the Dutch and Iranian/Persian origins respectively.

Altogether, the selection of oil industry allows us to control environmental variation and to clarify the domain of findings, i.e. the specific type of industry environment in which these two large oil firms operate. By deciding on this research design, we aim to implement a longitudinal comparative case study method (Pettigrew, 1990).

6.3 Data Collection Methods and Data Sources

We aimed to collect data, as suggested by Pettigrew (1990), that are processual (an emphasis on patterns of strategic renewal actions over time), comparative (two case companies in single industry), historical (take into account the historical setting of case industry and case companies) and contextual (examine the reciprocal relations between processes and historical and industry contexts). This means our focus is on case studies and not just case histories.

Our data sources comprise primary and secondary data sources (cf. Ginsberg, 1988). As a primary data source, we used historical data collected from internal and external sources of the target organization. The data include the organizational annual reports and other internal documents, books, journals and databases. As a secondary data source, we used retrospective data collected directly from members of the target organization through interviews.

Besides for cross-checking, the aim of various data collection methods is to draw on different strong points of diverse data sources. Archival documents and journals, for instance, have the strength of providing facts of the ‘what’ of change and quantitative data but suffer from selective deposit and survival (Pettigrew, 1990). Interviews, or multiple-informant data, can complement the former sources as they provide in-depth qualitative data to reveal the ‘how’ and ‘why’ of changes (Pettigrew, 1990).

In the next sections, we are going to discuss the data sources of this study. We start with the discussion of the use of archival data from multiple sources both at the oil industry level as well as at the level of our case companies, Shell and BP. This is then followed by the discussion of the interviews we conducted as a complementary source of the archival data sources.

Archival Data Sources

The use of published histories is particularly important for developing longitudinal research designs for researching changes in strategy (Ginsberg, 1988). In the first place, we used the annual reports of our case companies. There are at least three key reasons why annual reports are relevant for this study. First, annual reports that provide comparable corporate information through time (Jauch et al., 1980; Kabanoff, 1996; Weber, 1990) make it possible to implement our longitudinal research design.

Second, methodologically in comparison to interviews or questionnaires, Osborne et al. (2001) notice the reliability of using annual reports as they do not suffer from retroactive sensemaking. The validity of annual reports is also emphasized by organizational researchers because senior executives “spend considerable time outlining the content of the report, sketching out much of it, and proofreading and changing most of it to their taste” (Bowman, 1984, p. 63). Also

Fiol (1991, 1995), in her comparison of the annual report statements with internal company documents, found that annual reports did not differ significantly from internal documents in broad strategic issues and strategic facts.

Third, annual reports provide key information to study interaction of firms with their environment (Dirsmith & Covaleski, 1983) and strategic schemas (Nadkarni & Narayanan, 2007; Schneider & Angelmar, 1993). For instance, organizational researchers have used annual reports to identify corporate strategic actions (Barr et al., 1992), to assess casual reasoning within firms (Bettman and Weitz, 1983), and to explain differences in joint ventures (Fiol, 1989).

Also due to the longitudinal nature of the study, our data collection thus was conducted through an archival data collection approach. Our main data consists of the annual reports of the management board and company documents of the history of Shell and BP. For Shell's case, we digitalized the annual reports and internal documents of the company. The data digitalization is only conducted for the Shell's case as the company has very old and vulnerable hard copies of annual reports and internal documents of management board, in particular those from the early years (annual reports, 1907-1989; internal documents, 1907-1959). It is also possible since we were given an access to the company's archives. The Shell's annual reports from 1990-2008, however, are available online through the company's website and Thomson Research. For data digitalization, we electronically scanned 4,594 pages of the annual reports and internal documents after compiling them on a chronological basis. Following the data digitalization, we coded strategic renewal actions identified from each year of the annual reports. As a cross-check during the coding process, we triangulated our coding from the annual reports with our secondary data sources. In the "data analysis technique" section, we provide a more detailed explanation of how we did the coding.

For BP's case, we did not digitalize the data. Unlike the Shell's case, we did not have an access to the company's archives and thus limited the duration of our analysis. Therefore as a comparative firm in our study, our analysis of BP started from 1970. For the purpose of analysis, we managed to get the online sources of BP's annual reports from 1907-2008 from BP's website and Thomson Research. Additionally, we also collected the oil industry data from BP Statistical Review of World Energy 2008 that comprises among others data of oil statistics such as oil reserves, oil production, oil consumption and oil prices. There are also oil industry data based on the appendices from the study of Van Zanden et al. (2007).

In addition to internal archival documents of Shell and BP, we also used secondary data describing the history of Shell and BP, and industry publications. These include among others publications on the history of the oil industry (Jacoby, 1973; Sampson, 1975; Eternad et al., 1991; Yergin, 1993) and the history of Shell (e.g., Howarth, 1992, 1998; Van Zanden et al., 2007) and BP (Jones, 1977; Ferrier, 1982; Bamberg, 1994, 2000). Furthermore, we also use external sources of databases such as Thomson One Banker, Energy Information Administration, and

Online Derwent Databases. Table 6.2 summarizes the data sources that we used in conducting this PhD research.

Table 6.2: Summary of sources of archival data

Sources of Archival Data		
Type of data sources	Shell	BP
Oil industry	Jacoby, 1973; Sampson, 1975; Eternad et al., 1991; Yergin 1993; Energy Information Administration (www.eia.doe.gov); BP Statistical Review of World Energy 2008; Appendices from Van Zanden et al. 2007; Thomson One Banker; Online Derwent Databases (www.derwent.co.uk)	
Internal firm's document sources	<ul style="list-style-type: none"> • Annual reports, 1907-2008 (Shell's archive; company website: www.shell.com; Thomson Research) • Internal documents of management board, 1907-1959 (Shell's archive) • Organizational directory, 1985-1994 (Shell's archive) • HR archives and Shell's Who's Who system, 1994-2008 (Shell's archives and Intranet system) 	<ul style="list-style-type: none"> • Annual reports, 1970-2008 (BP's website: www.bp.com; Thomson Research) • BP Statistical Review of World Energy 2008 (www.bp.com/statisticalreview)
External firm's document publications	<ul style="list-style-type: none"> • References: Gerretson, 1957; Jones, 1977; Gabriels & Jongmans, 1990; Howarth, 1992, 1998; Yergin 1993; Brenneman et al., 1998; Grant, 2002; Cummins & Beasant, 2005; Tyler, 2007; Van Zanden et al., 2007) • Thomson One Banker • Energy Information Administration (www.eia.doe.gov) • Online Derwent Databases (www.derwent.co.uk) 	<ul style="list-style-type: none"> • References: Longhurst, 1959; Jones, 1977; Ferrier, 1982; Bamberg, 1994, 2000; Pettigrew & Whittington, 2003. • Thomson One Banker • Energy Information Administration (www.eia.doe.gov) • Online Derwent Databases (www.derwent.co.uk)

Another reason why we used archival data sources is that the necessity in this study of a longitudinal research design relying upon historical data diminishes the utility of self-typing and retrospective external assessments (See Golden, 1992, for a discussion of the limitations of retrospective external assessments). Nevertheless, archival documents such as annual reports have also been criticized as suffering from internal bias. Researchers must be aware of the communication strategies of senior executives with external stakeholders (Ingram & Frazier, 1983).

To address this issue, we use multiple sources of data to ensure and to augment the soundness of our research through data triangulation from diverse sources. Besides annual reports and internal company documents and archives, our sources of data stem from other publicly available documents, scholarly journals, computerized databases and interviews. The documents from external sources can help to mitigate the internal bias and enhance the external validity.

Even when archival data are available, a researcher must frequently employ retrospective accounts to interpret the data. For instance, Schwenk (1985, p. 501) noted that researchers who merely observe organizational decision processes (as opposed to also relying on retrospective accounts) may “see decision processes as quasi-random simply because they lack the knowledge about the organization necessary to find the order that exists in its decision processes”. The next section will address how we collected our data through interviews.

Interviews

In retrospective longitudinal research, one can conduct interviews by eliciting accounts of the past from key informants (Seidler, 1974) or groups of individuals to obtain information about past strategy. Selecting multiple informants at different organizational levels helped to mitigate subject biases (Golden, 1992) and to provide a broader range of perspectives (Bourgeois & Eisenhardt, 1988; Guba & Lincoln, 1989).

In organizational research, executives’ retrospective accounts have been used alone, or in conjunction with other methods, to identify firm strategy (Boeker, 1989; Feeser & Willard, 1990), planning process (Eisenhardt & Bourgeois, 1988; Mintzberg, Raisinghani & Theoret, 1976; Nutt, 1987) and strategic and organizational change (Eisenhardt & Schoonhoven, 1990; Smith & Grimm, 1987). In many cases, eliciting accounts of the past from key informants (Seidler, 1974) or groups of individuals is the only way to obtain information about past strategy.

As mentioned before, since we only had an internal access to Shell, we could only conduct interviews with the top managers of Shell. Interviews were semi-structured and were conducted from December 2006 until December 2007. The interviews lasted for one to two hours and were conducted with sixteen top managers who were still in service with Shell during the period of interviews and with five retired executives (previously worked for Shell). All interviewees have worked in different functions. The interviews were tape-recorded and the transcripts were written (Yin, 2003). The transcription resulted in 316 double-spaced pages of interview text. In some cases, interviewees were re-contacted after the interviews for confirmatory or follow-up questions. Eventually this procedure might provide the basis for a more comprehensive instrument of organizational assessment on emergent themes such as self-organization. This analytic approach is also appropriate for organizing longitudinal data, especially when based on a single case of abundant information (Langley, 1999).

Table 6.3 summarizes the profile of interviewees, the years of service at Shell, duration of interview, and the number of pages resulted from the interview transcriptions. The interview questions can be found in Appendix A of this thesis.

Table 6.3: Overview of interviews at Shell

Job function	Job title	Years of service	Number of respondents	Duration of interview (minutes)	Number of pages of interview transcripts
Management	(Former) Executive	>30	1	117	18
Management	(Former) Senior manager	>30	1	105	16
Planning	(Former) Senior manager	30-40	2	228	35
Research	(Former) Executive	>30	1	98	18
Technology	Executive	>25	1	107	17
Public Relations	Executive	>10	1	68	12
Planning	Executive and senior manager	25-35	3	276	42
Strategy	Executive and senior manager	20-30	3	299	46
Research	Senior manager	20-35	2	234	29
Innovation	Senior manager	20-35	3	307	46
Patent	Manager	25-30	2	112	22
Investment	Senior manager	>30	1	75	15
Total			21	2,026	316

Interview method may be very time-consuming. In total, we spent 2,026 minutes (almost 34 hours) for conducting the interviews, excluding the time (more than a month) spent to transcribe the interviews. The method, nevertheless, helps us to reveal some organizational constructs that do not lend themselves easily to quantitative measurement (Strauss and Corbin, 1988). For instance, the construct of self-organization in our study to some extent also requires qualitative comprehension despite being assessed quantitatively. All in all, the combination of quantitative and qualitative data obtained from diverse sources provides rich data sources to investigate organizational sustained strategic renewal over an extensive period of time.

6.4 Data Analysis Method

To analyze the rich data set, we employed several data analysis techniques that are appropriate to investigate each of the three key principles of sustained strategic renewal. Table 6.4 shows an overview of data analysis techniques that we used to investigate the three key principles along with the associated measures, level of analysis and time frame. In the rest of this section, we will discuss the data analysis method that we used to study each of the three key principles.

Table 6.4: Overview of data analysis techniques used to investigate three key principles

Key Principle	Measure	Level of Analysis	Data Analysis Technique	Time Frame
1: Rate of Change	<ul style="list-style-type: none"> Homogeneous measures for internal rate of change (IRC) and external rate of change (ERC) Heterogeneous measures for internal rate of change (IRC) and external rate of change (ERC) Differences between internal and external rates of change (ΔRC) Average annual IRC, ERC, ΔRC Volatility of annual IRC, ERC, ΔRC 	<ul style="list-style-type: none"> Industry level (oil industry) Firm level (Shell and BP) 	<ul style="list-style-type: none"> Computation of rates of change Structural change test (Chow, 1960) Content analyses of archival data and interviews 	Depending on data availability, analysis of each level can range from: <ul style="list-style-type: none"> Oil industry (1907-2008) Shell (1907-2008) BP (1970-2008)
2: Self-Organization	<ul style="list-style-type: none"> Hierarchical level Chief executive's span of control Administrative intensity 	<ul style="list-style-type: none"> Firm level (Shell only) 	<ul style="list-style-type: none"> Computation of self-organization measures Content analysis of interviews 	<ul style="list-style-type: none"> Shell, 1985-2008
3: Exploitation= Exploration	<ul style="list-style-type: none"> Exploitation ratio of exploitative strategic renewal actions Exploration ratio of explorative strategic renewal actions External ratio of external growth strategic renewal actions Internal ratio of internal growth strategic renewal actions Top management team (TMT) corporate governance perspective Proportion of shareholders 	<ul style="list-style-type: none"> Firm level (Shell and BP) Strategic renewal actions (Shell and BP) Top management team (Shell only) 	<ul style="list-style-type: none"> Content analyses of archival data Computation of ratios of strategic renewal actions Correlation analysis 	<ul style="list-style-type: none"> Shell, 1907-2006 BP, 1970-2006 For the study of TMT is only applicable for Shell, 1959-2004

Data analysis techniques for investigating the first principle

To begin with, we put forward the method of how to calculate change over time. The rate of change specifies how fast the magnitude increases or decreases per unit of time (Monge, 1990). To calculate the rate of change of data from two or more points in time, we use the following formula as shown in Table 6.5. The rates of change (RC, in percentage) can have a value of minus, zero or plus. While the negative resulting number means a decrease of rate of change over time, the positive resulting number means an increase of rate of change over time. If the RC equals to zero, this means that there is no change in the value between the earlier point and the later point in time.

By the same token, we computed the differences between the annual internal and external rates of change (ΔRC), the result can also be negative, zero or positive. For the measures of RC, they are not additive as the time window changes along the timeline. However, for the homogeneous measures we can compute the magnitude of the differences of the levels between the annual IRC and ERC (sum of ΔRC over the years). While negative ΔRC means that at a certain year the annual internal rate of change (IRC) is falling behind the annual external rate of change (ERC); positive ΔRC means that the annual IRC exceeds the annual ERC. If ΔRC equals to zero, this means that the annual IRC exactly matches the annual ERC. For the heterogeneous measures, the measures of ERC or IRC are not additive. In this case, to better describe the distribution of the rates of change, we use the minimum and maximum values of yearly ERC or IRC instead of the sum of the ΔRC . Additionally, we also computed the average and volatility of annual IRC, ERC, and ΔRC .

Table 6.5: Computation of rates of change

Measure	Formula or definition	Symbol
<ul style="list-style-type: none"> Rate of change 	$RC (\%) = \left(\frac{X_t}{X_{t-1}} - 1 \right) * 100$	<ul style="list-style-type: none"> RC: rate of change (in percentage) X_t: value from the later point in time X_{t-1}: value from the earlier point in time
<ul style="list-style-type: none"> For homogeneous measures only: Magnitude of the level differences between annual internal and external rates of change 	$\Delta RC = IRC - ERC$	<ul style="list-style-type: none"> ΔRC: differences between annual internal and external rates of change
<ul style="list-style-type: none"> For heterogeneous measures only: Minimum and maximum values of yearly internal and external rates of change 	<ul style="list-style-type: none"> Min. annual IRC or ERC Max. annual IRC or ERC 	<ul style="list-style-type: none"> IRC: internal rate of change ERC: external rate of change
<ul style="list-style-type: none"> Average annual RC 	Average of annual IRC, ERC, or ΔRC	
<ul style="list-style-type: none"> Volatility of annual RC 	Standard deviation of annual IRC, ERC, or ΔRC	

As indicated in Table 6.4 before, for the measures of rates of change we developed homogeneous and heterogeneous measurement indicators to quantify both external and internal rates of change. We develop these two types of measurement indicators because of the limitation of the availability of longitudinal data that have comparable and sufficient duration for both firm and industry level. Additionally, in some cases there are measures that are specific to the industry level or specific to the firm level, but not for both industry and firm levels. For instance, data such as oil prices and competitive diversity are only available at the industry level but not for the firm level. Table 6.6 provides the definition of homogeneous and heterogeneous measures. We will delineate the measurement indicators for each of the two types of measures in Chapter 8 (see Table 8.1).

Table 6.6: Homogeneous and heterogeneous measures of rates of change

Type of measures	Definition
Homogeneous measures	Measures that are similar and comparable between the industry level and the firm level
Heterogeneous measures	Measures that are different between the industry level and the firm level

Source: Author.

Regarding the heterogeneous measures, for the firm level, we built upon Fine (1998). Fine (1998) introduced the concept of industry clockspeed to capture the rate of industry change driven by endogenous factors (technological and competitive). He suggested three facets of industry clockspeed: product, process, and organizational. Product clockspeed represents new product introduction rates. Process clockspeed reflects the rates at which process technologies are replaced in an industry. Organizational clockspeed reflects the rate of change in the strategic actions (e.g. mergers, acquisitions, internal expansion, interorganizational alliances) and structures (e.g., restructuring and changes in top management) of incumbent firms in an industry. The results, however, are based on the aggregate actions of all incumbent firms in an industry rather than the actions of any individual firm. Our study complements Fine's study by also looking at the firm-level actions.

To this end, we built upon the Fine's (1998) concept of the industry clockspeed by translating it into the firm-level concept, respectively: the internal rate of change (IRC) of new products and services, process, organizational structure, and internal venturing. Fine's (1998) organizational clockspeed entails two aspects: the structure and the strategic actions of venturing. We take these into account by separating the change in organization structure with the change in venturing. For the venturing activity, we divided into the internal and external venturing. Since we have data on external venturing for both the industry and the firm levels, we categorize the rate of change of external venturing into the

homogeneous measure. While for the internal venturing, since we only have the data at the firm level, we categorize it into the heterogeneous measures. Table 6.7 shows the translation from Fine's (1998) concept of industry clockspeed into our firm-level heterogeneous measurement indicators.

Table 6.7: Measures built on Fine's (1998) concept of industry clockspeed

Dimension	Fine (1998)	This study
Focus	Aggregate actions of all incumbent firms in an industry, an indication of industry clockspeed	Individual actions at an individual firm level, an indication of firm-level heterogeneous measures
Measure and definition	<ul style="list-style-type: none"> Product clockspeed: new product introduction rates Process clockspeed: rates at which process technologies are replaced in an industry Organizational clockspeed: rate of change in the strategic actions (e.g. mergers, acquisitions, internal expansion, interorganizational alliances) and structures (e.g., restructuring and changes in top management) of incumbent firms in an industry 	Firm-level heterogeneous measures: <ul style="list-style-type: none"> Internal rate of change (IRC) new products and services: rate of new product/service introduction IRC process: rate of new process technology IRC organizational structure: rate of restructuring in organization, departments, and changes in top management IRC internal venturing: rate of internal expansion Homogeneous measures (due to the availability of data in both the industry and the firm levels) ⁷ <ul style="list-style-type: none"> Internal and external rate of change of external venturing: rate of change of mergers, acquisitions, joint ventures, and interorganizational alliances

Additionally to investigate the first key principle, we used Chow test (Chow, 1960) in the SPSS software to indicate if there is indeed a change in the industry. A time series or longitudinal data can often contain a structural break. The Chow test uses an F-test to determine whether a single regression is more efficient than two separate regressions involving splitting the data into two sub-samples. In principle, the purpose to do the Chow test is to develop a framework that may focus on major social breakpoints (Pettigrew, 1985; Tushman and Romanelli, 1985) in a firm's history that indicate the end or beginning of periods of continuity or change.

After that, we used a structured content analysis technique (Jauch et al., 1980; Weber, 1990) to obtain data on the rate of change related to the rate of change of firm-level data of product/service, process, organizational, and internal venturing rates of change. Here, our main data consists of the annual reports of Shell and BP. We coded and calculated the yearly frequency of new product/service introductions, new process/technology, change in organizational structure and top management, and internal venturing that are initiated by the case firms. We then computed the rate of change of those variables.

In principle, the structured content analysis technique (Jauch et al., 1980; Weber, 1990) is an approach that uses a set of coding procedures to make valid and replicative inferences from text and to move the rich qualitative descriptions of the case studies approach beyond the quantification of the qualitative constructs (Weber, 1990; Stone et al., 1966; Krippendorff, 1980).

Why did we choose the longitudinal content analysis technique? We based our decision on the argument that content analysis allows rendering the rich meaning associated with organizational documents combined with powerful quantitative longitudinal analysis (Dureau et al., 2007). Content analysis of organizational documents and published histories provides an important way to quantify historical data (Ginsberg, 1988). Hence, content analysis, which involves coding words, phrases, and sentences in terms of particular constructs, appears to hold much promise for researchers interested in going beyond qualitative case studies or questionnaire designs in the investigation of changes in strategy (Bowman, 1985). Jauch et al. (1980) contrast the case studies through content analysis with questionnaires. Questionnaires are particularly susceptible to the problems of same source data, single-time collection and lack of depth regarding dynamic and comprehensive organizational conditions and processes. Cases studies through content analysis, however, can provide data from multiple sources over several time periods in considerable depth. The results from content analysis can also be used to explore dynamic changes over time. Furthermore while questionnaire measures have a number of conceptual and measurement problems (e.g. Downey et al., 1975; Tosi et al., 1973; Osborn, 1976), structured content analysis can provide an additional quantifiable assessment that is structured and replicable. Content analysis method can also provide separate estimates of volatility in different parts of a firm's environment (Jauch et al., 1977). Table 6.8 contrasts the key differences between questionnaire-type of study and content analysis.

Table 6.8: Differences between questionnaire and content analysis

Characteristics	Questionnaire	Content Analysis
Data source	Same source data	Multiple sources
Period of data	Single period	Multiple time periods
Level of depth	Lack of depth regarding dynamic of change processes	Considerable depth to study dynamic changes over time

Source: based on Jauch et al. (1980)

Furthermore, there are several methodological and practical benefits that we can achieve by implementing content analysis. First, this technique is considered as a reliable methodology because the coding scheme can be corrected and improved as the study proceeds (Tallerico, 1991; Woodrum, 1984). Second, content analysis requires the specification of category criteria for reliability and validity checks that fosters the creation of a replicable database (Lissack, 1998; Woodrum, 1984). Third, content analysis can be used in conjunction with other methods for the purpose of triangulation (Erdener & Dunn, 1990; Jauch, Osborn, & Martin, 1980; Kabanoff, 1996; Smith, Grimm, & Gannon, 1992).

Data analysis techniques for investigating the second principle

In the context of studying the self-organization principle, the issue of measuring the construct is still a challenge. A major task is the development of conceptual and methodological tools, particularly for dealing systematically with operationalization of self-organization construct. From a methodological standpoint, the selection of an appropriate measurement and analysis technique is certainly of great importance.

Some scholars (e.g. Krippendorf, 1984; Steier and Smith, 1985) have argued that self-organization must be observed and studied through organizational characteristics. It follows that self-organization exhibits a close connection with bureaucratic structure and control but in a contradictory way (Nonaka, 1988). For one thing from the self-organization perspective, dispersion of authority down the hierarchy can take place without loss of control. For another thing in the view of self-organization, decreased concentration of authority seems to accompany increased structuring of activities (Inkson et al., 1970).

Consistent with the above views in this study, structural concepts drawn mainly from the theory of hierarchical structure were conceptualized as a means of characterizing concentration of authority and administrative structures of organizations and used as variables in the study of self-organization.

Building on this idea, we translated the previously well-established dimensions of hierarchical structure into measurement indicators of self-organization in an attempt to quantitatively assess the variation of self-organization in an organization (in this case, Shell) over time. Table 6.9 shows the measurement indicators of self-organization that we built upon the constructs of bureaucracy. For more detailed explanation on these measurement indicators, please refer to Chapter 9.2.

Table 6.9: Measurement of self-organization

Measurement Indicator	Definition	Data Source & Timeframe
Hierarchical level	Number of levels of authority from top management to workers (Pugh et al., 1968)	Shell Exploration & Production (EP) Organizational Directories, 1985-1994, HR archives and Shell's Who's Who system, 1994-2008
Chief executive's span of control	Ratio of a chief executive to number of subordinates the chief executive has (Pugh et al., 1968; Evan, 1963)	Shell EP Organizational Directories, 1985-1994
Administrative intensity	Ratio of administrative staffs to exploration and production staffs (Evan, 1963; Melman, 1956)	Shell Organizational Directories (NL & UK), 1985-1994; HR archives and Shell's Who's Who system, 1994-2008

In our study of Shell, after performing the measurement, we will also present the quantitative results in a longitudinal chart in Chapter 9.3 to show the possible variation of self-organization in Shell over the years. Also in combination with the quantitative approach, we employ qualitative method to gain insight on, for instance, how important top management teams regard or perceive self-organization for their firms' long-term survival (the second key principle). In this sense, data were gathered by means of interviews designed to elicit factual organizational data from discussions with the top managers of various functional activities. Please refer back to Table 6.3 for the overview of the interviews we conducted at Shell. The analytic approach of interviews is appropriate for organizing longitudinal data, especially when based on a single case of abundant information (Langley, 1999). Eventually, the interview procedure provides a basis for a more comprehensive instrument of organizational assessment on self-organization.

Data analysis techniques for investigating the third principle

According to Kimberley and Miles (1980), historical records of the actions actually taken by an organization are often the most accurate sources of the firm's strategic decisions. The method of systematic document analysis has the advantage of capturing both a longitudinal and a cross-sectional study approach (Pettigrew, 1990). Building on the above discussions, we employed the structured content analysis technique (Jauch et al., 1980; Weber, 1990) to investigate the third key principle, particularly to obtain data of exploratory and exploitative strategic renewal actions.

In principle, a systematic document analysis is an approach to move the rich qualitative descriptions of the case studies approach beyond the quantification of the qualitative constructs. Using the content analysis technique, we developed, in the first place, a manual that prescribes a structural coding rule and schedule to analyze the content of each strategic renewal actions. The coding manual can be found in the Appendix B of this thesis. The manual provided a procedure to systematically analyze strategic renewal actions of our case companies (Shell and BP) and to consistently categorize each of the relevant strategic action based on the defined coding rules. The expected bottom line is to uncover longitudinal patterns of strategic renewal. This is achieved through the coding of strategic actions reported by the top management team in the annual reports. Note also that we follow Mintzberg (1978) regarding the realized strategic actions by coding strategic actions that are realized (materialized, implemented) for the year in which they were reported. For a triangulation purpose, we cross-checked the coding of strategic renewal actions with external sources such as books, articles, journals, or other publicly accessible documents.

To address the reliability and validity issues associated with the application of content analysis (Huff, 1990; Morris, 1994; Weber, 1990), we developed explicit coding rules to ensure reliability and comparability of results across texts. Additionally, we need to use multiple coders to ensure high intercoder reliability checks (Weber, 1990). To address the intercoder reliability issue, we conducted the coding to uncover strategic renewal actions through a team of three researchers. For this purpose, one researcher read and coded strategic renewal actions in the annual reports for the whole period of study. Using the same coding manual, two other researchers respectively coded certain number of years of the annual reports. For instance in Shell's case, the two researchers coded 20 years of the annual reports, divided in two periods i.e. 1976-1985 and 1995-2004. The three coders agreed on 439 of the 491 strategic renewal actions (89.4%) identified from the selected twenty years of annual reports. This resulted in a Cohen's kappa of 0.82, which indicates high intercoder reliability (Weber, 1990). The different coding results among the coders are primarily because coder(s) overlooked some of the realized strategic renewal actions. These discrepancies were then discussed and resolved by using the coding rules in the manual as a guideline.

Accordingly, we specify the definitions and attributes of each dimension in the coding manual. First, regarding exploitative or exploratory strategic renewal actions, we adopt the exploitation-exploration dichotomous concepts introduced by March (1991). While *exploitative* strategic renewal actions are defined as actions that elaborate on the current range of activities and fall within the current geographic scope (expansion, specialization), or that rationalize activities (closure, consolidation, downscoping), *exploratory* strategic renewal actions are defined as expanding a firm's repertoire of activities, making new, innovative combinations of current activities, or expanding the geographic scope of a firm's markets

(diversification of activities or geographic regions). For the coding purpose, we used binary codes where exploratory strategic renewal actions were coded ‘1’ and exploitative strategic renewal actions were coded ‘0’.

Second, for our second study of the TMT’s corporate governance perspective in Chapter 10, we put forward our definitions and attributes of internal and external growth strategic renewal actions. This is only done for the Shell’s case. Internal growth strategic renewal actions are implemented through one of the Royal Dutch Shell Group of Companies; this means through Shell or one of its subsidiaries autonomously. Actions that can be categorized as internal growth strategic renewal actions include starting up new business, entering new country, launching new products/services, obtaining license, reorganizing activities and closing offices or product lines. External growth strategic renewal actions are undertaken by any of the Shell entity and other external organizations. Actions that are grouped as external strategic renewal actions include merger, acquisition, joint venture, and other strategic alliances. While external strategic renewal actions were coded ‘1’, internal strategic renewal actions were coded ‘0’. To provide a better understanding of how we did the coding, we present Table 6.10 to show an example of our coding taking the example of Shell’s coding.

Table 6.10: Example of coding of strategic renewal actions

Year (annual report)	Page (annual report)	Short name	Description / context	Exploration (1) – Exploitation (0)	External (1) – Internal (0)
1984	10	Netherlands: formation of renewable energy systems	“A new company has been established in the Netherlands to develop and market solar energy systems world wide.”	1	0
1987	11	Germany: acquisition Celamerck	“Celamerck, a West German agrochemicals company, was acquired.”	0	1
1987	14	Netherlands: formation phytonova	“In the Netherlands, Phytonova, a micropropagation business, was started.”	1	0
1993	1, 10, 18	Group companies: cost reduction and efficiency improvement programmes	“Group companies therefore continued with further cost reduction and efficiency improvement programmes, particularly in Europe and North America.”	0	0

Source: Shell’s annual reports, 1984, 1987, 1993.

In addition to archival data collection, we also conducted a series of retrospective interviews with sixteen key (active) top managers of Shell from different divisions and with four retired executives. This is particularly conducted for the study of the TMT’s corporate governance perspective. All interviews were taped and were then transcribed. The duration of the interviews ranges from one hour to two hours. Please refer back to Table 6.3 for the overview of the

interviews. We later used these additional insights to triangulate our initial coding as well as our key findings. Subsequently, we used the data that we obtained from retrospective interviews to triangulate our key findings.

To conclude in our empirical research setting, we implemented content analysis of organizational documents and published histories to quantify retrospective longitudinal data. Our data analysis method is built upon established inductive qualitative methods: coding, data categorization, and pattern identification (Eisenhardt, 1989b; Miles & Huberman, 1984; Yin, 2003). To this end, we followed the basic phases of content analysis: data collection, coding, analysis of content, and interpretation of results (Holsti, 1969; Weber, 1990).

6.5 Conclusion

Research is an iterative process. In determining the relevant research methodology, a researcher needs to consider at least three factors: the research topic, researchers' skills and preferences, and the availability of research sites (Leonard-Barton, 1990). The methodology described in this chapter is suited for observing and exploring organizational processes that involve dynamics of historical and evolving patterns of sustained strategic renewal. It guides us to have the wide-angle lens of the comparative study and the close-up lens of the longitudinal study (cf. Pettigrew, 1990).

Our research questions posed in Chapter 1.4 requires an integrative and comprehensive research approach that enables us to investigate the three key principles of sustained strategic renewal from multiple methods and levels of analysis (cf. Lewin & Volberda, 1999). The longitudinal, comparative and multilevel research approaches that we chose are resource intensive and intellectually challenging.

Regarding the longitudinal research design, there are three key points worth noting. First, since the longitudinal method requires sufficient duration of analysis, it provides us with the opportunity to reveal patterns of temporal changes through time-series data. Temporal observations further facilitate a process analysis that enables us to examine the origins, development, change and dissolution of strategic renewal actions.

Second, one of the criticisms of the longitudinal content analysis research has been that the themes elicited through content analysis may not capture the real-time dimensions of strategic decision making and that measures such as word centrality often do not reflect the hidden intent of the strategist (Huff, 1990). To address this issue, we used multiple sources of data (Kabanoff & Holt, 1996; Kabanoff, et al., 1995) and to triangulate basic content analysis (Weber, 1990). In

particular, we used multiple sources of data consisting of comprehensive archival data and interviews that enable us to do quantitative and qualitative data analyses (Edmondson and McManus, 2007). Through these multiple sources of data, however, we are able to deal with the triangulation issue.

Finally, since it is very resource-intensive and time-consuming to obtain sufficient longitudinal data on each case company, we need to make a tradeoff that involves the duration of longitudinal study that is reflected in data collection and comparative analysis (Ginsberg, 1988). In our empirical study, we made this tradeoff by conducting a comprehensive longitudinal analysis for our focal firm (Shell, 1907-2006) while conducting a more parsimonious longitudinal analysis for our comparative firm (1970-2006). As a subsequent consequence, the comprehensive investigation of the three key principles is conducted at the focal-firm level while using the comparative firm at certain aspects of the three key principles.

We also argued in this chapter that the longitudinal content analysis through a comparative study best suits the research topic we are pursuing. Regarding the content analysis method, we have also ensured the high intercoder reliability by using multiple coders and developing coding manual (see page 116). Furthermore in this chapter, we also discussed and used diverse data analysis techniques to ensure the proper operationalization of the three key principles that resulted into valid and reliable measurement indicators.

In conclusion, this chapter has given a comprehensive sketch of methods for research approaches, data collection method, data analysis technique and case-industry and case-companies selections. In the next chapter, we turn to description of our empirical settings of our case companies and our case industry as the environment in which the case companies operate.

7. Empirical Settings

7.1 Introduction

In this chapter, we provide a brief historical account of the oil industry and its competitive landscape. Subsequently, we also describe the company history of our two case companies, respectively Royal Dutch Shell plc (Shell) and British Petroleum plc (BP). The purpose of this chapter is thus to provide a background review of the development of oil industry, Shell and BP over the years. By doing so, we aim to highlight the motivation and the contextual relevance of our empirical settings for studying sustained strategic renewal.

This chapter is structured as follows. We start with the description of the temporal changes and competitive landscape in the oil industry. Subsequently, we highlight the key firm-level events of Shell and BP respectively. Finally, we provide an outline of our empirical studies prior to the conclusion of this chapter.

7.2 Oil Industry Outlook

Oil industry has long been a remarkable prominence that has shaped the world we live in today. An early petroleum industry can be traced back to the eight century in the Middle-East and continued to the ninth century in Baku (Ajram, 1992). Oil, also known as black gold, is vital to many industries and is of importance to the maintenance of industrialized civilization itself. This makes oil become a critical concern for many nations. Sampson (1975), for instance, propounds that whoever controls oil reserves or productions gains in both market and political power. Yergin (1993) also asserts that oil is a commodity that has always been intertwined with national strategies and global politics and power.

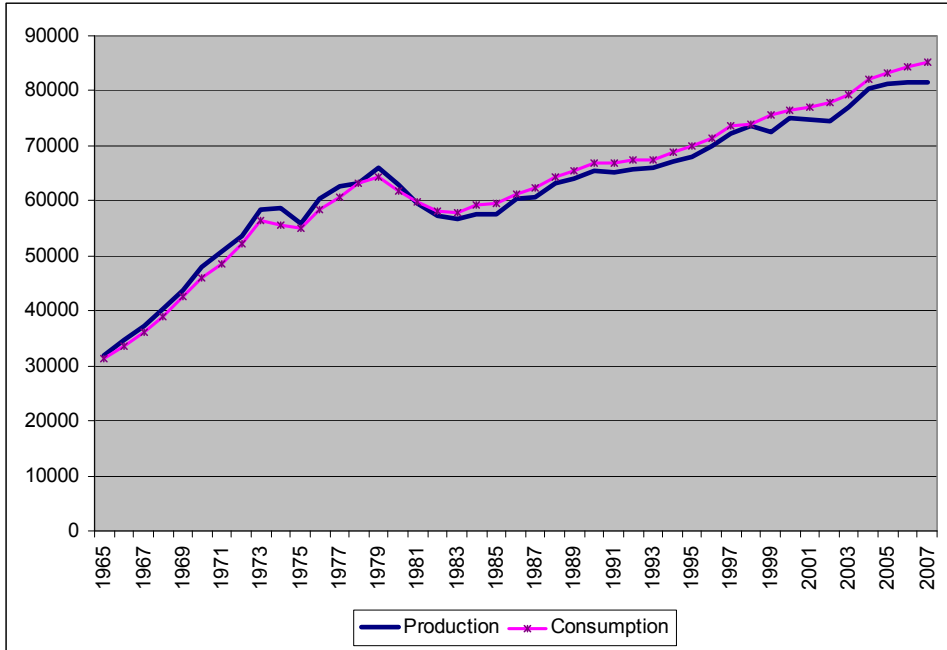
In fact, with the average yearly consumption of 30 billion barrels, oil accounts for a large percentage of the world's energy consumption, ranging from a low 32% for Europe and Asia, up to a high of 53% for the Middle East.¹ Figure 7.1 shows the oil production and oil consumption (in thousand barrels daily) from 1965 until 2007². We can see here that the oil consumption trend is increasing even at a slightly higher rate than the oil production trend, reflecting a very tight balance of supply and demand. More specifically in 2007, while global oil consumption grew by 1.1% or 1 million barrels per day (b/d), global oil production fell by 0.2%

¹ Source: Energy Information Administration (www.eia.doe.gov)

² Source: BP Statistical Review of World Energy 2008 (www.bp.com)

or 130,000b/d. The decreasing of 2007 oil production is partly due to the world's proved oil reserves edged lower in the same year. Although the reserves-to-production (R/P) ratios of 41.6 years was unchanged in the face of declining oil production, the level of reserves fell by 1.6 billion barrels in 2007 due to declines in Mexico, Syria, Qatar, and Norway.

Figure 7.1: World oil production and consumption, 1965-2007 (in thousand barrels daily)



Source: BP Statistical Review of World Energy 2008 (www.bp.com)

Note:

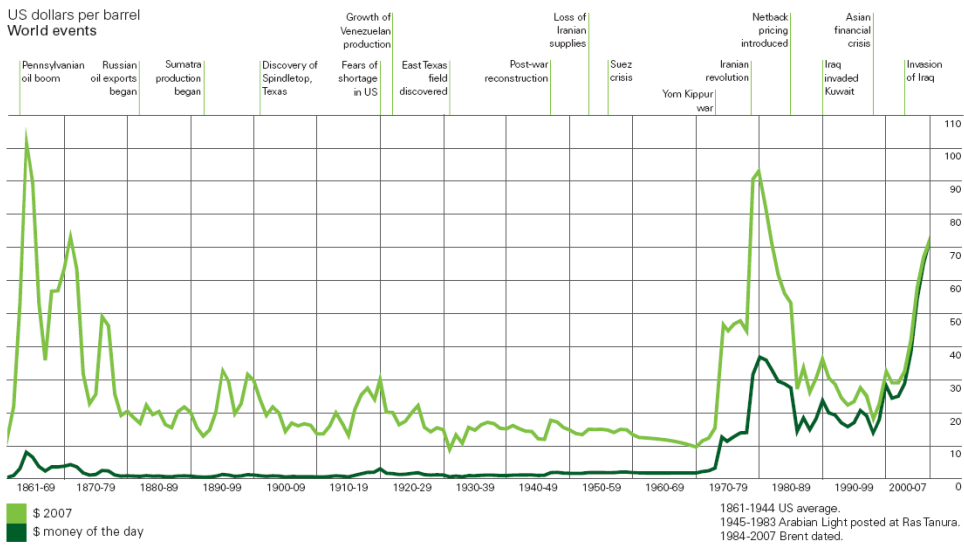
- Oil production includes crude oil, shale oil, oil sands and NGLs (the liquid content of natural gas where this is recovered separately)
- Oil consumption is inland demand plus international aviation and marine bunkers and refinery fuel and loss. Consumption of fuel ethanol and biodiesel is also included

Operation wise, the oil industry is usually divided into three major streams: upstream, midstream and downstream (Yeomans, 2004). Midstream operations are normally grouped in the downstream category. The three major operations include the global processes of exploration, extraction, refining, transporting (often by oil tankers and pipelines), and marketing of petroleum products. Taken as a whole, the three major streams make the oil industry one of the world's largest industries.

The importance of oil as a source of energy makes it fundamental for producers, consumers and investors to track the world crude oil prices. Due to the volatile nature of the supply and demand of the oil industry, crude oil prices behave very much as any other commodity with wide price swings in times of shortage or oversupply. Major oil price movements can fuel economic growth or contrarily drive inflation and kick off recessions (Yergin, 1993). While most

industrial firms suffer from higher prices of their supplies, oil producers traditionally reap the benefits from rising prices of crude oil as it determines how much the company earns for its production and sales (Bloch and Voola, 2002). Figure 7.2 shows the time series data of the world's crude oil prices from 1861 until 2007 in both dollar values of the year and the dollar 2007 values.

Figure 7.2: World crude oil prices and world key events in the oil industry, 1861-2007



Source: BP Statistical Review of World Energy 2008 (www.bp.com); Energy Information Administration (www.eia.doe.gov)

Figure 7.2 also highlights the world's key events in the oil industry chronologically. The first event can be traced back to 1861 when the first oil well in California is drilled manually in Humboldt County³. In 1878, Ludvig Nobel and his Barnobel Company revolutionized oil transport by commissioning the first oil tanker and launching it on the Caspian Sea (Yergin, 1993; Akiner and Aldis, 2004). This marked the beginning of Russian oil exports. From this moment on, the rush for oil continued in many parts of the world.

Other key events that worth noting are among others the Second World War which was a major shock in the industry. From 1946, companies and nations started to compete for economic rewards of oil. Major oil companies continued their pre-war cartel as they joined forces to keep prices up. In return, many governments nationalized their oil concessions and in 1960 the Organization of the Petroleum Exporting Countries (OPEC) was formed.⁴ In the 1970s, two major events changed the fundamental structure of the industry. The first Energy Crisis dates back to 1973, when oil exporting countries decided to raise the price of a barrel of crude from \$3 to \$6 after failed negotiations between the major oil firms

³ Source: www.sjgs.com/history.html.

⁴ <http://www.opec.org/aboutus/history/history.htm>

and the OPEC countries. This caused major unpredictability and uncertainty in the industry and prices rose further. Prices only stabilized after they quadrupled, and when oil companies began looking for alternative supplies. The outbreak of the Iranian Revolution in 1979 triggered the second Energy Crisis. Long-term crude contracts between nations and multinationals were broken, and speculations on spot markets caused prices at the pump to increase fast. The second energy crises precipitated the collapse of several firms in the industry and led to the disappearance of operational vertical integration of oil companies (Antill and Arnott, 2003). In these periods of political instability, engineers and research and development departments however did not stand still. Major oil companies developed a range of techniques to get cheaper and to transform their supplies in more valuable goods through advanced refining and processing techniques (Bloch and Voola, 2002; Davis, 2006). During these years, many large oil conglomerates diversified into chemicals and even entered into unrelated businesses.

Following the aforementioned events, high oil prices persisted until early 1980s. From 1992-1994, the world oil prices had a substantial drop from \$19 to \$15 per barrel. Then from 1997-1998 the oil prices declined from \$19 to \$12 per barrel. This situation however changed when the oil prices started to increase from 1999 until 2007. On October 19, 2007, the price of a barrel of crude oil reached the \$ 90 per barrel record mark,⁵ and stock prices of oil companies rose benefit from this trend.⁶

At present, oil companies face emerging concerns that need to be seriously addressed. Besides political, economic and technological disturbances, changes in society largely affect the way companies do business including the oil industry. For instance, the rising global energy demand, a reduction of carbon dioxide emission⁷, and the increased awareness of global warming has created a sense of unity among people to demonstrate against self-destruction of their planet and for energy conservation.

Considering the long period of existence of the oil industry, some scholars attempt to study the underlying factors that enable the longevity of the oil industry. Table 7.1 summarizes prior studies that try to explain the long existence of the oil industry. In this respect, prior studies use samples of oil companies either through a single longitudinal case study, paired case studies, or cross-case studies with many samples. Prior research, however, needs a study approach that moves beyond the qualitative, comparative case studies and the focus on financial measures. Through this PhD study, we aim to enrich the prior research by looking at the renewal context (thus beyond financial performance context) through the operationalization and quantitative measurement of the three key principles of self-renewing organizations (Volberda and Lewin, 2003).

⁵ MNSBC. October 19, 2007

⁶ Financial Times, October 15, 2007. Short View: reporter John Authers on record oil prices and the implications for oil stocks.

⁷ International Energy Outlook, 2004.

Table 7.1: Prior research on longevity of the oil industry

Authors	Focus	Study Sample	Period	Method
Grant and Cibir, 1996	An in-depth study of strategic and structural changes in the international oil majors	Eight of the world's ten largest oil companies (based on the 1985 sales revenue)	1970-1991	Multiple, longitudinal case studies within a single industry (the oil industry); phased analyses of changes
Grant, 2003	Strategic planning of oil companies in a turbulent environment	Eight leading oil and gas majors (based on 1996 sales revenue)	1970s-1990s	In-depth case studies of the planning system of the eight oil majors
Dixon et al., 2007	An examination of the relationship between exploitation and exploration learning, and the development of organizational capabilities in transition economies	Four Russian privatized oil majors	1995-2005	Longitudinal and cross-sectional case studies through interviews
Stadler, 2007	Four principles of enduring success that enable companies to perform at a very high level over very long periods of time	9 paired case studies; one of these are a paired case study of BP and Shell	1953-2006	Comparative case studies by comparing eight to ten key financial performance indicators for each industry in the study
Van Zanden et al., 2007	Five themes: operational spread, internal organization structure, competition and performance, innovations, and politics to explain long-term success of Shell	Single case study on the history of Shell	Periodical analysis of 1890-1939, 1939-1973 and 1973-2007	Qualitative historical analysis in combination with periodical time series analyses showing the statistical trend of the oil industry, Shell and key competitors (Exxon Mobil and BP)

In the next section, we discuss the competitive landscape in the oil industry by focusing on the four big oil majors which were transformed from the seven sisters, the seven big oil majors in the 1970s.

Competitive Landscape in the Oil Industry: Four Big Oil Majors

According to Sampson (1975) and Jacoby (1973), the oil industry is a solid industry with a few key players. The main factor that inhibits firms to exit the market and restricts the entrance of new competitors is the capital-intensity of the industry. Furthermore, major technological breakthroughs in petroleum refining, chemicals, and exploration techniques, have helped major oil companies to strengthen their competitive positions. To describe major oil companies that

controlled the Middle East's oil after the Second World War, Enrico Mattei, an Italian oil tycoon, coined the phrase "the seven sisters" (Sampson, 1975). The seven sisters were Exxon (Esso), Shell, BP, Gulf, Texaco, Mobil, and Socal (Chevron). Until 1960 the oil market was effectively controlled, with great stability, by the seven sisters. To that end, they formed a scheme in which they shared the profits on their concessions with the host countries, in which the countries received 50% of the value of extracted oil less the cost of production

The beginning of those oil majors can be traced back to 1870 when Standard Oil was formed by J.D. Rockefeller. In 1882, several US companies signed the Standard Oil Trust, creating a monopoly position. In 1902, major oil discoveries in East Texas further led to the formation of Texaco and Gulf. To deal with the monopoly issue of Standard Oil, Teddy Roosevelt's administration launched a successful antitrust suit against Standard Oil in 1906. Subsequently in 1911, the Supreme Court ordered the company to be broken up, creating indirectly the forerunners of Exxon, Amoco, Mobil, and Chevron. These four companies together with Gulf later comprised the US oil majors of the seven sisters. Later on, Shell and BP, that comprised the European oil majors, joined the seven sisters together with those US major companies.

Important changes due to the merger wave that took place in the 1990s, transformed the seven sisters into four big oil majors. These important changes that include the mergers between BP and Amoco (1998), between Exxon and Mobile (1999), between Chevron and Texaco (2001), and the unification of Royal Dutch and Shell Transport and Trading (2005). Table 7.2 shows the transformation from the seven sisters in the 1970s into the present four big oil majors.

Table 7.2: From Seven Sisters to Four big oil majors

Seven Sisters	Oil Major	Early Formation, Mergers, Acquisitions, and Unifications
<ul style="list-style-type: none"> • Esso • Mobil 	Exxon-Mobile	<ul style="list-style-type: none"> • Formation Jersey Standard/ Exxon (1882) • Formation Socony/ Mobile (1882) • Merger of Exxon and Mobile (1999)
<ul style="list-style-type: none"> • Royal Dutch/Shell Group of Companies 	Royal Dutch Shell	<ul style="list-style-type: none"> • Formation Royal Dutch (1890) • Formation Shell Transport and Trading (1897) • Alliance of Royal Dutch and Shell Transport and Trading (1907) • Unification Royal Dutch and Shell Transport and Trading (2005)
<ul style="list-style-type: none"> • BP 	BP	<ul style="list-style-type: none"> • Formation Anglo-Persian (1909) • Acquisition Amoco (1998) • Acquisition ARCO (2000)
<ul style="list-style-type: none"> • Gulf Oil • Chevron • Texaco 	Chevron	<ul style="list-style-type: none"> • Formation Pacific Coast Oil/ Chevron (1879) • Formation Texas Oil Company/ Texaco (1906) • Most of Gulf Oil became part of Chevron (1984) • Acquisition of Texaco to form Chevron-Texaco (2001) • Name changed to Chevron (2005)

Additionally, Table 7.3 shows how the competitive positions of the four largest oil companies have developed since 1980 until 2006.

Table 7.3: Competitive dynamics of the four big oil majors based on Global 500

	Year (position):	1980	#	1985	#	1990	#	1995	#	2000	#	2005	#	2008	#
Exxon Mobil	<i>Total Sales</i>	103	1	86	2	106	2	108	2	206	1	328	1	373	1
	<i>Total Assets</i>	57	2	69	2	87	2	91	2	149	1	207	2	242	2
	<i>Market Capitalization</i>	35	1	40	1	64	2	100	2	301	1	344	1	406	1
Royal Dutch Shell	<i>Total Sales</i>	81	2	94	1	115	1	109	1	149	2	241	2	356	2
	<i>Total Assets</i>	68	1	76	1	88	1	118	1	122	3	217	1	269	1
	<i>Market Capitalization</i>	26	4	28	3	71	1	117	1	210	2	203	3	159	3
BP	<i>Total Sales</i>	49	3	59	3	64	3	56	3	146	3	236	3	291	3
	<i>Total Assets</i>	22	3	44	3	59	4	50	4	144	2	207	3	236	3
	<i>Market Capitalization</i>	16	6	14	5	34	3	47	3	181	3	209	2	142	5
Chevron	<i>Total Sales</i>	40	4	41	4	39	5	31	6	47	7	185	4	211	4
	<i>Total Assets</i>	22	4	39	4	35	7	34	7	41	11	125	5	149	6
	<i>Market Capitalization</i>	17	5	13	6	25	4	34	4	54	5	127	7	150	4

Note: Values in billion US dollar; #: Position within the oil industry (SIC-code: 2911)

Source: Fortune Global 500; www.shell.com, www.exxonmobil.com, www.bp.com, www.chevron.com,
Thompson One Banker

Besides the four oil majors, there are two other big oil companies. They are Conoco Phillips that comprises Union 76, Conoco, Jet, and Phillips 66; and Total that comprises Total, Mobil and Elf. For our case companies, however, we selected Shell and BP. Our selection was based on the fact that both companies have more or less the similar background of European companies, not mainly the US background. While Shell has the Anglo-Dutch background, BP has the Anglo-Persian background. In the next sections, we provide a brief company history of Shell and BP respectively.

7.3 Focal Firm: Royal Dutch Shell plc (Shell), 1907-2008^{^)}

Chronologically, Royal Dutch Shell plc was formed in 1907 after a well-known historic Anglo-Dutch alliance between the UK-based The “Shell” Transport and Trading Company, plc (40%) and the Netherlands-based Royal Dutch Petroleum Company (60%) (Howarth, 1998; Van Zanden et al., 2007). Since then both parent companies are holding companies which together own, directly or indirectly, investments in numerous companies known collectively as the Royal Dutch/Shell Group (present: Royal Dutch Shell plc).

According to Van Zanden et al. (2007), Shell’s initial key success factors were the booming and undeveloped nature of the oil industry, and its integrated value chain, geographical spread, attention for human resources, and best practice technology. Looking at the company’s history, Shell was indeed very active in its geographical expansion by acquiring and expanding its producing interests, among others in Romania (1906), Russia (1910), Egypt (1911), the US (1912), Venezuela (1913), and Trinidad (1914). Furthermore due to their technological innovations in product (e.g. rotary drilling), process (e.g. cracking, petrochemicals) and exploration (e.g. geophysics, seismic surveying), Shell gradually emerged as a market leader.

At the same time, Shell’s interest for new technology created competitive advantages through a diversified product portfolio. The company diversified into aviation (1919), chemicals (1929), alternative energy sources such as gas (1959), nuclear energy (1973) and coal (1974); metals (1970) and even forestry (1980s). Regarding its diversification strategy, the CEO of Shell, Jeroen van der Veer, once said:

“We have this beautiful Dutch expression of ‘putting pots on the fire’. Shell has a pot for solar energy, a pot for wind, a pot for hydrogen, a pot for biofuels and so on. They are all mini businesses. If the pot smells good, we give it more money. And if the pot doesn’t smell good, we turn off the gas.”

(Interview with Jeroen van der Veer in the *European Business Forum*, 26, Autumn 2006)

His statement indicates that the continuation of the diversified portfolios depends on the fruitful outcomes of the portfolios to generate the firm’s competitive advantage.

⁾ This section is based on diverse sources of the history of Shell, ranging from Gerretson, 1957; Jones, 1977; Gabriels and Jongmans, 1990; Howarth, 1992, 1998; Yergin, 1993; Brenneman et al., 1998; Cummins and Beasant, 2005; Tyler, 2007; Van Zanden et al., 2007

The Second World War was a major environmental disturbance for Shell. The company suffered from large tanker losses and loss of production output and processing capacity. After the Second World War, the large oil companies created market stability through strategic partnering and interlocked directorships. In this respect, Shell always kept an open attitude towards the OPEC after its formation in the 1960. Internally after the war, Shell also experienced several changes among others, the management structure of the parent companies was aligned and the general attitude towards staff management changed to more in-house selection and training. Furthermore, under the presidency of Loudon in the 1950s, Shell approached an external consultant to review its management structure. A review by McKinsey led to remodeling of the organization; decentralized operating companies were established and responsibilities and authorities were delegated. A matrix-organization structure was implemented and a formal Committee of Managing Directors (CMD) was established.

After the 1973 oil shock, the Company diversified into alternative energy sources (e.g. nuclear energy and coal), metals and even forestry with varying degrees of success. During the 1980s and 1990s when competition intensified and the environment changed, Shell stepped back from its diversified and decentralized strategy. To be more solid, in 1997 the Shell Oil Company in the US was integrated in the group operations of Shell (Van Zanden et al., 2007; Tyler, 2007). Prior to that, in 1984 the group had bought the minority interest (30%) of Shell Oil followed by buying the remaining 31% of it in the mid 1980s.

In 2004, Shell's reputation suffered from the overestimation of oil reserves (Cummins and Beasant, 2005). Ultimately, this scandal and other internal disturbances led to Shell unification. At two shareholder meetings on June 28, 2005, a large majority of shareholders voted for the unification proposal of Royal Dutch and Shell Transport. Incorporated in England and Wales, and headquartered in the Netherlands, Royal Dutch Shell plc was born. Implementation of the new structure took place in July 2005, Jeroen van der Veer was appointed as the Group's first Chief Executive to lead the new Executive Committee. Table 7.4 shows a summary of Shell historical timeline with the key historical contexts of the environment at the pertaining periods.

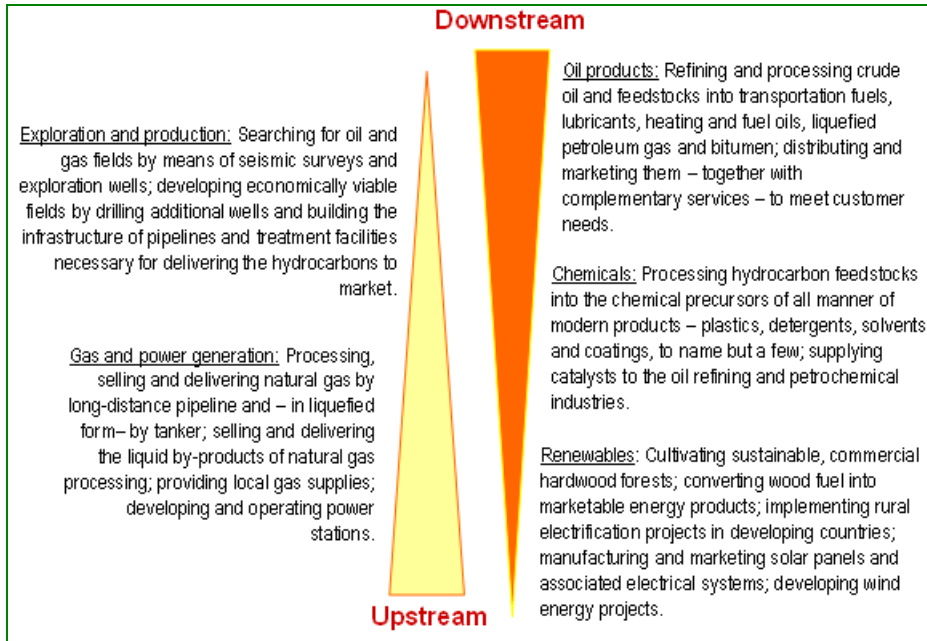
Table 7.4: Historical timeline of Shell and oil industry environment

Main Historical Events of Royal Dutch Shell	Period	Key Changes in Global and Industry Environment
Foundation of Royal Dutch Petroleum Company (1890); Foundation of Shell Transport and Trading Company, Ltd (1897)	19th century	First oil in Titusville, Pennsylvania (1859); US Civil War (1861-1965); Foundation Standard Oil (1870); Standard Oil Trust (1882)
Foundation of Asiatic Petroleum Company (1906); Merger Royal Dutch and Shell (1907)	1900s	Foundation Texaco Oil and Gulf Oil (1901); Foundation Anglo-Persian (BP, 1909); oil industry boom
Foundation of American Gasoline Company (1912) Establishment of Shell Aviation Services (1919) Formation Shell Chemicals (1929)	1910s 1920s 1930s	Standard Oil declared an illegal monopoly, and split up in 34 companies: a.o. Socal (Chevron), Standard Oil of New Jersey (Exxon), Standard Oil of New York (Mobil); First World War (1914-1918) San Remo Agreement between France and Britain (1920); Red Line Agreement (1928); Stock market crash (1929) Nationalization of Mexican oil fields (1937); Concessions in the Middle East: Bahrein (Chevron), Kuwait (BP and Gulf), Qatar (BP), Saudi Arabia (Chevron and Texaco); Second World War (1939-1945);
Shell's cooperation with the Allied Government with fuel supplies and chemical production despite losing some businesses, tankers and properties	1940s	Marshall plan (1947); Exxon and Mobile join in ARAMCO (1948)
Investigation McKinsey consultants (1957); Formation N.V. Nederlandse Aardolie Maatschappij (NAM) after gas was found in Slochteren (1959)	1950s	Nationalization of Iranian oil fields (1951); Korean War (1951-1953); Suez Crisis (1956); Iraqi Revolution (1958)
Discovery of Leman gas field in the southern North Sea (1960, followed by discoveries of natural gas in the UK, Dutch, Norwegian and Danish sectors)	1960s	Formation OPEC (1960) ; Six Day War (1967)
Major oil and gas discoveries in the North Sea. Move into the Liquefied Natural Gas (LNG); Formation of Shell Coal International (1974); Diversification in Nuclear Energy	1970s	Yom Kippur War, Arab oil embargo and OPEC negotiations result in First Energy Crisis (1973) ; Formation International Energy Agency (IEA, 1974); Iranian Revolution and speculation lead to Second Energy Crisis (1979)
Sustainable development practices, such as exploration of solutions to environmental concerns, installation of advanced technology, and launching of new products and services.	1980s	First OPEC Quotas (1982); Oil Price Collapse (1986)
Focus on exploiting core businesses: oil, gas, and chemicals; Move into renewables; Crisis and transformation at Shell Oil; Reporting currency changed into US Dollar (1998), increased shareholder focus	1990s	Kuwait Invasion and Gulf War (1990); End of Cold War/ fall of Berlin Wall (1990); Asian/ Russian Financial Crisis (1997/1998); Global economic downturn (1998-2003); Exxon-Mobile (1999) and BP-Amoco (1999)
2005: Unification of Royal Dutch and Shell	2000s	Chevron-Texaco (2001); Terrorist attack at World Trade Centre, New York (2001); Iraq invasion (2003); BP-Amoco-Arco (2005)

(Source: From document analysis including information from Gerretson, 1957; Jones, 1977; Howarth, 1992, 1998; Yergin, 1993; Cummins and Beasant, 2005; Van Zanden et al., 2007)

Furthermore as of 2004, Shell conducts its business through five principal segments: Exploration & Production, Gas & Power, Oil Products, Chemicals and renewables as shown in Figure 7.3.

Figure 7.3: The business streams of Shell: Upstream and downstream



At present, the company who still uses the pecten as its emblem, operates the five business segments in more than 110 countries with 104,000 employees and are subject to changing economic, regulatory and political conditions. By exploiting the existing skills and exploring other innovative opportunities, Shell is trying to keep their favorable competitive position against competitors such as Exxon Mobile, BP, ChevronTexaco, and Total. As Shell is now experiencing a challenging period in exploring new growth opportunities and sustaining its competitive advantage, the question that remains is whether Shell still possesses the capabilities to renew itself in the future. We further investigate this issue in part IV of this thesis.

7.4 Comparative Firm: British Petroleum plc (BP), 1970-2008^{^)}

The origin of British Petroleum plc (BP) can be traced back to the time when William Knox D'Arcy was granted a concession by the Shah of Iran in 1901 (Longhurst, 1959; Ferrier, 1982). After the significant discovery of oil in May 1908, the Anglo-Persian Oil Company (APOC) was incorporated on April 14th, 1909. In 1935, the company was renamed the Anglo-Iranian Oil Company (AIOC).

After the Second World War, the AIOC faced the Iranian nationalist pressure to reconsider the company's concession terms (Longhurst, 1959; Meyer and Brysac, 2008). In this respect, 1951 was a crucial year as the Iranian government decided to nationalize the company's assets which created a threat to the British's largest single investment overseas back then. Fortunately three years later, in 1954, the conflict was resolved thanks to the British government backing and the company was renamed the British Petroleum Company (Bamberg, 1994). BP continued to operate in Iran until the Islamic Revolution in 1979 (Bamberg, 2000). It was when the new regime of Ayatollah Khomeini confiscated all of BP's assets in Iran without compensation. This concluded the 70-year of BP's presence in Iran.

BP's experience in Iran taught the company to broaden its geographical spread. In the following years, BP initiated explorations in other Middle East countries, like Kuwait, Libya and Iraq. BP's most important moves, however, occurred in 1960s through its expansion to the North Sea and Alaska. Through these two new exploration areas, in the mid 1970s, BP found oil in the British offshore and discovered the biggest oilfield in the US at Purdhoie Bay in Alaska. These findings strengthened BP's competitive position and helped the company to survive the impact of the two oil price shocks of 1973 and 1979.

The success drove BP to go slightly overboard. Under the chairmanship of Sir Peter Walters (1981-1990), the company made significant investments. As a result of the high investments in the 1980s, company's overheads increased dramatically. Worse is that by then the company did no longer had the British government backing. Due to the government's privatization strategy, the government sold its last shares in BP in 1987. Unavoidably in 1992, the group reported a loss and had to embark on a drastic cost-cutting exercise.

This situation continued until the leadership of Robert Horton who succeeded Sir Peter Walters in 1990. He had to carry out a major corporate downsizing by removing various tiers of management within the BP Head Office (Roberts, 2004). The turning point occurred under a new management of Sir John Browne in 1995 who set tough targets for debt reduction, profitability and cost-cutting. Browne's measures worked well and profits increased. As a result, BP managed a turn-around-moving from the bottom of the industry into the top

⁾ This section is based on diverse sources of the history of BP, among others Longhurst, 1959; Jones, 1977; Ferrier, 1982; Bamberg, 1994, 2000; Pettigrew and Whittington, 2003.

quarter. Browne's actions in the late 1990s could be said not just to have transformed BP but also the energy industry of which BP was now a critical player (Pettigrew and Whittington, 2003).

BP's key comparators and competitors are Exxon Mobil and Shell (refer back to Table 7.2). BP's relative positioning with these competitors was fundamentally changed in 1998 when BP acquired Amoco (formerly Standard Oil of Indiana) for \$110 billion. Actually, it is not until 1995 that BP began to overtake its major European-based competitor Shell and then in 1996-1998 overtook Exxon (Pettigrew and Whittington, 2003). After the merger of BP and Amoco in 1998, BP became BP Amoco until 2000. Amoco merger propelled BP into a new dimension and is possibly the high point in the history of the company (Pratt, 2000).

In 2000, BP acquired Arco for \$30 billion. These changes in organizational boundaries not only affect market share and power, they also represent crucial opportunities for cost-driven efficiencies (Pettigrew and Whittington, 2003). By the end of 2000, two years after the Amoco deal and only 12 months into the Arco acquisition, BP had reduced operating costs for the new group by \$6 billion. Furthermore, BP also streamlined its businesses. In 2002, BP had four main businesses, a reduction from the eleven businesses of the 1980s. The four are exploration and production; gas, power and renewables; refining and marketing; and chemicals.

At present operating in 100 countries with 97,600 employees, BP has two business segments: (1) exploration and production; and (2) refining and marketing. Table 7.5 shows the comparison of key facts and figures between Shell and BP (updated December 2007).

Table 7.5: Comparison of key facts and figures of Shell and BP (2006/7)

Key Fact and Figure	Shell	BP
Number of employees	104,000	97,600
Number of countries	110	100
Market capitalization (\$ billion)	269	232
Assets (\$ million)	269,470	236,076
Revenue (\$ million)	355,782	284,365
Total Shareholder Return (%)	23.8	15.8
2007 Global 500 rank	2	3
2006 Fortune Innovation Score	7.3	8.0

Source: 2007 Shell Annual Report, 2007 BP Annual Report, 2007 Global 500 & 2006 Fortune Innovation Score

7.5 Outline of Empirical Investigation of Three Key Principles

We outline the empirical studies on the upcoming empirical chapters (part IV) in table 7.5. The table highlights the variables of interest we are going to measure, method used, level of analysis, time frame of analysis, and the source of data. In Chapter 8, we investigate the first key principle by focusing on operationalizing and measuring the magnitude and volatility of the internal rate of change in comparison with the external rate of change. For this purpose, we focus on two levels of analysis: industry and firm. Regarding the comparative time frame of analysis, for data that are comparable between the industry and the firm levels, we develop homogeneous measures, i.e. measures that are similar and comparable between the industry level and the firm level (Table 6.6). In another case, some data are available at different level, for the industry level only or for the firm level only. For this purpose, we develop heterogeneous measures, i.e. measures that are different between the industry level and the firm level. Depending on the data availability, our analyses range from 1907 until 2008. To provide a richer understanding of the first key principle, we also conducted interviews with Shell's top managers for gaining an insightful perspective of how the company's top managers perceive the importance of aligning the firm's internal rate of change with the external rate of change.

In Chapter 9, we focus on the investigation of the second key principle: self-organization. To this end, we looked at three variables of interest which are developed from the well-established concept of hierarchy: hierarchical level, span of control and the interdepartmental structure focusing on the administrative intensity (Melman, 1956). Since these variables are very firm specific, we focus only on Shell in which we had an internal access to the firm's archive. Our longitudinal analysis is based on the archival sources and interviews. To measure the variables of self-organization, we used the data from Shell's Organizational Directories, HR archives, and internal system called Who's Who. In addition to this, we also interviewed Shell's top managers to assess the importance of self-organization in their views.

The third key principle will be investigated in Chapter 10. Here, we operationalize and measure the constructs of exploratory and exploitative strategic renewal actions. In addition, we also look at the influence of top management team's (TMT) perspective on a firm's strategic renewal trajectory. For this latter study, we conducted it at Shell's case only. This is because Shell embodied a board composition of Committee of Managing Directors (CMD). This structure allows us to look at the TMT's corporate governance perspective of Anglo-Saxon model and Rhine model. Related to this, we also operationalize and measure the external and internal growth of strategic renewal actions. The investigation of the third principle is done through the use of content analyses of annual reports of Shell and BP, diverse databases and documents, and interviews (Shell's case only).

Table 7.6: Overview of empirical investigation of three key principles

Key Principle	Empirical Verification	Variables of interest	Method	Level of Analysis	Time Frame	Data Source
1: Rate of Change	Chapter 8	<ul style="list-style-type: none"> Magnitude and volatility of the internal rate of change in comparison with the external rate of change 	<ul style="list-style-type: none"> Longitudinal Comparative Interviews (Shell only) 	Industry and firm level (Oil industry vs. Shell and Oil industry vs. BP)	Extended (subject to data availability, periods ranging from 1907 to 2008)	Annual reports, databases, diverse documents, and interviews
2: Self Organization	Chapter 9	<ul style="list-style-type: none"> Hierarchical level Span of control Interdepartmental structure/administrative intensity (Melman's ratio) 	<ul style="list-style-type: none"> Longitudinal Interviews 	Firm level (Shell)	Limited, 1985-2007 (data constraint)	Shell Organizational Directories, Shell Internal HR Archives, Who's Who system, and Shell's top managers
3: Exploitation and exploration	Chapter 10	<ul style="list-style-type: none"> Exploration ratio External ratio Top management team's governance perspective 	<ul style="list-style-type: none"> Longitudinal Comparative Interviews (Shell only) 	<ul style="list-style-type: none"> Firm level (Shell and BP) Strategic renewal actions (Shell and BP) Top management team (Shell only) 	Extended (Shell: 1907-2006; BP: 1970-2006)	Annual reports, databases, diverse documents and Shell's top managers

7.6 Conclusion

Environment in which a firm is embedded and operating is always regarded as the main precursor of how the firm should change over the time. In this chapter, we described the environmental setting of our study, i.e. the oil industry. Change in an industry environment is normally accompanied by change in the firms that operate in the industry (Grant and Cibin, 1996). This is also valid for the oil industry. The oil companies that operate in this industry thus need to take into account the changing condition of the oil industry environment.

A central feature of the oil industry and oil companies is their long existence. Despite the size and complexity of the oil companies, they seem to be able to go through a transition of their industry environment from one of stability and continuity to one of turbulence and discontinuity. For instance, their competitive environment was thrown into turmoil by the oil shocks of 1973–74 and 1979–80, the nationalization of the reserves, and the growth of competition (Grant and Cibin, 1996). This can be seen also at the discussion of our case companies, Shell and BP.

The empirical settings in this chapter have also demonstrated the dynamism of the oil industry over the years. Considering such dynamism, the oil firms should find a strategic way to renew themselves to match their internal dynamism with the external (industry) dynamism. This investigation is the first part of our three empirical studies of the three key principles of self renewal. We now move on to Chapter 8 to address the issue of managing internal rate of change to match a firm's external rate of change.

Part IV: Empirical Studies

8. Investigating Principle 1: Internal vs. External Rates of Change

8.1 Introduction

To a large extent, the problematic nature of sustaining corporate longevity has to do with management failure in one of these two areas: “a failure in managing the internal processes or a failure to adjust interaction in the face of change in the external environment” (Krell, 2000, p.9). This concern is actually not new in the literature. Environmental influences on organizations and managers have well been documented in the industrial organization (Scherer, 1970) and organization theory (Thompson, 1967) literatures. Lawrence and Dyer (1983) propound that fluctuations or contingencies from the environment are adjusted to by organization change. In the same line of thought, contingency theory claims that the manner in which the organization is organized and functions must correspond to the nature of the environment which it finds itself in (Lawrence and Lorsch, 1967).

Since then, researchers are interested in investigating the influence of the speed of environmental change on a firm’s strategic management (Bourgeois and Eisenhardt, 1988; Brown and Eisenhardt, 1997; D’Aveni, 1994; Eisenhardt, 1989a; Eisenhardt & Martin, 2000; Williams, 1994). Mounting research on environmental change has focused on environmental turbulence (Dess and Beard, 1984; Garg et al., 2003) and magnitude (Tushman and Romanelli, 1984; Tushman and Anderson, 1987). Research examining the “strategic challenges presented by rate of industry change is, however, sparse” (Nadkarni and Narayanan, 2007, p.245). The empirical study of this chapter aims to contribute to this underexplored area. Furthermore by reconciling the selection and adaptation perspectives, this chapter will address our third research question, that is how firms regulate their internal rates of change to match the firms’ external rate of change.

This chapter is organized as follows. In Chapter 8.2, we start with the identification of measurement indicators to quantify both internal rate of change and external rate of change. Next we present the results of the analyses and highlight the key findings in Chapter 8.3, and finally draw the conclusions in Chapter 8.4.

8.2 Measurement Indicators of Internal and External Rates of Change

To measure external or environmental change, industry has been considered an adequate measure of environment by most researchers (e.g., Lawrence & Lorsch, 1967; Hrebiniak & Snow, 1980; Porter, 1980). Subsequently, the organization literature identifies three distinct dimensions of industry change: rate (frequency of changes and span of intervals between changes in the relevant industry variables) (Duncan, 1972; Bourgeois and Eisenhardt, 1988; Fine, 1998; Jurkovich, 1974; Tung, 1979; Williams, 1994); turbulence (unpredictability and variation of change in industry variables) (Boulding, 1971; Dess and Beard, 1984; Duncan, 1972; Fombrun and Ginsberg, 1990; Jurkovich, 1974; Perrow, 1979; Tung, 1972); and magnitude (scope or size of change; e.g., incremental vs. radical changes, technological continuities vs. discontinuities) (Brown & Eisenhardt, 1997; Jurkovich, 1974; McGahan, 2004; Tushman & Anderson, 1987; Tushman & Romanelli, 1984). As our main interest is to measure the rate of change, we focus on environmental dynamism that refers to the rate of change and the degree of instability of the environment (Dess & Beard, 1984).

At firm level, strategy researchers conceptualize change as how strategies of a firm become different over time as the environment changes, and what effects such differences might have for the firm's competitive advantage. Although conceptually change seems straightforward, measuring and testing change involve complex issues that are not at all obvious (Bergh and Fairbank, 2002). Despite such complexity, Godfrey and Hill (1995) argue that construct measurement is particularly relevant to strategic management research, as the variables of interest tend to be complex or unobservable.

We build upon the aforementioned arguments by developing homogeneous and heterogeneous measurement indicators to quantify both external and internal rates of change (see Table 6.6). As mentioned in Chapter 6, we need to develop these two different types of measurement indicators because of the limitation of the availability of longitudinal data that have comparable and sufficient duration for both firm and industry level. At certain circumstances, we mitigate the issue of limitation in the oil industry data by summing the data that we could obtain from the six largest oil firms⁸ as an aggregate measure of the industry data, such as what we did in the homogeneous measures of patents, research and development intensity, and external venturing. Additionally, in some cases there are measures that are specific to the industry level or specific to the firm level, but not for both industry and firm levels. For instance, data such as oil prices and competitive diversity are only available at the industry level but not for the firm level. While homogeneous measures are concerned with similar measures that are comparable

⁸ Oil industry in this study is represented by a collection of the biggest six oil companies, i.e. Exxon Mobil, Royal Dutch Shell plc, BP plc, Chevron Corp., Total SA, and ConocoPhillips.

between the industry level and the firm level, heterogeneous measures are concerned with different measures between the industry level and the firm level.

The first type of measure is homogeneous measures, i.e. measures that comprise longitudinal data of comparable duration between the oil industry and case companies. There are four variables of interest: rate of change of oil production, patents, research and development intensity, and external venturing. All variables are measured both at the oil industry level and firm level (in our case, Shell and BP). The second type of measure is heterogeneous measures. Here we distinguish between measures for the industry-specific variables and for the firm-specific variables. The outcome, however, is still the same, i.e. the comparison of the total average of external rates of change (from the industry measures) with the total average of internal rates of change (from the firm measures).

For the industry level, we measured variables that are specific to oil industry, i.e. the rates of change of oil prices and competition. We follow Matusik and Hill (1998) to measure environmental competitiveness as the extent to which external environments are characterized by intense competition. To this end, we used competitive diversity (cf. Ferrier et al, 1999) which is computed as the inverse of concentration ratio; whereas concentration ratio is computed as the percentage of the market share held by the four largest firms in the oil industry (C4).

For the firm level, our measures are built upon Fine (1998) who introduces the concept of industry clockspeed to capture the rate of industry change driven by endogenous factors (technological and competitive). He suggests three facets of industry clockspeed: product, process, and organizational. Product clockspeed represents new product introduction rates. Process clockspeed reflects the rates at which process technologies are replaced in an industry. Organizational clockspeed reflects the rate of change in the strategic actions (e.g. mergers, acquisitions, internal expansion, interorganizational alliances) and structures (e.g., restructuring and changes in top management) of incumbent firms in an industry. Furthermore in his study, Fine (1998) identifies seven fast clockspeed industries and nine slow clockspeed industries. Based on his study of 31 petrochemicals companies, the petrochemicals industry falls in the category of a slow clockspeed industry with a product clockspeed of 10-20 years, process clockspeed of 20-40 years, and organizational clockspeed of 20-40 years. The results, however, are based on the aggregate actions of all incumbent firms in an industry rather than the actions of any individual firm. Our study complements Fine's study by also looking at the firm-level actions.

As elaborated in Chapter 6 to this end, Fine's (1998) organizational clockspeed entails two aspects: the structure and the strategic actions of venturing. We take these into account by separating the change in organization structure with the change in venturing. For the venturing activity, we divided into the internal and external venturing. Since we have data on external venturing for both the industry and the firm levels, we categorize the rate of change of external venturing into the homogeneous measure. While for the internal venturing, since we only have the

data at the firm level, we categorize it into the heterogeneous measures. Therefore we built upon the Fine's (1998) concept of the industry clockspeed by translating it into the firm-level concept, respectively: the internal rate of change (IRC) of new products and services, process, organizational structure, and internal venturing (refer back to Table 6.7). Table 8.1 summarizes the measurement indicators for both homogeneous and heterogeneous measures.

Table 8.1: Homogeneous and heterogeneous measures of rates of change

Variable	Measurement	Source of data		
		Industry	Shell	BP
<i>Homogeneous measures</i>				
1 (industry & firm): RC oil production	Rate of change of yearly oil production	<ul style="list-style-type: none"> Energy Information Administration BP Statistical Review of World Energy Eternad et al., 1991 	<ul style="list-style-type: none"> Shell's annual reports Van Zanden et al., 2007 	<ul style="list-style-type: none"> BP's annual reports Van Zanden et al., 2007 Ferrier, 1982 Bamberg, 1994, 2000
2 (industry & firm): RC patents	Rate of change of annual number of patents	Online Derwent Databases	Online Derwent Databases	Online Derwent Databases
3 (industry & firm): RC research and development (R&D)	Rate of change of R&D intensity (R&D expenses to sales)	Thomson One Banker	<ul style="list-style-type: none"> Shell's annual reports Thomson One Banker 	<ul style="list-style-type: none"> BP's annual reports Thomson One Banker
4 (industry & firm): RC external venturing	Rate of change of mergers, acquisitions, joint ventures, and interorganizational alliances	Thomson One Banker	Content analysis of Shell's annual reports triangulated with Thomson One Banker	Content analysis of BP's annual reports triangulated with Thomson one Banker
<i>Heterogeneous measures</i>				
5 (industry): ERC oil prices	External rate of change of oil prices	<ul style="list-style-type: none"> Energy Information Administration BP Statistical Review of World Energy 	-	-
6 (industry): ERC competition	External rate of change of competitive diversity (the inverse of concentration ratio)	Van Zanden et al., 2007	-	-
7 (firm): IRC new products and services	Internal rate of change of new products or services introduction	-	Content analysis of Shell's annual reports	Content analysis of BP's annual reports
8 (firm): IRC process	Internal rate of change of new process technology	-	Content analysis of Shell's annual reports	Content analysis of BP's annual reports
9 (firm): IRC organizational structure	Internal rate of restructuring in organization, departments, and changes in top management	-	Content analysis of Shell's annual reports; Van Zanden et al., 2007; Grant, 2002	Content analysis of BP's annual reports; Pettigrew & Whittington, 2003
10 (firm): IRC internal venturing	Internal rate of change of internal expansion	-	Content analysis of Shell's annual reports	Content analysis of BP's annual reports

Source: Author.

In addition, our interest here is one level higher than the clockspeeds, i.e. the rates of change. Firm-level rates of change capture changes that are endogenous to a firm. This is important for our research on internal rate of change because incumbent firms play more direct roles in shaping endogenous changes than in shaping exogenous (e.g., regulations, recession, and political) changes (Ferrier, 2001; Ferrier et al., 1999; Rindova and Fombrun, 1999; McGahan, 2004; Porac et al., 1989).

8.3 Analyses and Results

Structural Change Test (Chow Test)

Before we actually compute the internal and external rates of change, we first need to see if there is indeed a change. Environmental changes, in particular abrupt changes, may occasion structural change by altering roles and relationships. For instance, a disruptive change in the environment may alter the competitive advantage of key firms in the industry. In the same line of reasoning, Agarwal, Sarkar and Echambadi (2002, p. 976) propound that “there appears to be convergence on the notion that at a particular point in time in an industry’s history, a structural change occurs that changes the resources conditions associated with competitive advantage”.

We conduct the Chow test (Chow, 1960) by using a simple linear regression model of rate of change of oil prices which is a function of rate of change in oil production and consumption. We are interested if there is any structural change in the oil industry due to a certain drastic change event. In this case, we took the year 1973 when the oil crisis first struck the oil industry. Figure 8.1 shows the two separate regression models for the oil prices before and after 1973.

Figure 8.1: Regression model for Chow Test

$y_t = \beta_1 + \beta_2 p_t + \beta_3 c_t + e_{1t}$ $y_t = \delta_1 + \delta_2 p_t + \delta_3 c_t + e_{2t}$
<p>where: y_t = rate of change of oil prices (PRICE) p_t = rate of change of world oil production (PROD) c_t = rate of change of world oil consumption (CONSUMP)</p>

We did the Chow test with the data from 1913-2007. We divided this data into two groups: group one comprises data from 1913 until 1973 (59 observations) and group two comprises data from 1974-2007 (34 observations). Table 8.2 shows the ANOVA outcome from the Chow test in the SPSS. The result demonstrates a significant evidence to reject the hypothesis of structural stability (equality) from the Chow test and to conclude that there is indeed a structural change/break after the oil crisis in 1973. Note that we also conducted the chow test to test if there is any structural break during the First and the Second World War. The results, however, are not significant. This is because we have nonsufficient data points to statistically do the Chow test.

Table 8.2: ANOVA table from the Chow Test

Oil Crisis	Model		Sum of squares	df	Mean Square	F	Sig.
0 Before	1	Regression	1.544	2	1.544	7.300	.008
		Residual	12.270	57	.212		
		Total	13.814	59			
1 After	1	Regression	558.181	2	279.090	6.928	.009
		Residual	4634.428	32	107.326		
		Total	5392.609	34			

Predictors: (Constant), PROD, CONSUMP

Dependent Variable: PRICE

Our finding on the structural change in the oil industry due to the 1973 oil crisis confirms the study of Grant and Cibin (1996). They also demonstrated that the 1973 oil crisis marked the transition from a stable to an unstable environment for the oil industry. This caused a sharp discontinuity in the development of oil companies' strategies and structures. Furthermore, Grant and Cibin (1996) show that the increased industry turbulence due to the 1973 oil crisis was further accompanied by adaptation of strategy and structure. We apply this idea to the remaining of our analyses of rates of change, in particular for the data that have the applicable and sufficient time frames that can be categorized into the periods before 1973 and after 1973. For instance, we apply this idea in variable 1 (RC of oil production, 1922-2000), variable 5 (RC of oil prices, 1907-2007) and variable 6 (competition, 1907-2007).

Homogeneous Measures

As indicated in section 8.2 (Table 8.1), there are four variables of interest in the homogeneous measures to quantify the internal (IRC) and external rates of change (ERC). All variables are used in our comparative study by comparing the oil industry with Shell and the oil industry with BP. In the rest of this chapter, we show the outcomes of each comparison for each variable respectively. As indicated previously in Table 6.5 for the simplicity of notion, we refer to the difference between the IRC (of Shell or of BP) and the ERC (i.e. $IRC_{(\text{Shell or BP})} - \text{ERC}$) as ΔRC . If the ΔRC is positive, this means that the internal rate of change exceeds the external rate of change. On the contrary if the ΔRC is negative, the internal rate of change falls behind the external rate of change. Finally, if the ΔRC is equal to zero, then it means that the internal rate of change exactly matches the external rate of change.

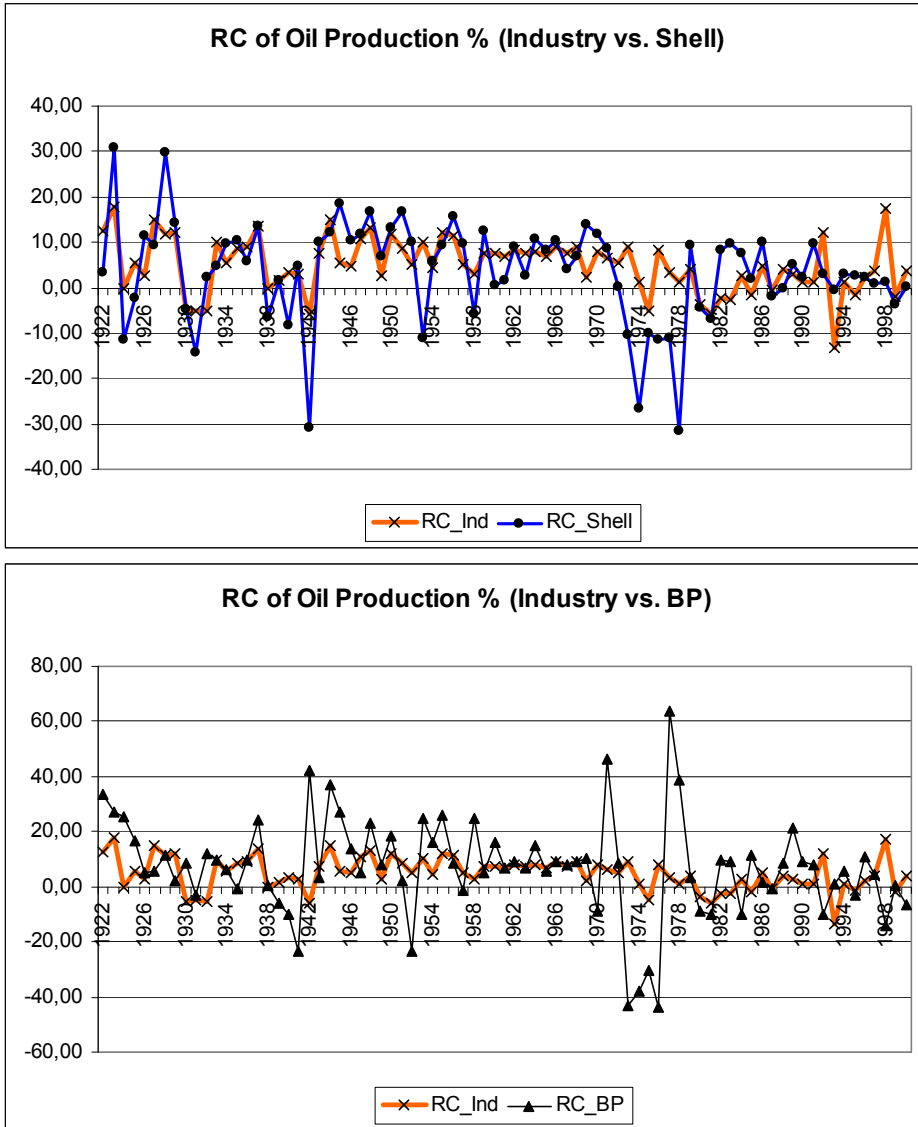
Additionally, as mentioned previously in Chapter 6, the measures of RC are not additive as the time window changes along the timeline. However, for the homogeneous measures we can compute the magnitude of the differences of the levels between the annual IRC and ERC (sum of ΔRC over the years). Later on for the heterogeneous measures, the measures of ERC or IRC are not additive. In this case, to better describe the distribution of the rates of change, we use the minimum and maximum values of yearly ERC or IRC instead of the sum of the ΔRC . Additionally, we also computed the average and volatility of annual IRC, ERC, and ΔRC . We start with the analysis of the rate of change of oil production.

Variable 1 (Industry & Firm): Rate of Change (RC) of Oil Production

At the industry level, we used the data from the Energy Information Administration (EIA) and BP Statistical Review of World Energy 2008 for the data of oil production. The industry-level data is available from 1907 until 2007. At the firm level, we used the data of oil production by Shell and BP from the companies' annual reports and the study of Van Zanden et al., 2007; Ferrier, 1982; and Bamberg, 1994, 2000. The oil production data at the firm level for both Shell and BP, however, is only available from 1921 until 2000. Based on the oil production data, we computed the rate of change by using the formula previously presented in Table 6.5 resulting in the RC data of oil production, 1922-2000.

For a comparable duration, we did the comparative analysis from the 1922 until 2000. Figure 8.2 shows the comparison of the patterns of the ERC of the oil industry vs. the IRC of Shell's oil production and the ERC of the oil industry vs. the IRC of BP's oil production. From the results, it is possible to compare the total magnitude, the average magnitude, and the volatility of $\Delta RC_{\text{oil_prod}}$ between Shell and BP.

Figure 8.2: Comparison of the RC of oil production between the industry vs. Shell and the industry vs. BP, 1922-2000



Source: Energy Information Administration; BP Statistical Review of World Energy June 2008, Shell's and BP's Annual Reports; Eternad et al., 1991; Van Zanden et al., 2007; Ferrier, 1982; Bamberg, 1994, 2000.

In terms of the total magnitude of the level differences of ΔRC , the IRC of oil production of both Shell and BP exceeds the ERC of the industry's oil production. Table 8.3 summarizes the total magnitude of level differences, yearly average, and volatility of the difference between the internal rate of change of Shell and BP respectively with the external rate of change.

Table 8.3: Difference between IRC and ERC (Δ RC) of oil production, 1922-2000

Δ RC of oil production (%)	Shell – Industry			BP – Industry		
	1922-1973	1974-2000	1922-2000	1922-1973	1974-2000	1922-2000
Magnitude of level differences	158.96	<i>-67.65</i>	91.31	163.56	<i>-3.55</i>	160.01
Yearly average	3.06	<i>-2.51</i>	1.16	3.15	<i>-0.13</i>	2.02
Yearly volatility	8.29	11.29	18.12	15.90	22.37	18.29

Source: Erasmus Strategic Renewal Centre; Italic means negative sum or average Δ RC.

As indicated previously, we applied the result of the Chow test that showed the structural break resulted from the 1973 oil crisis. To implement this, we divide the periods of analysis into three categories, the periods of 1922-1973 (before the oil crisis), the periods of 1974-2000 (after the oil crisis) and the full periods of 1922-2000. The results in Table 8.3 illustrate the structural break finding. They showed that before the 1973 oil crisis, both the rate of oil production of both Shell and BP exceeds the rate of oil production at the industry level. However, after the 1973 oil crisis, we saw a negative Δ RC, meaning that the rate of oil production at the firm level fell behind the rate at the firm level.

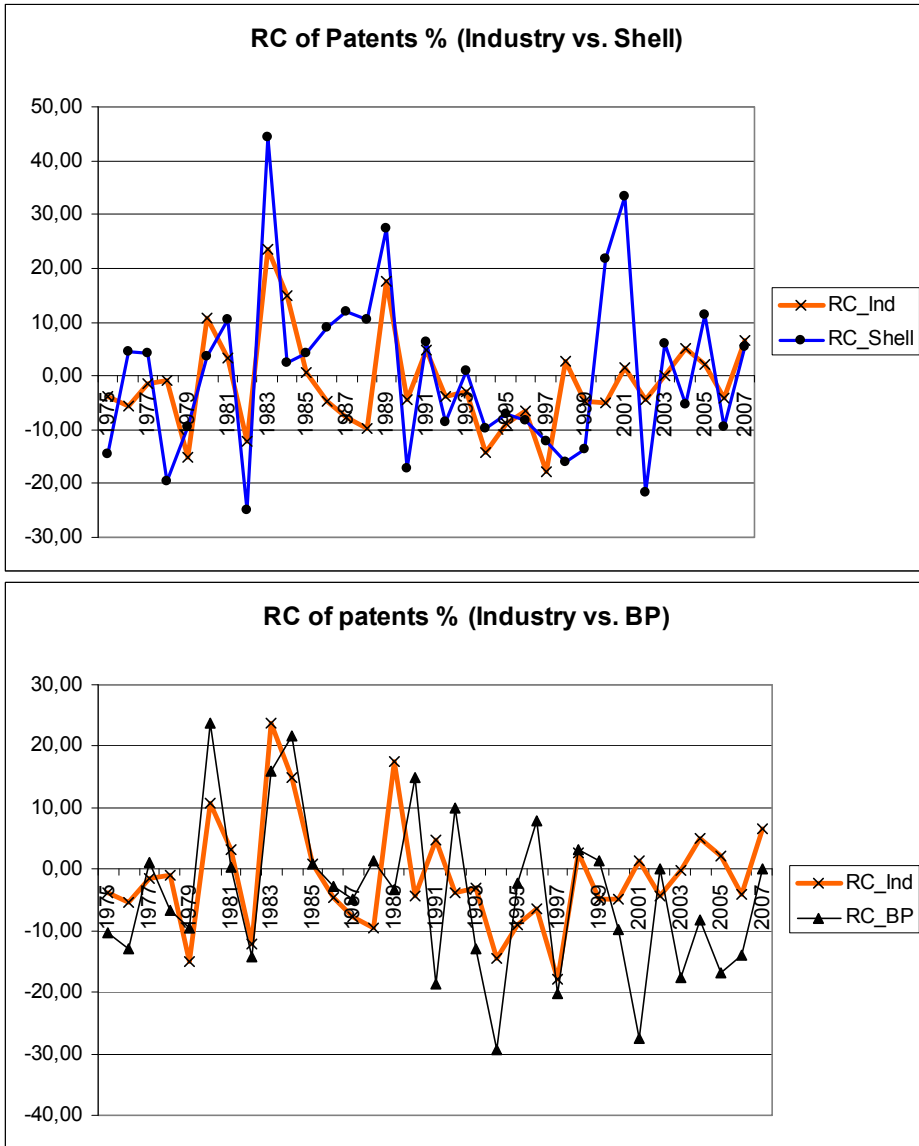
Additionally, the results in Table 8.3 show there are slight differences in the yearly average and volatility between the Δ RC of Shell and the Δ RC of BP. The Δ RC of Shell was less volatile than the Δ RC of BP. Based on Figure 8.3, we can see particularly in the periods of 1972-1979, the Shell's RC pattern of oil production was more aligned to the industry's RC pattern than the BP's RC pattern. During these periods, Figure 8.3 shows that BP's RC pattern of oil production was more volatile than the Shell's RC pattern. Nevertheless, the results from the full periods of analysis (1922-2000) demonstrate that the RC of oil production of both Shell and BP exceed the one of the industry.

In sum, through these key findings we have illustrated how both long-lived firms have managed their internal rates of change to match and even exceed the external rate of change of their industry. In sum, with regard to the first variable (RC of oil production), the findings confirm the first key principle of self-renewing organizations.

Variable 2 (Industry & Firm): RC of Patents

For the patent data, we collected both industry- and firm-level data from the Derwent World Patents Index from the Online Derwent Databases, updated on January 15, 2009. We obtained the data from 1975-2007. The results of the analyses of the rate of change of the patent data are shown in Table 8.4 and Figure 8.3. Figure 8.3 shows a comparison between patterns of the IRC of Shell and the IRC of BP with the ERC of the oil industry regarding the patent data.

Figure 8.3: Comparison of the RC of patents between the industry vs. Shell and the industry vs. BP, 1975-2007



Source: Online Derwent Databases (www.derwent.co.uk), searched in Derwent World Patents Index on January 15, 2009.

Table 8.4 summarizes the total magnitude of level differences, yearly average, and volatility of the differences between the IRC of Shell and BP with the ERC of the oil industry in terms of patents.

Table 8.4: Difference between IRC and ERC (Δ RC) of patents, 1975-2007

Δ RC of Patents (%)	Shell – Industry	BP – Industry
Magnitude of level differences	64.37	<i>-94.61</i>
Yearly average	1.95	<i>-2.87</i>
Yearly volatility	13.01	11.65

Source: Erasmus Strategic Renewal Centre; Italic means negative sum or average Δ RC.

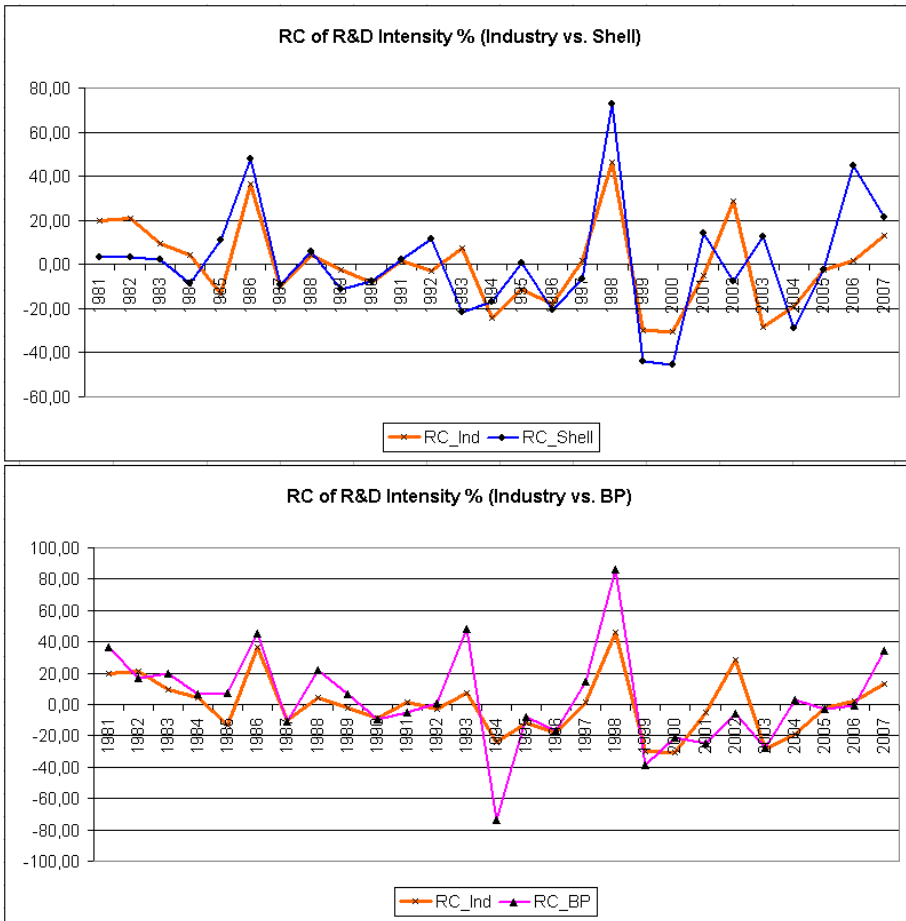
In the case of the Δ RC of patents, Table 8.4 shows that Shell's IRC pattern exceeds the industry's pattern of the external RC while BP's internal RC falls behind the industry RC. The pattern of the difference between Shell's and industry's RC patterns, however, seems to be slightly more volatile than the pattern of BP's. This illustrates that in comparison with BP, Shell could more promptly manage its internal rate of change of patterns to align with the external rate of change. In this case regarding the RC of patents, Shell's case provides an empirical support to the first key principle.

Variable 3 (Industry & Firm): RC of Research and Development (R&D) Intensity

We refer to research and development intensity as the R&D expenses to sales. We use R&D intensity as a measure of variety in resource deployment (cf. Fombrun and Grinsbert, 1990). For the industry-level data, we aggregated the data of R&D intensity from the biggest six oil companies in the oil industry, i.e. Exxon Mobil, Royal Dutch Shell, BP, Chevron, Total, and ConocoPhillips. We collected the industry- and the firm-level data from Thomson One Banker and the companies' annual reports. The comparable duration for both the industry- and the firm-level data is available from 1981-2007. We then computed the rate of change of the R&D intensity data. The results of the analysis of the RC of R&D intensity are shown in Table 8.5 and Figure 8.4.

Figure 8.4 shows that with regard to the R&D intensity, the IRC pattern of Shell and BP are very much aligned with the patent pattern of ERC.

Figure 8.4: Comparison of the RC of R&D Intensity between the industry vs. Shell and the industry vs. BP, 1981-2007



Source: Thomson One Banker, Shell's and BP's annual reports

Additionally, Table 8.5 shows that in the case of the RC pattern of R&D intensity during 1981-2007, both Shell's and BP's IRC patterns exceed the ERC pattern of the industry. BP, however, exhibits a faster rate of change pattern than Shell. The ΔRC of Shell, however, is slightly more volatile than the ΔRC of BP.

Table 8.5: Difference between IRC and ERC (ΔRC) of R&D intensity, 1981-2007

ΔRC of R&D Intensity (%)	Shell – Industry	BP – Industry
Magnitude of level differences	32.33	110.62
Yearly average	1.20	4.10
Yearly volatility	19.05	18.93

Source: Erasmus Strategic Renewal Centre.

In conclusion, with reference to the RC of R&D intensity to a various degree, both Shell's and BP's cases provide an empirical support to the first principle.

Variable 4 (Industry and Firm): RC of External Venturing

According to Fine (1998), external venturing is one of the measures for the construct of organizational speed. It comprises strategic actions of mergers, acquisitions, joint ventures, and interorganizational alliances. We build upon this by computing the rates of change of external venturing at the oil industry level and the firm level (Shell and BP).

We collected the external venturing data from Thomson One Banker and the annual reports of Shell and BP. The earliest possible year where the complete data exists in both the industry level and the firm level is from 1985. We managed to collect the data until 2008 that enables us to compute the rates of change from 1986-2008. Our analysis is therefore conducted for the period 1986-2008.

Figure 8.5 shows the RC pattern of external venturing in the oil industry, Shell and BP. In comparison with Shell, BP pattern followed the pattern of the industry to a closer degree. Particularly during 1999-2004, the BP's pattern was very similar to the oil industry's pattern. This can be seen as well from the volatility dimension in Table 8.6.

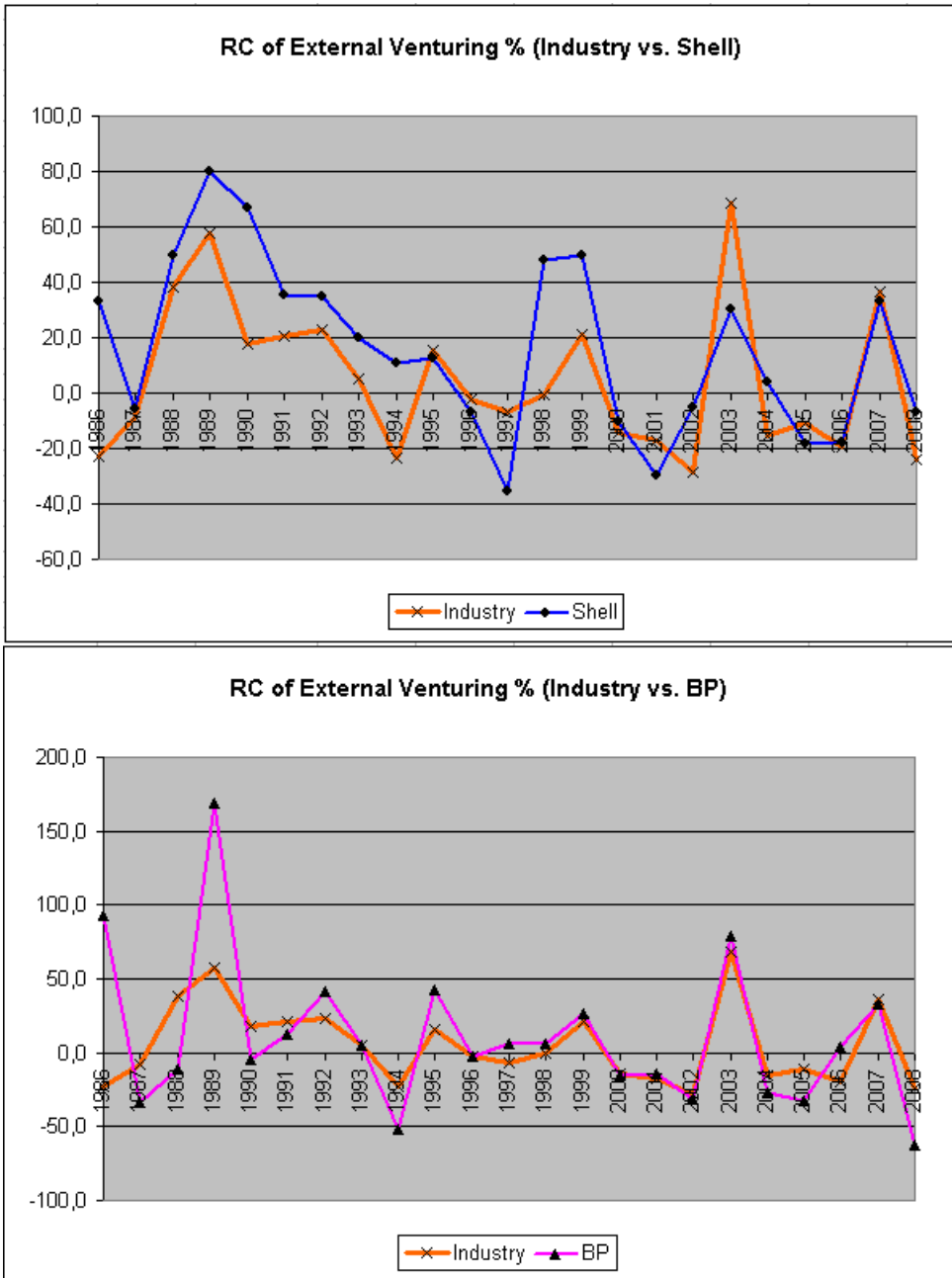
Table 8.6: Difference between IRC and ERC (Δ RC) of external venturing, 1986-2008

Δ RC of External Venturing (%)	Shell – Industry	BP – Industry
Magnitude of level differences	265.96	122.85
Average	11.56	5.34
Volatility	23.26	39.06

Source: Erasmus Strategic Renewal Centre.

More specifically Table 8.6 shows that in the case of the RC of external venturing during 1986-2008, both Shell and BP exceeds the RC of external venturing at the industry level. The Δ RC of BP, however, is slower but more volatile than the Δ RC of Shell. Nevertheless, both Shell and BP managed to regulate their IRC of external venturing to exceed the ERC of external venturing at the oil industry level. In this respect, the results of the RC of external venturing confirm the first key principle.

Figure 8.5: Comparison of the RC of external venturing between the industry vs. Shell and the industry vs. BP, 1986-2008



Source: Thomson One Banker, content analysis of Shell's and BP's annual reports

To summarize the results of the homogeneous measures, we present Table 8.7. The table demonstrates that in general, both BP and Shell could manage to regulate their internal RC to exceed the external RC of the oil industry; *except* on the measure of RC patents where the IRC of BP falls behind the ERC of the industry. The results illustrate how Shell and BP, to a various degree, managed their internal rate of change to match, or in most cases, even exceed the external rate of change in the oil industry.

Table 8.7: Summary of the results of the homogeneous measures

Average annual RC (%)	Industry	Shell	BP
Oil Production, 1922-2000	4.90	6.06	6.92
Patents, 1975-2007	-1.37	0.59	-4.23
R&D Intensity, 1981-2007	-0.37	0.83	3.73
External Venturing, 1986-2008	4.73	16.30	10.08
Yearly average	1.97	5.95	4.13
Difference IRC–ERC (ΔRC)		ΔRC_{Shell} = 3.97	ΔRC_{S/BP} = 2.15
Δ RC and Period	Magnitude of level	Average	Volatility
Oil Production, 1922-2000	▪ Δ RC _{Shell} (+); Δ RC _{BP} (+) ▪ Δ RC _{Shell} < Δ RC _{BP}	▪ Δ RC _{Shell} (+); Δ RC _{BP} (+) ▪ Δ RC _{Shell} < Δ RC _{BP}	Δ RC _{Shell} is less volatile than Δ RC _{BP}
Patents, 1975-2007	▪ Δ RC _{Shell} (+); Δ RC _{BP} (-) ▪ Δ RC _{Shell} > Δ RC _{BP}	▪ Δ RC _{Shell} (+); Δ RC _{BP} (-) ▪ Δ RC _{Shell} > Δ RC _{BP}	Δ RC _{Shell} is more volatile than Δ RC _{BP}
R&D Intensity, 1981-2007	▪ Δ RC _{Shell} (+); Δ RC _{BP} (+) ▪ Δ RC _{Shell} < Δ RC _{BP}	▪ Δ RC _{Shell} (+); Δ RC _{BP} (+) ▪ Δ RC _{Shell} < Δ RC _{BP}	Δ RC _{Shell} is more volatile than Δ RC _{BP}
External Venturing, 1986-2008	▪ Δ RC _{Shell} (+); Δ RC _{BP} (+) ▪ Δ RC _{Shell} > Δ RC _{BP}	▪ Δ RC _{Shell} (+); Δ RC _{BP} (+) ▪ Δ RC _{Shell} > Δ RC _{BP}	Δ RC _{Shell} is less volatile than Δ RC _{BP}

Note: Δ RC (+): Internal rate of change exceeds external rate of change;
 Δ RC (-): Internal rate of change falls behind external rate of change

In sum, altogether the results from the homogeneous measures provide an empirical illustration and support to our proposition of the first principle (see proposition 5.1 in Chapter 5.3): i.e. the internal rate of change of a firm that is commensurate with the external rate of change of the firm's environment contributes to sustained strategic renewal.

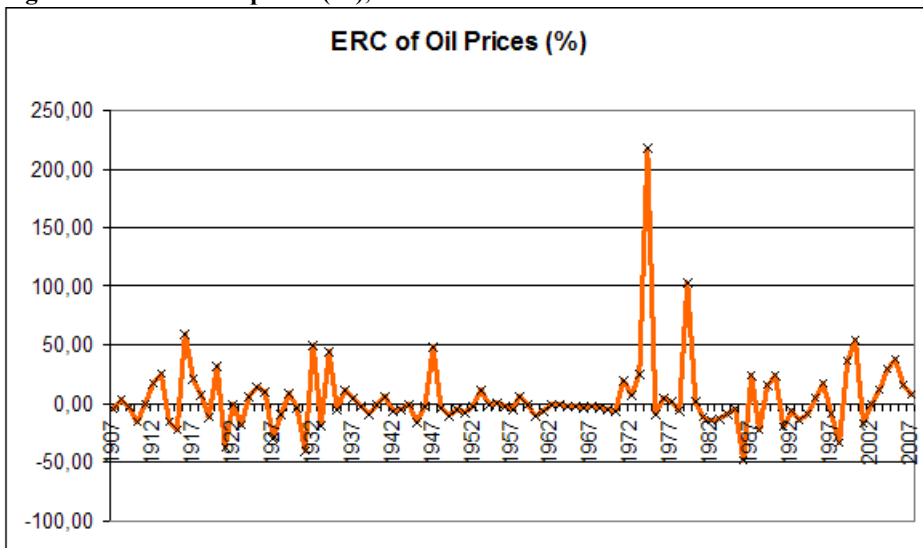
Heterogeneous Measures

For the heterogeneous measures, we have different measures for the industry level and the firm level. This is due to the constraint of data availability with a sufficient long duration for both industry and firm level. It is also due to that some measures are industry specific (such as competitive diversity). For the industry level, we employ two variables to measure the environmental rate of change: the rate of change of oil prices and the rate of change of competitive diversity in the oil industry. For the firm level, we based our measurement on five variables that are built upon the industry clockspeed introduced by Fine (1998) (refer to Table 6.7 in Chapter 6). Additionally regarding the heterogeneous measures, the measures of ERC or IRC are not additive. In this case, to better describe the distribution of the rates of change, we use the minimum and maximum values of yearly ERC or IRC instead of the sum of the ΔRC .

Variable 5 (Industry): ERC of Oil Prices

At the industry level, the first measure we used for the heterogeneous measures is the rate of change of oil prices. As indicated before from the Chow test (Table 8.2), there is a structural break when the oil crisis struck the oil industry in 1973. This may provide an explanation to the peak in 1973 show in the pattern of ERC of oil prices in Figure 8.6.

Figure 8.6: ERC of oil prices (%), 1907-2007



Source: BP Statistical Review of World Energy June 2008; Energy Information Administration (www.eia.doe.gov)

To incorporate the structural break check, we divided the full periods of analysis (1907-2007) into two periods: 1907-1973 (before the oil crisis) and 1974-2007 (after the oil crisis). The results are shown in Table 8.8.

Table 8.8: Summary of the ERC of oil prices, 1970-1973, 1974-2007, and 1907-2007

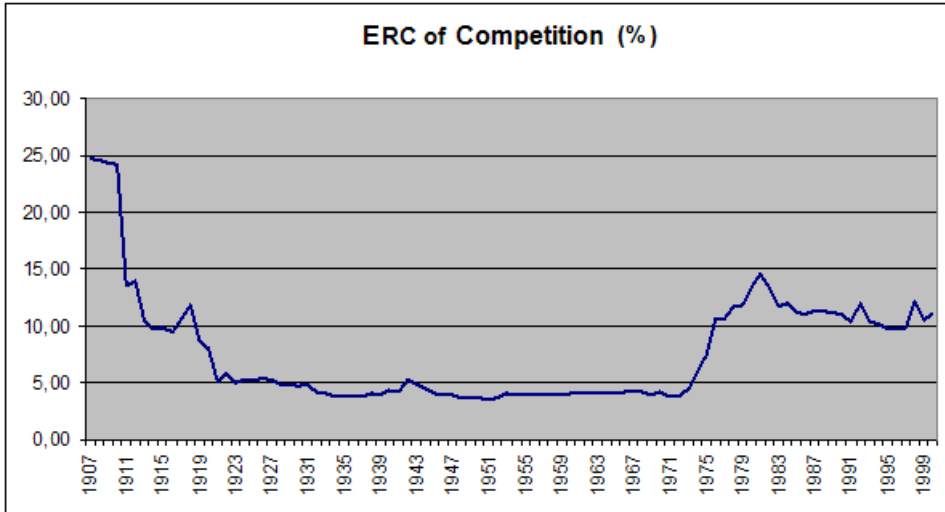
ERC of oil prices (%)	1907-1973	1974-2007	1907-2007
Min	-40.08	-48.85	-48.85
Max	59.74	217.19	217.19
Yearly average	1.34	10.63	4.47
Yearly volatility	17.88	45.49	30.22

Source: Erasmus Strategic Renewal Centre

Based on these results, one can see that the structural break or change does exist. The magnitude, average magnitude, and volatility of ERC of oil prices showed a big difference before and after the oil crisis. The first oil shock of 1973 indicated by the tripling of oil prices marked the end of the environmental stability in the oil industry (Grant and Cibin, 1996). Altogether, during the period 1907-2007, Table 8.8 shows that the average rate of change of oil prices is 4.47% and is considered to be reasonably volatile (30.22%). As mentioned before, the high volatility can be partly explained by the disruptions happened in the oil industry such as the oil crises in 1973 and 1979.

Variable 6 (Industry): ERC of Competition

The profile of the oil industry outlined in Chapter 7.2 has indicated that it is a solid industry with a few key players (Sampson, 1975; Jacoby, 1973). Figure 8.7 shows the pattern of the ERC of competition in the oil industry. We use the competitive diversity as a way to measure the ERC of competition in the oil industry. Competitive diversity is defined here as the inverse of concentration ratio of the four big oil majors (see Table 7.2 and 7.3). As shown in Figure 8.7, the ERC pattern with respect to competition concurs that the solid profile of the oil industry is concurred by the results of the external rate of change of the industry's competitive diversity.

Figure 8.7: ERC of competition (%), 1907-2000

Source: Van Zanden et al., 2007

Figure 8.7 shows that particularly during the period of 1920s until mid 1970s the industry comprised mainly the existing major oil companies. The low diversity in the competition can be explained mainly by the high capital intensity of the industry. This main factor seems to inhibit existing firms to exit the market and restricts the entrance of new competitors. Additionally, due to major technological breakthroughs in petroleum refining, chemicals, and exploration techniques, major oil companies manage to strengthen their competitive positions. Also in terms of the competitive diversity, our finding shows that the oil industry does not exhibit a high rate of change. This reflects the slow industry clockspeed based on the Fine's (1998) finding.

Additionally, Table 8.9 shows the total magnitude, the average magnitude and the volatility of the external rates of change (ERC) of competition in the oil industry. Likewise in the ERC of oil prices, we also divided the full periods of analysis (1907-2007) into the periods before oil crisis (1907-1973) and after the 1973 oil crisis (1974-2007). The analysis of the ERC of competition within these two periods indicates the existence of structural change, which we also tested previously by using the Chow test (Chow, 1960).

Table 8.9: Summary of the ERC of competition, 1970-1973, 1974-2007, and 1907-2007

ERC of competition (%)	1907-1973	1974-2007	1907-2007
Min	3.56	6.10	3.56
Max	24.80	14.54	24.80
Yearly average	6.44	10.99	7.74
Yearly volatility	5.19	1.66	4.91

Source: Erasmus Strategic Renewal Centre

Our results regarding the ERC of competition also reflect the previous findings from the study of Verleger (1991). He indicated that until the early 1970s, the world oil industry was dominated by seven major oil companies known as the Seven Sisters (refer to Table 7.2). However, they lost their dominant position within the oil industry. Verleger's (1991) study showed that during 1973-1987 their share of the world crude oil production fell from 29.3% to 7.1% and their share of world refinery capacity fell from 25.5% to 17.0%. Competition increased in the mid 1970s which was also indicated by the increase of the ERC of competitive diversity in Figure 8.7. According to Grant and Cibin (1996) the increase of competition in the oil industry starting from the mid 1970s can be explained by two factors. The first factor is after 1972, there was a nationalization of a large part of the oil assets of the large oil companies. The second factor is there was an expansion of small players in the oil industry including state-owned oil producers (some was formed from the nationalized oil assets of the majors) and domestically-based oil companies (such as Elf Aquitaine, Nippon Oil, and Repsol) which grew internationally.

Variable 7 (Firm): IRC of New Products and Services

As defined by Fine (1998), product clockspeed represents new product or service introduction. We followed this definition when computing the rate of change (RC) of new products and services (refer to Table 6.7). Through the content analyses of the annual reports of Shell and BP, we obtained the data on the number of new products or services introduced per year. Consistent with previous studies examining rates of new product and service introductions (Jones, 2003; Mendelson and Pillai, 1999; Nerkar and Roberts, 2004), we did not weigh the new product and service introductions. We identified the new product and service introductions from the content analyses of the annual reports of Shell (1907-2007) and BP (1970-2007). Based on the data collected from the content analyses, we computed the internal rates of change (IRC) of new products and services for both Shell and BP. Although for Shell's case it was possible for us to do content analyses of annual reports from 1907-2007, our study of BP only ranges from 1970-2007. For a comparable duration, our analysis of IRC of new products and services thus ranges from 1970 until 2007. This will also apply to the analyses of the remaining IRC variables: process, organizational structure, and internal venturing.

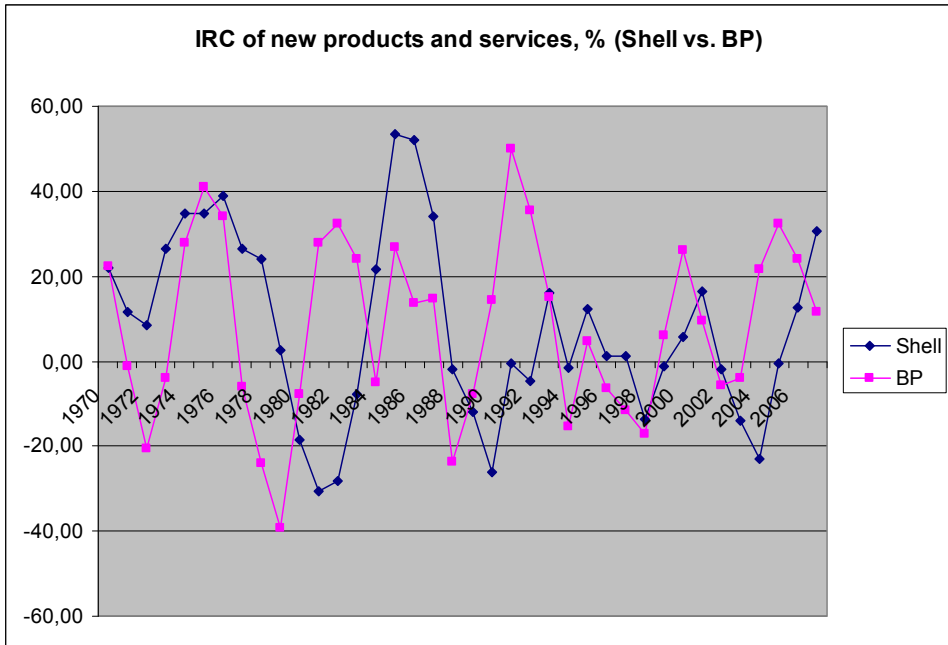
Furthermore since the new product and service introduction did not happen every year in most cases of the oil companies, this can result in the high fluctuations in the computational results of the rates of change. To counter this problem, we used a three-year moving average for smoothing out the fluctuations. The previous analyses of variable 1-6 were, however, conducted on a yearly basis. This is because the yearly data were available. The data of the rates of change resulted from the computation of yearly data did not show high fluctuations. This means that there was no need to use the three-year moving average for smoothing out high fluctuations. Likewise later on, for the RC of process, we also used the three-year moving average to smooth out fluctuations due to unavailability of yearly data. Table 8.10 summarizes in which RC variables we used the yearly data or the three-year moving average.

Table 8.10: Summary of RC variables using yearly data or three-year moving average

Aspect	Yearly Data	3-Year Moving Average
Availability of yearly data	Yes, the yearly data are then used to compute the rates of change; there was no high fluctuations	Not every year so there are high fluctuations in the computational results of the rates of change
Data smoothing	No need for smoothing out fluctuations	Due to yearly data gaps, there is a need to smooth out high fluctuations
RC variable	<ul style="list-style-type: none"> • All homogeneous measures: variable 1-4 • Heterogeneous measures: variable 5, 6, 9, 10 	<ul style="list-style-type: none"> • Variable 7 • Variable 8

Subsequently, we computed the internal rates of change of the number of new products/services introduction in the case of Shell and BP. Figure 8.8 shows the result of the computation. Despite the smoothing process by using the three-year moving average, we can still see that the IRC patterns of new products and services for both Shell and BP were still quite volatile.

Figure 8.8: IRC of Product Clockspeed (%), 1970-2007



Source: Content analyses of Shell's and BP's annual reports, 1970-2007

Table 8.11 shows that overall in terms of the total magnitude and the average IRC, BP's IRC however was faster than Shell's. However in terms of volatility of RC, Shell's RC is more volatile than BP's RC. Note that we did not divide the full periods of analysis (1970-2007) into the categories of before and after the 1973 oil crisis. This is because in this respect, the duration for the "before 1973 oil crisis" category would consist of only four data points (1970-1973).

Table 8.11: Summary of IRC of new products and services, Shell and BP (1970-2007)

IRC of new products and services (%)	Shell	BP
Min	-30.53	-39.26
Max	53.33	50.00
Yearly average	7.91	8.32
Yearly volatility	21.53	20.97

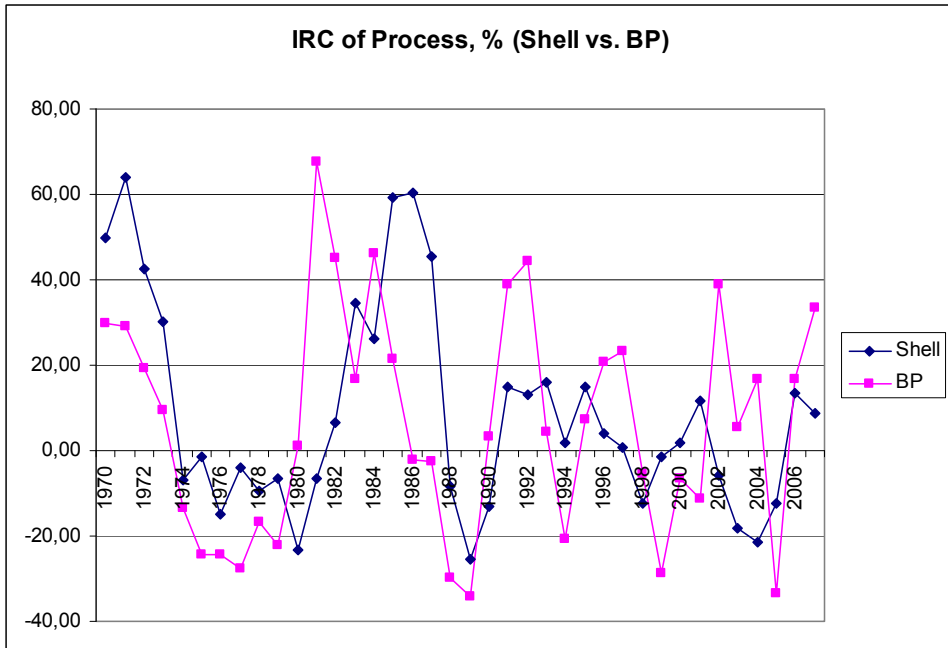
Source: Erasmus Strategic Renewal Centre

In sum in the cases of Shell and BP, the results of the IRC of new products and services show that the rates of new product and service introduction are not very high and reasonably volatile. To some extent, our results reflect the findings of Fine (1998) that indicate that the new product and service introductions in the oil industry occurred once within 10-20 years.

Variable 8 (Firm): IRC of Process

Process clockspeed reflects the rates at which process technologies are replaced (Fine, 1998). We built on this definition for our eighth variable: IRC of process, defined as the rate of new process technologies. The oil industry is known as an industry with major technological breakthroughs in the exploration techniques, oil drilling and refining, and chemicals. For a technological breakthrough to happen, however, it may take a reasonable time. We performed content analysis of the new process technologies from the annual reports of both Shell and BP. Similar to the data of new products and services, the data of new process technologies did not exist every year or at every regular period. This will result in high fluctuations when computing the IRC from such data. To smooth out the fluctuations, we used the three-year moving average. Similar to the IRC of new products and services, for a comparable duration between Shell and BP, our analysis for the IRC of process covers the periods of 1970-2007. Figure 8.9 shows the patterns of IRC of process at Shell and BP, 1970-2007.

Figure 8.9: IRC of Process Shell and BP (%), 1970-2007



Source: Content analyses of Shell's and BP's annual reports, 1970-2007

Table 8.12 provides a summary of the total magnitude, average magnitude and volatility of the IRC of process. Magnitude wise, Shell's IRC of process was faster than BP's. On average, the RC's of Shell (8.62%) is also faster than the RC's of BP (6.20%). The RC of Shell is also slightly less volatile than the RC of BP (24.37% vs. 26.28%).

Table 8.12: Summary of IRC of process, Shell and BP (1970-2007)

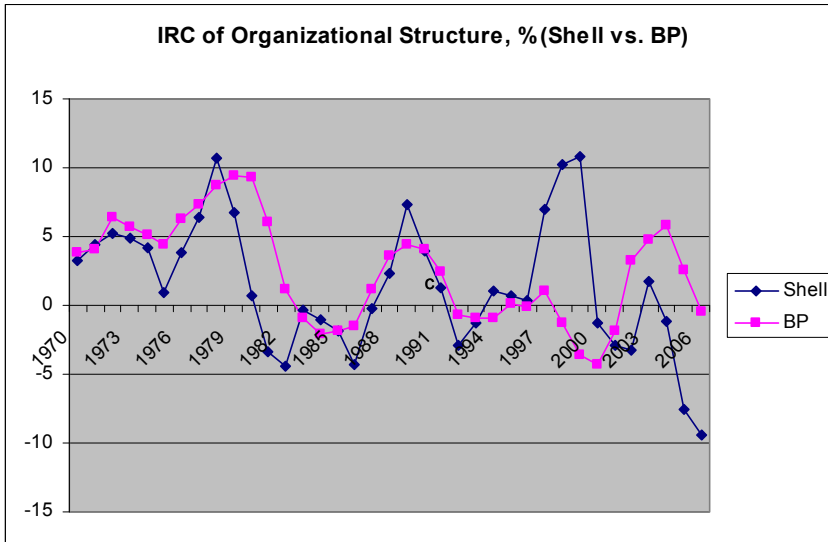
IRC process (%)	Shell	BP
Min	-25.32	-34.33
Max	63.89	67.68
Yearly average	8.62	6.20
Yearly volatility	24.37	26.28

Source: Erasmus Strategic Renewal Centre

To conclude, with regards to IRC of process, Shell seemed to introduce more new technologies than BP or in other words the Shell's pattern of IRC of process seemed to be faster than BP's.

Variable 9 (Firm): IRC of Organizational Structure

Following Fine (1998), we define the IRC of organizational structure as the changes in the structure that consists of several components: restructuring in the organizational level, subsidiary or departmental level, and changes in top management team of incumbent firms in an industry. Since our measure of IRC of organizational structure comprises several structural components, it is possible for us to have yearly data. Therefore, it is not necessary to use the moving average method to smooth out possible fluctuations. Figure 8.10 shows the patterns of IRC of organizational structure at Shell and BP.

Figure 8.10: IRC of Organizational Structure of Shell and BP, 1970-2007

Source: Content analyses of Shell's and BP's annual reports, 1970-2007; Van Zanden et al., 2007; Grant, 2002; Pettigrew and Whittington, 2003.

Additionally, Table 8.13 shows reasonably low values of the magnitude and average of IRC and low volatility. The maximum rate of change that these two firms have is around 11% (see Figure 8.10) while on average the rate of change is around 1.42% (Shell) and 2.44% (BP).

Table 8.13: Summary of IRC of organizational structure, Shell and BP (1970-2007)

IRC of organizational structure (%)	Shell	BP
Min	-9.40	-4.34
Max	10.80	9.44
Yearly average	1.42	2.44
Yearly volatility	4.78	3.71

Source: Erasmus Strategic Renewal Centre

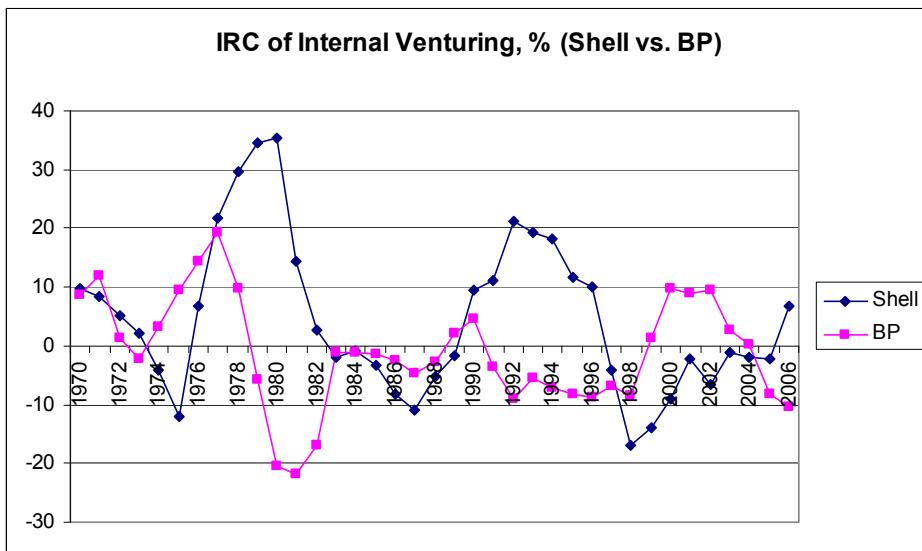
The above results imply that if there is a change in the organizational structure of both incumbent firms, it was more periodic and reasonably radical change rather than constant and incremental adjustment. For instance, the drastic change of organizational structure did not happen at a frequent pace but only once in many years or decades. In Shell's case, for instance, there were basically four main changes of organizational structure from 1907-2004. The first one is the function and market form that existed from 1907 until 1950s before the second

form of matrix structure took place in 1959 (the outcome of McKinsey's study). The third change to multidivisional form only happened gradually in 1970s before the fourth change happened in the 1990s where Shell slowly moved back to the matrix form. In sum, based on the IRC patterns of organizational structure, both Shell and BP thus seemed to exhibit a slow rate of organizational structure (cf. Fine, 1998 that showed the organizational clockspeed of 20-40 years in the oil industry).

Variable 10 (Firm): IRC of Internal Venturing

Internal venturing represents new initiatives or expansion that a firm instigates autonomously without cooperation with parties outside the firm. This includes starting up new business, entering new country, obtaining license, reorganizing activities and closing offices or product lines. Since this variable comprises many components, it is also possible for us to use the yearly data without having to use the moving average method for the smoothing purpose. To get the data, we performed structural content analysis (Jauch et al., 1980; Weber, 1990) of Shell's and BP's annual reports. Similar to the previous IRC variables, our analysis of the IRC of internal venturing ranges from the year 1970 until 2007. Although for Shell, it was possible for us to identify the internal venturing from 1907-2007, for BP our study only ranges from 1970-2007. For a comparable duration, our analysis of IRC of internal venturing thus ranges from 1970 until 2007. Regarding the internal venturing, Figure 8.11 shows the IRC patterns of Shell and BP respectively.

Figure 8.11: IRC of Internal Venturing of Shell and BP, 1970-2007



Source: Content analyses of Shell's and BP's annual reports, 1970-2007

Furthermore with respect to the IRC of internal venturing, Table 8.14 shows that the magnitude and average of Shell's IRC are higher than BP's that shows negative values. The IRC of Shell, however, is more volatile than the IRC of BP.

Table 8.14: Summary of IRC of internal venturing, Shell and BP (1970-2007)

IRC internal venturing (%)	Shell	BP
Min	-16.87	-21.94
Max	35.45	19.18
Yearly average	4.66	-1.05
Yearly volatility	13.08	9.32

Source: Erasmus Strategic Renewal Centre

We can relate the findings of IRC of internal venturing with the two main ways a firm grows: through the use of the firm's internal resources (i.e. internal venturing) or through the cooperation with a party outside the firm's boundary such as through mergers, acquisitions, joint ventures and alliances (i.e. external venturing). From the results shown in Table 8.14, we can thus interpret that in terms of growth, in comparison with BP, Shell paid more attention to its internal venturing activities in addition to its external venturing activities (see Table 8.6).

Finally, as a conclusion to the findings of our heterogeneous measures (variable 5-10), Table 8.15 summarizes the results of the heterogeneous measures. For a comparative purpose, we computed the average external rates of change across industry measures and the average internal rates of change across firm measures for both Shell and BP.

Table 8.15: Summary of the results of the heterogeneous measures

Average Annual Rate of Change (%)	Industry	Shell	BP
ERC Oil prices, 1907-2007	4.47	-	-
ERC Competitive diversity, 1907-2000	7.74	-	-
IRC New products & services, 1970-2007	-	7.91	8.32
IRC New process, 1970-2007	-	8.62	6.20
IRC Organizational structure, 1970-2007	-	1.41	2.44
IRC Internal venturing, 1970-2007	-	4.66	-1.05
Average	ERC = 6.10	IRC_{Shell} = 5.65	IRC_{BP} = 3.98
Difference IRC- ERC (ΔRC)		ΔRC_{Shell} = -0.45	ΔRC_{S\BP} = -2.12

Source: Erasmus Strategic Renewal Centre

Comparing the average IRC with the average ERC, it seems that both Shell and BP were slightly lacking behind the industry rate of change. It does not necessarily mean, however, that the IRC of Shell and BP fell behind the ERC of the oil industry. This can be resulted due to the different measures that are used for

measuring the ERC and the IRC separately while these measures may not be completely comparable. This issue will be discussed and explained in more detailed in Chapter 8.4 (see Table 8.17). Nevertheless, in terms of the differences between the IRC and ERC (ΔRC), ΔRC_{Shell} exhibited a faster rate of change than ΔRC_{BP} .

8.4 Discussion and Conclusion

It is well recognized in the literature that organizations have to adapt to their environments in order to survive. Accordingly, the heart of most approaches to organization-environment research lies on an investigation of how an appropriate alignment between a firm and its environment can be achieved. The goal of management, therefore, is to maximize an organization's "fit" with its environment (Drazin & Van de Ven, 1985) in various ways (e.g., Lewin, 1936; Thompson, 1967). Of central concern is the alignment between the internal rate of change of the firm and the external rate of change of the environment in which the firm is embedded.

The question of how fast firms undergo changes relative to environmental changes is rooted in a central debate in organizational theory regarding the relative influence of inertia forces and environmental forces (selection perspective) and strategic choice on activity patterns over time (adaptation perspective) (Romanelli and Tushman, 1986). On the one hand from the selection perspective, the predominance of inertial forces in organizations may explain the observation that periods of changes in magnitude tend to be interspersed with periods of discontinuous changes in pattern (Hannan and Freeman, 1984; Mintzberg and Waters, 1982; Tushman and Romanelli, 1985). On the other hand from the adaptation perspective, changes can be explained by key external and internal conditions that influence the pace of change (Levinthal, 1991; Lewin et al., 2003). In this respect, the rate of change is regarded as a function of managers' continual need to adjust the internal rate of change with the external rate of change.

Combining the two perspectives, we use the first principle of self-renewing organizations to allow one to see an organization's change trajectory in light of a coevolutionary perspective. The key issue here is that it is essential that a firm's internal rate of change should match or even exceed the external rate of change in the firm's environment. Understanding how temporal changes in environment affect the survival of constituent organizations is of central concern in corporate longevity or sustained strategic renewal research. This is reflected in one of our interviews at Shell:

“In my opinion, there are at least two key aspects in managing the long-term viability of your firm. First, you need to understand how the society is developing, including how the business environment is developing, and you need to understand how technology and science are developing; so basically, an understanding of where the business environment goes, how fast it changes, and what drives the changes. Second, with that knowledge, you need to align your business and technology strategy with the business environment. This means you should be able to understand where and how fast a new business for your firm could evolve.”

(Interview with a Shell’s top executive in strategy, 8 December 2007)

The previous interview quote was further complemented by another interviewee who during our interview, acted as a top manager in the investment department. This interviewee mentioned that a robust investment proposal should take into account the alignment of firm strategy with the condition at the industry level. He also mentioned about the need to balance short-term and long-term initiatives, which later relates to our third key principle.

“Based on my experience, I think it is fundamental to scan your business environment before you formulate your firm’s strategy. The idea is that you need to have a good match between your firm and your firm’s environment. What I understand is that a robust investment proposal is the proposal that reflects and incorporates the changing condition of a firm’s business environment. In doing so, you will also have an idea that you need to invest both in the short-term as well as the long-term initiatives”.

(Interview with a Shell’s top manager in investment department, 4 August 2007)

In addition to the qualitative insight that was provided from the above interview quote, we demonstrated the first key principle quantitatively. To this end, we developed measurement indicators in this chapter. We start by investigating if there is indeed a structural change at the industry level by using the Chow test (Chow, 1960). Through the result from the Chow test (Table 8.2), we found that due to a certain drastic change event (e.g. oil crisis in 1973) may result in structural change. This finding was reflected when we analyzed the variables of RC of oil production, ERC of oil prices, and ERC of competition.

Additionally we developed measures that comprise homogeneous and heterogeneous measures (refer to Table 6.6). Homogeneous measures are concerned with similar measures both at the industry as well as the firm level. Heterogeneous measures, however, are concerned with different measures between the industry level and the firm level. For a comparison, in both homogeneous and heterogeneous measures we compare the average external rate of change from the industry with the average internal rate of change from the case companies (Shell or BP). Table 8.16 summarizes the key findings from both homogeneous as well as heterogeneous measures.

Table 8.16: Summary of the key findings of homogeneous and heterogeneous measures of internal vs. external rates of change

Homogeneous Measures (Industry- & Firm-Level)	Average Annual ΔRC_{Shell}	Average Annual ΔRC_{BP}	Comparison
Oil Production, 1922-2000	+	+	$\Delta RC_{Shell} < \Delta RC_{BP}$
Patents, 1975-2007	+	-	$\Delta RC_{Shell} > \Delta RC_{BP}$
R&D Intensity, 1981-2007	+	+	$\Delta RC_{Shell} < \Delta RC_{BP}$
External Venturing, 1986-2008	+	+	$\Delta RC_{Shell} > \Delta RC_{BP}$
Heterogeneous Measures (Firm-level)	Average Annual IRC Shell	Average Annual IRC BP	Comparison
IRC new products and services, 1970-2007	+	+	$RC_{Shell} < RC_{BP}$
IRC new process, 1970-2007	+	+	$RC_{Shell} > RC_{BP}$
IRC organizational structure, 1970-2007	+	+	$RC_{Shell} < RC_{BP}$
IRC internal venturing, 1970-2007	+	-	$RC_{Shell} > RC_{BP}$

Note: $\Delta RC_{Shell} = RC_{Shell} - RC_{Industry}$; $\Delta RC_{BP} = RC_{BP} - RC_{Industry}$

Source: Erasmus Strategic Renewal Centre

Delineating the heterogeneous measures, from Table 8.16 we can also make the comparison on the firm-level only, i.e. a comparison between Shell and BP for the IRC variables. Only at the IRC of internal venturing, BP shows a negative rate of change. In comparison with Shell, BP shows faster rates of change in terms of IRC of products/services and organizational structure. Conversely, Shell shows faster rates of change than BP in terms of IRC of process and internal venturing.

To move the results shown in Table 8.16 to a more sophisticated analysis, we need to do a total comparison of both homogeneous and heterogeneous measures. To this end, we took the average of the industry's ERC across all measures from both homogeneous and heterogeneous measures and by the same token, the two firms' IRC. Subsequently, we calculated the average differences between the average ERC and the average IRC. This is related to the idea that an average, i.e. across various indicators, the average IRC must be equal or higher compared to the ERC from our comparative-longitudinal study of oil industry, Shell and BP. The results of both homogeneous and heterogeneous measures demonstrate that to a large extent the internal rates of change (IRC) of both firms are aligned with the oil industry's rates of change (except at the RC variable of patents where BP's IRC falls slightly behind the industry rate of change and that BP showed a negative IRC with respect to the internal venturing measure). Table 8.17 summarizes the average ERC and the average IRC across all measures and the differences between the average ERC and IRC (ΔRC).

Table 8.17: Summary of the comparison of average annual internal and external rates of change across measures

Measures of RC and Period	Industry	Shell	BP
Homogeneous measures			
Oil Production, 1922-2000	4.90	6.06	6.92
Patents, 1975-2007	-1.37	0.59	-4.23
R&D Intensity, 1981-2007	-0.37	0.83	3.73
External Venturing, 1986-2008	4.73	16.30	10.08
Heterogeneous Measures			
ERC Oil prices, 1907-2007	4.47	-	-
ERC Competitive diversity, 1907-2000	7.74	-	-
IRC New products & services, 1970-2007	-	7.91	8.32
IRC New process, 1970-2007	-	8.62	6.20
IRC Organizational structure, 1970-2007	-	1.41	2.44
IRC Internal venturing, 1970-2007	-	4.66	-1.05
Average across measures	ERC = 3.35	IRC_{Shell} = 5.80	IRC_{BP} = 4.05
Difference of average IRC– average ERC (ΔRC) across measures		ΔRC_{Shell} = 2.45	ΔRC_{S,BP} = 0.70

Source: Erasmus Strategic Renewal Centre

Altogether to a various degree, Shell and BP manage to align their internal rates of change with the external rates of change of the oil industry. The Δ RC of Shell, however, is higher than the Δ RC of BP. This means that although the IRC of both Shell and BP exceed the ERC of the oil industry, Shell moves even faster than BP with respect to aligning the IRC with the ERC.

To conclude through our empirical investigation of the first key principle, we provide an answer to our third research question (Chapter 1) and evidence on the proposition (Chapter 5) to the first key principle of self-renewing organization, i.e. at different rates, our case firms (Shell and BP) manage to align their internal rates of change with the external rate of change. The alignment of the internal rate of change of a firm with the external rate of change of the firm's environment positively influences the firms' sustained strategic renewal efforts. By illustrating this through our empirical analysis, we hope to give top management an understanding of the importance to match the dynamics of internal strategy making processes with the dynamics of external ecology in which the firm operates. In the next chapter, we continue with the empirical investigation of the second key principle: self-organization.

9. Investigating Principle 2: Self-Organization

9.1 Introduction

Self-organization, the key construct of the second principle of self-renewing organizations (Volberda & Lewin, 2003), are derived from many disciplines such as cybernetics (Von Foerster, 1960; Ashby, 1962; Beer, 1966; Heylighen and Joslyn, 2001), thermodynamics (Nicolis and Prigogine, 1977), mathematics (Lendaris, 1964), information theory (Shalizi, 2001), synergetics (Haken, 1981) and geophysics (Bak and Chen, 1991). Independently of the origination of self-organization construct, a central principal notion is that self-organizing systems achieve order because multiple local agents or members interact and those interactions produce unintended outcomes without the intervention of a central controller (Chiles et al., 2004).

The central premise of self-organization challenges organizational researchers to use the construct in organizational studies. Since then, organizational theorists have begun to conceptualize organizations as complex adaptive systems (Anderson, 1999a; McKelvey, 2001; Stacey, 1995) that give rise to the notion of emergent self-organization. Through an empirical case study of Shell in this chapter, we aim to contribute to the understanding of self-organization in the organization studies, in particular the study of sustained strategic renewal. In this chapter, we also aim to address our fourth research question of how large incumbent firms manage self-organization to sustain their strategic renewal over time. Additionally, this chapter also aims to address the second proposition in Chapter 5.3, i.e. self-organization positively influences sustained strategic renewal.

The outline of this chapter is as follows. Chapter 9.2 presents some measurement indicators that we used to measure the construct of self-organization. We discuss the method used in conceptualizing and quantifying self-organization in Chapter 9.3. Chapter 9.4 presents the data analysis and subsequently the results from the key findings. We then conclude this chapter by summarizing and discussing the key findings.

9.2 Measurement Indicators of Self-Organization

Literature on self-organization (Allen, 1988, 1997; Anderson, 1999a, b; Holland, 1995; Kauffman, 1995; McKelvey, 1999; Nicolis and Prigogine, 1989; Nonaka, 1988; Stacey, 1995; Von Foester, 1960; Von Foerster and Zopf, 1962) suggests that self-organizing adaptability observed in long-term surviving companies is similar to that observed in ecosystems which are typically complex, non-linear, dynamic systems whose behavior may be better understood with knowledge of complexity theory (Hall, 1997). The difference that is made between the two research streams is that organization studies recognize barriers to freedom and natural default behavior suggested by complexity theory in the form of bureaucratic structure (Anderson, 1999a, b).

Accordingly, Chiles et al. (2004) propounds that in self-organizing systems, order comes from the actions of interdependent agents who exchange information, take actions, and continuously adapt to feedback about others' actions rather than from the imposition of an overall plan by a central authority. This is in line with Volberda and Lewin (2003, p.2126) who refer to self-organization as "the process by which organizations always find order no matter how complex or convoluted the structure of the organization."

The idea development towards self-organization makes organizational scholars to critically contemplate on the traditional, mechanistic view of organization that is built upon bureaucracy (Weber, 1946). This traditional view of organization is largely based on the idea of regarding an organization as a kind of mechanical system in which discernable forces and basic laws of motion are in operation (Capra, 1996; Stacey, 1995). From this view, organizations try to seek order through highly prescribed rule sets, formalized control and hierarchical authority structures. To put it another way, a hierarchical authority structure is regarded as an essential element in helping organization leaders determine proper actions and deploy central instructions and control to the workforce (Pugh et al., 1968; Evan, 1963).

Contradictorily enough in trying to comprehend the mechanisms that give rise to self-organization, Bak and Chen's (1991) study of self-organized criticality suggests that organizational researchers think of it as a hierarchical process. This view made intuitive sense in understanding why self-organization is observable in processes that do not have a top-down, hierarchical structure. In organization studies, hierarchical structure means vertical organizational structure and refers to the typical way that a business is constructed. In stark contrast to this understanding of the term hierarchical structure is its meaning in the biological sciences, where it refers to the hierarchical structure as the polar opposite of self-organization (Brunk, 2000). In self-organizing systems, control of the organization is typically distributed not through hierarchy but over the whole of the systems.

It follows then that from the perspective of self organizing, traits such as the absence of centralized control and bureaucratic hierarchies are shared by all self-organizing systems (Nonaka, 1988). In order to enquire this matter, the task at hand now is to develop measures of self-organization. The purpose here is to develop some measurement indicators to assess what degree of variation of self-organization in fact exists in an organizational structure. Since the bureaucratic structure influences the magnitude of the self organization, we develop the measurement indicators of self-organization built upon the measures of bureaucratic tendency that may facilitate this line of inquiry. For this purpose, we developed three key measurement indicators that are summarized in Table 9.1 (see also Table 6.9 in Chapter 6). Since the study of self-organization requires firm-specific data in a very detailed level, it is only possible to do this kind of study in a firm where one has an access to the firm's internal archives. In this case, the firm in which we have an internal access is Shell only, the focal firm of our study. This means that the empirical investigation of self-organization in this study can only be done for the case of Shell, and not the case of BP.

First, of central importance to the concept of bureaucracy is the measure of hierarchical structures of organizations. The most readily quantifiable measure of the structure of authority is the vertical height of hierarchy. This is defined as the number of levels of authority or echelons from top management to workers (Evan, 1963; Pugh et al., 1968). In relation to self-organization, hierarchical level is expected to negatively influence self-organization. As indicated previously in Chapter 6 (Table 6.9) for this measure, we collected data from the organizational directories of Shell Exploration and Production (EP) from 1985-1994 and the Human Resources (HR) archives combining with the Shell's internal system called "Who's Who" from 1994-2007. We particularly chose Shell EP for the investigation of self-organization as Shell has a highly complex structure. In the past, Shell comprised four types of company: the parent companies, the group holding companies, the service companies, and the operating companies. Due to the company's structural complexity, the company's organizational chart was difficult to be outlined and studied. It was, however, possible to analyze the organizational chart of operating companies through the archive of Shell's organizational directories (1985-1994) which are then followed by the archives of HR and Shell's Who's Who system (1994-2008).

The second measurement indicator that we used is the chief executive's span of control. While the first measurement indicator relates to the vertical span of control, the second indicator relates to the lateral width span of control (Pugh et al., 1968; Evan, 1963). In this respect, chief executive's span of control is defined as the ratio of the Shell EP chief executive to number of subordinates who report directly to the chief executive. For this measure, the data that we obtained from organizational directories are, however, only available from 1985 until 1994.

Nevertheless, this measure can complement the first measurement indicator of hierarchical level. Similar to hierarchical level, the chief executive's span of control is expected to negatively influence self-organization. This can be partly explained by the idea that when organizational hierarchy is flattened, managers supervise more organizational members than the traditional organizational structure with many hierarchical levels.

Table 9.1: Operationalization of measurement indicators of self-organization

Measure	Definition & Reference	Source & Duration	Self-Organization Indication
Hierarchical level	Number of levels of authority from top management to workers (Pugh et al., 1968)	Shell Exploration & Production (EP) Organizational Directories, 1985-1994, HR archives and Shell's Who's Who system, 1994-2008	The lower the hierarchical level, the higher the self-organization
Chief executive's span of control	Ratio of a chief executive to number of subordinates the chief executive has (Pugh et al., 1968; Evan, 1963)	Shell EP Organizational Directories, 1985-1994	The lower the chief executive's span of control, the higher the self-organization
Administrative intensity	Ratio of administrative staffs to exploration and production staffs (Evan, 1963; Melman, 1956)	Shell Organizational Directories (NL & UK), 1985-1994; HR archives and Shell's Who's Who system, 1994-2008	The lower the administrative intensity, the higher the self-organization

Finally, the third measurement indicator relates to the hierarchy of administrative structure. In this respect, we use the measure of administrative intensity (also known as the Melman's ratio) defined as the ratio of administrative staffs to exploration and production staffs (Evan, 1963; Melman, 1956). This measure is based on the notion that the number of administrative staffs can be a symptom of bureaucratization (Pugh et al., 1968). The central premise here is that the hierarchy of the administrative structure is deliberately reduced in order to bring about an extensive decentralization of responsibility and devolution of authority. This implies that the administrative intensity negatively influences self-organization. For this last measure, we collected data from the archive of Shell's organizational directories (1985-1994) which are then followed by the archives of HR and Shell's Who's Who system (1994-2008). It should be noted that the data only cover the Shell in the Netherlands and in the UK. The data enables us to perform a longitudinal measurement of the administrative intensity ratio from the period 1985-2008.

With the aid of the above three measurement indicators, it would now be possible to study the degree of change in self-organization over time through the degree of change in hierarchical structure. In this respect, delayering the hierarchical and administrative structure is expected to be a positive indication to the self-organization construct. In the next section, we present our methods of how to measure and analyze self-organization based on the measurement indicators we developed.

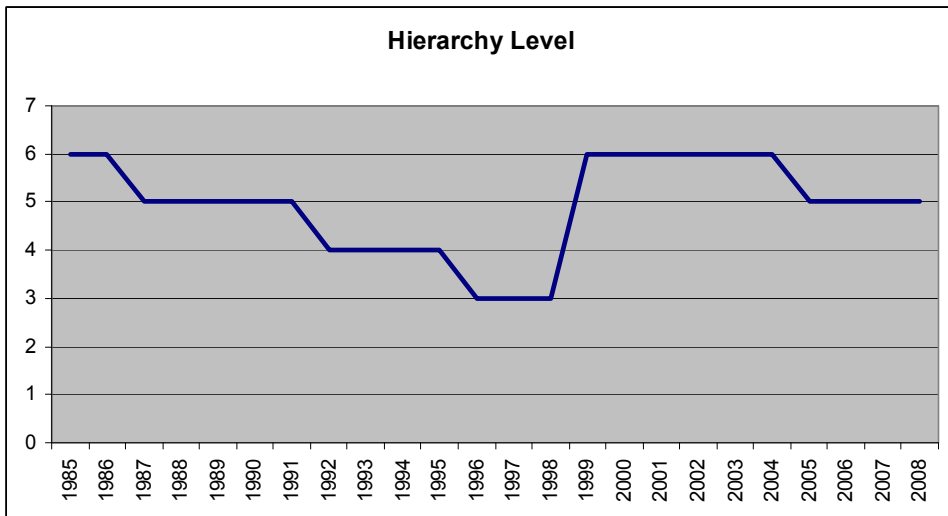
9.3 Analyses and Results

Analyses of Measurement Indicators

Hierarchical Level of Shell EP

As indicated in the previous section to analyze the self-organization construct, we focus on the organizational structure of Shell's Exploration and Production (EP). Following Pugh et al. (1968) the first measurement indicator, hierarchical level, is defined as the number of levels of authority from the top manager of Shell EP to the lowest level of Shell EP's members. To measure the hierarchical level of Shell EP, our data is based on three sources: Shell EP Organizational Directories (1985-1994), HR archives and Shell's internal system called Who's Who system (1994-2008). Figure 9.1 shows the pattern of Shell EP's hierarchical level from 1985-2008.

Figure 9.1: Shell EP hierarchical level, 1985-2008



Source: Shell Exploration & Production (EP) Organizational Directories, 1985-1994, HR archives and Shell's Who's Who system, 1994-2008

As mentioned before (Chapter 9.2) in relation to self-organization, hierarchical level is expected to negatively influence self-organization. Table 9.2 shows the indication of the degree of self-organization assessed from the measure of hierarchical level at Shell EP, 1985-2008.

Table 9.2: Indication of degree of self-organization based on the hierarchical level measure at Shell EP, 1985-2008

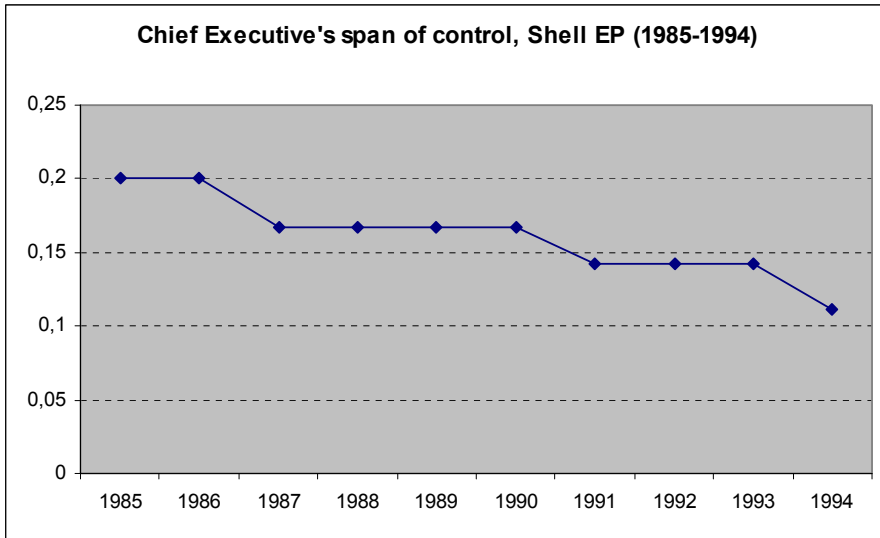
Indicator Trend	1985-1997	1998-2005	2006-2008
Hierarchical level	--	+	-
Self-organization indication	++	-	+

Source: Erasmus Strategic Renewal Centre

The results from the analysis indicate that to a large extent, the hierarchical level decreased starting from 1985 and reached the lowest level 1997. Since hierarchical level negatively influences self-organization, this implies a stronger indication of self-organization during those periods. However, starting from 1998 the hierarchical level at Shell EP increased from three to five levels due to the changes in organizational structure following the integration of Shell Oil. The high hierarchical level continued until around 2005. The increase of hierarchical level negatively influences the degree of self-organization. During the last two periods (2006-2008), the hierarchical level at Shell EP had a one-level decrease. The decrease of hierarchical level positively influences the self-organization resulting in a positive indication of self-organization (although to a lesser degree than the periods of 1985-1997). In sum, we demonstrated in this section how the measure of hierarchical level can be used to assess the degree of self-organization in a firm.

Shell EP Chief Executive's Span of Control

Following Evan (1963) and Pugh et al. (1968), we measure the chief executive's span of control as the ratio of a chief executive to number of subordinates the chief executive has. In this case, we focus on the top manager at the highest level of Shell EP and the direct subordinates that the manager has. The data for this measure, however, are only available in the Shell EP's organizational directory from 1985 until 1994. Unfortunately, we could not obtain such data in the two other data sources of HR archives and Who's Who system. Figure 9.2 shows the pattern of the span of control of Shell EP's chief executive.

Figure 9.2: Shell EP chief executive's span of control, 1985-1994

Source: Shell Exploration & Production (EP) Organizational Directories, 1985-1994

As shown in Figure 9.2 and Table 9.3, the result from the analysis of chief executive's span of control concurs with the previous finding of the hierarchical level, i.e. an indication of the increase of self-organization during the period 1985-1994.

Table 9.3: Indication of degree of self-organization based on the chief executive's span of control measure at Shell EP, 1985-1994

Indicator Trend	1985-1994
Chief executive's span of control	--
Self-organization indication	++

Source: Erasmus Strategic Renewal Centre

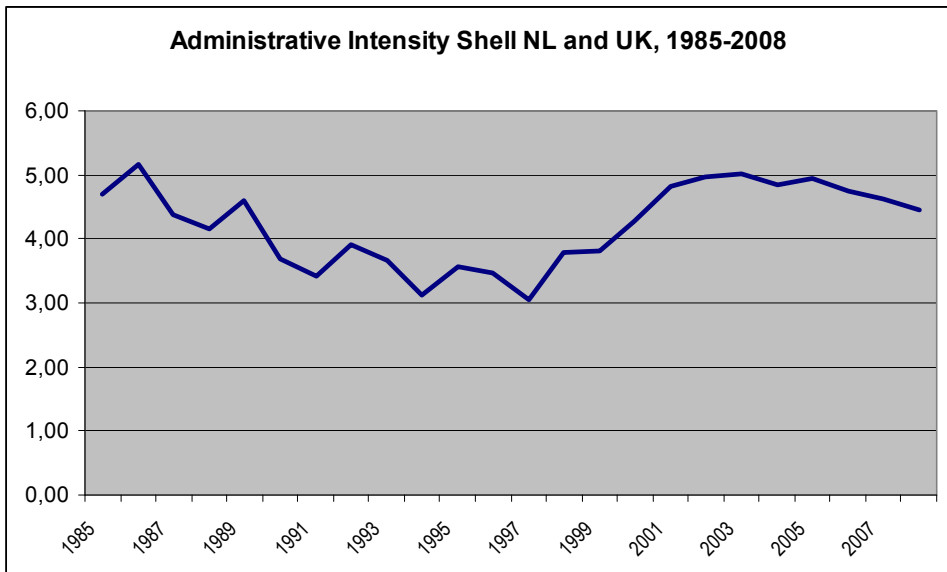
As shown in Figure 9.2, the pattern of the span of control exhibits a decreasing trend since 1985 until 1994. As argued before, the span of control indicates the strength of concentration of authority. Therefore, the span of control is likely to negatively influence self-organization. To conclude as the span of control decreased during the period 1985-1994, there is a strong indication that the degree of self-organization increased.

Administrative Intensity

The final measurement indicator is based on the notion that the number of administrative staffs can be a symptom of bureaucratization (Pugh et al., 1968). The notion of self-organization implies that the hierarchy of the administrative structure is deliberately reduced in order to bring about an extensive decentralization of responsibility and devolution of authority. To measure administrative intensity, we follow the construct of Melman (1956) and Evan (1963) which is defined as the ratio of administrative staffs to exploration and production staffs. Similar to hierarchical level, data were collected from the archive of Shell's organizational directories (1985-1994) which are then followed by and combined with the archives of HR and Shell's Who's Who system (1994-2008). The data, however, only cover the number of staffs in two operating locations of Shell, i.e. the Netherlands and the UK.

Figure 9.3 depicts the pattern of administration intensity of Shell EP from 1985-2008. From the graph, we can see that the results concur with the previous findings of measurement indicators of the hierarchical level and the chief executive's span of control. In particular, the pattern resembles the pattern of the hierarchical level and partly also the pattern of span of control.

Figure 9.3: Administrative intensity of Shell in the Netherlands and the UK, 1985-2008



Source: Shell Organizational Directories (NL & UK), 1985-1994, HR archives and Shell's Who's Who system, 1994-2008

Figure 9.3 and Table 9.4 also demonstrate that there was a decreasing trend of administrative intensity from 1985 until around 1997 before it showed an increasing trend in 1998 and then followed by a decreasing trend from 2006 onwards.

Table 9.4: Indication of degree of self-organization based on the administrative intensity measure at Shell NL and UK, 1985-2008

Indicator Trend	1985-1997	1998-2005	2006-2008
Administrative intensity	--	+	-
Self-organization indication	++	-	+

Source: Erasmus Strategic Renewal Centre

Since the administrative intensity negatively influences self-organization, the degree of self-organization in Shell seemed to be high during the period of 1985-1997 and became low during the period 1998-2005. From 2006-2008, the slight decrease of administrative intensity indicates a slight increase of self-organization.

Table 9.5 summarizes the varying degree of self-organization indication based on all three measurement indicators during 1985-2008. Since all three measures negatively influences the degree of self-organization, when there is an increase in any of the indicators it results in a decrease of self-organization and vice versa.

Table 9.5: Summary of degree of self-organization across measures, 1985-2008

Indicator Trend	1985-1997	1998-2005	2006-2008
Hierarchical level (Shell EP)	--	+	-
Chief executive's span of control (Shell EP)	--	n.a.	n.a.
Administrative intensity (Shell NL & UK)	--	+	-
Self-organization indication	++	-	+

Note: n.a. = data not available.

Source: Erasmus Strategic Renewal Centre

In particular during the period 1985-1997, all three measurement indicators gave a reasonably strong indication of the increase in the self-organization at Shell. During the period 1998-2005, however, the self-organization at Shell decreased which is indicated by the measurement indicators of hierarchical level and chief executive's span of control. Finally, during the past two years (2006-2008), there was again an indication of an increase in self-organization at Shell although to a lesser degree than in the periods of 1985-1998. In conclusion over time, Shell depicts the self-organizing behavior to a various degree.

Analyses of Interviews

In addition to quantitative measurement of self-organization, we also employed a qualitative method through a series of interviews (see Table 6.3). Interviews are appropriate here, because organizational constructs, in particular self-organization measures investigated in this chapter, do not lend themselves easily to quantitative measurement (Strauss and Corbin, 1988). The data that we gathered from interviews with Shell's top managers can also help to gain insights into the view of managers of how important they consider self-organization for Shell's long-term survival.

In particular, the interviews help to obtain insights into among others stewardship role of managers in guiding self-organization as a primary process by which new orders in firms may emerge. As mentioned in the literature, self-organization implies that managers function as stewards of the evolutionary process and focus their managerial role on devising and articulating critical values and on establishing boundary conditions that enable and guide decision making at lower levels of the organization (Volberda and Lewin, 2003). To facilitate guided self-organization, Volberda and Lewin (2003) further propound that self-organization, however, does not mean that individuals or units can pull in all directions at will or break all rules. It does not mean that managers are not necessary or that they have diminished roles. Contrarily, it means that no central controller is necessary. Guided self-organization requires fundamental departure from command and control philosophy of traditional hierarchical bureaucratic organizations. Instead of acting as a central controller, managers thus function as stewards of the evolutionary process by enabling and guiding decision making at lower levels of the organization (Volberda and Lewin, 2003). The importance of guided self-organization process was concurred by one of the Shell's top manager at the research department taking the example of technology context:

"I see that a successful technology is always generated from the bottom to the top level. It is necessary though that management allow people to create option while simultaneously set the context and provide the guidance whenever it is needed."

(Interview with a Shell's top manager at research department, 14 March 2007)

The previous statement was reiterated by a former executive of Shell planning department at the following interview quote. This former executive indicated that instead of acting as a central controller, the top managers in the head office should act as a facilitator the decision making at the bottom level for stimulating experimentation. Top managers who act as a facilitator is key to the self-organizing processes (Nonaka, 1988) and experimentation is fundamental for maintaining firm's internal requisite variety (Ashby, 1964) which relates to the first key principle.

“The head office would say, “Listen, I set a context for you. Then at your level, in your country, or in your refinery, you take your own decision. But if you need help, you can come to talk to me.” It is interesting to see that though this particular structural condition, Shell actually facilitated decision taking from the bottom level of the organization. This means that at the lower level, at the operating level or service at the company, there is space to do experiments and to try out new things.”

(Interview with a Shell's former top executive of the planning department, 12 December 2007)

Furthermore to gain insights into how Shell's managers consider the structure that facilitates the guided self-organization process, we asked them about their opinion of hierarchical structure. The following interview quotes indicate that the delayering of hierarchical structure positively influences self-organization:

*“We understand that we should get rid of the corporate and management layer so that we could have a very short line between the top and the people working at the bottom. By doing so, we expect to have **self-managing** team. [...] We think highly decentralized power structure is an asset because it creates a room for diversity, for diverse inputs.”*

(Interview with a Shell's top manager of strategy in exploration and production, 17 September 2007; Emphasis by the author in **bold italic**)

“Some companies have decided to have “the” company's strategies from the top level and then based on that, they derived the operational strategies enforced to the bottom level. However, such idea of military operations is not the way how it works in Shell's practice.”

(Interview with a Shell's top executive in technology, 28 November 2007)

“If I take a perspective of people-related longevity, I think that throughout the 100 years, the various bits and pieces of the Shell group have some kind of autonomy to make individual decisions. So it is a kind of almost like a federation of companies rather than one company where you have really a strong hierarchy, with the top to decide what everyone has to do.”

(Interview with a Shell's top executive in public relation, 27 October 2007)

Additionally we also asked about how Shell's top managers consider their role in particular their span of control that may encourage guided self-organization process. The following interview quote suggests that top managers need to incorporate the tolerant management style that is decentralized. High decentralization implies a small span of control rather than a big span of control (Evan, 1963; Pugh et al., 1968). This implies that span of control negatively influences self-organization.

"I gave you my hypothesis: a tolerant management style is very important to improve the survivability of a company, in particular in the case of Shell's longevity. It requires a decentralized structure. [...] I am sure that if you observe, you will find that renewal nearly always starts as an experiment at the lower level and that renewal rarely succeeds as an initiative taken from the top down. So renewal grows from the grassroots upward into the organization and is not being planted from the top down. Such renewal that grows organically from the bottom up, that is what renews the company."

(Interview with a Shell's former executive of the planning department, 12 December 2007)

We further investigate the relation between the administrative intensity with the self-organization. The following interview quote confirms that administrative intensity negatively influences the self-organization. More specifically, the quote also confirms our finding that there was a decrease in the administrative intensity during the period 1985-1997 (Table 9.4) which is a positive indication of self-organization.

"If I look at the group's structure from the 1980s until around 1996, the group was very decentralized. The support and administrative structure was very lean and simple, like Finance and HR; thus easy accessible – that is of course related to the decentralization. Then in around 1997/1998, the group became, in a way, more centralized because the businesses has started to run as one business."

(Interview with a Shell's top manager at the patent department, 21 May 2007)

His statement was further reiterated by our other interviewees who have worked and still worked at Shell (during the period of our interview) in various functions from research to technology and innovation:

"If you look back, up till 1995/1996, we had a country-based organization. At that time, we had a few central organizations that supported these countries. In 1996, Shell decided to change to get more focuses on businesses. At that time, Shell Research got a lot of criticism about the ivory tower and science for science. In the new structure, we had a problem of segmentation or silo forms. We started to establish a stronger role for central functions. We got central IT, HR, finance, etc. organizations."

(Interview with a Shell's top executive in innovation, 28 November 2007)

In conclusion, both our quantitative and qualitative analyses of self-organization, show that although to a varying degree there was a self-organizing process in Shell, the focal company in our study. The additional insights that we obtained from the interviews with the Shell's former and active top managers suggest that self-organization is a fundamental principle of the firm's long-term viability, i.e. sustained strategic renewal

9.4 Discussion and Conclusion

Traditionally, organizations as social systems have been seen as essentially stable entities (Capra, 1996; Stacey, 1995). In this view, an organization exists in a state of equilibrium, the state in which a system has the greatest likelihood of retaining its internal order (Bettis & Prahalad, 1995). Self-organization perspective, however, suggests an opposed view. To self-organize, it may be necessary that organizations deal with chaotic processes in such a way that existing orders can be dissolved and new orders can emerge (Nonaka, 1988; Weick, 1987; Prigogine and Stengers, 1984).

With reference to creating new orders, self-organization encourages an organizational structure that has limited centralization of authority and low hierarchies. By this means, organizational members are expected to become an autonomous self-organizing group that is given a guided freedom to stimulate creative activities that may contribute to the rejuvenation of their organization.

The idea of self-organization to flatten the hierarchies of more traditional organizations leads us to develop some measurement indicators to assess what degree of variation of self-organization in fact exists in an organizational structure. Since this type of study requires in-depth data from a firm's internal archives, we focus on the study of our focal firm, Shell in which we had an internal access to the company's archives. Also since Shell's organizational structure has always been very complex, our focus is at the Shell's operating company level, i.e. Shell Exploration and Production (EP) and at the region level, i.e. Shell in the Netherlands and the UK.

As a result, we developed three measures to indicate the degree of self-organization in Shell over time. More precisely, the three measures comprise the hierarchical level, chief executive's span of control, and administrative intensity (for the definition of each measure, see Table 9.1). For the first and third measures, our analyses cover the period 1985-2008. The second measure, however, has a shorter duration of analysis, i.e. from 1985-1994 due to the data constraint.

Nevertheless, the three measures help to indicate the degree of self-organization in Shell over the years. The indication is that the three measures negatively influence self-organization. Table 9.2 summarizes the key findings of the three measures. The results show that from the year 1985 until around 1997/8 the self-organization of Shell increased over the years as the three measures showed a decreasing trend. During the period 1998/9-2005, however, the self-organization of Shell seemed to decrease before it depicted a slight increase in the past two years, 2006-2008. In comparison with the past two years, the level of increase during the period 1985-1997/8 seemed to be higher, meaning that there was a stronger indication of an increase in self-organization during the period 1985-1998 than in the period of 2006-2008.

Table 9.6: Summary of the key findings of measurement of self-organization

Measures	Self-Organization Indication		
	1985-1994 or 1985-1997	1998 – 2005	2006-2008
Hierarchical level	++	–	+
Chief executive's span of control	++	n.a.	n.a.
Administrative intensity	++	–	+

Note: ++ = a stronger indication of an increase in self-organization than the sign +
 – = an indication of a decrease in self-organization
 n.a. = data not available

In addition to the quantitative measures of self-organization, we also conducted interviews with both retired executives and active top managers from various functions. By and large, the results of the interviews show that the top managers of Shell understand the concept of self-organization. They also understand the importance of self-organization for the firm's business and technology strategies that are directed towards the firm's longevity. The interviews also gave some indications of the change of the degree of self-organization. It was indicated that in 1995 they saw that the company became more centralized by creating more central functions and more segmentations or silos. To a large extent, this concurs to the results from our quantitative analyses of the three measures.

To conclude, in this chapter we have addressed our fourth research question (Chapter 1) of how firms manage self-organization over time through the Shell's case. The results show that there are some degrees of variation of self-organization over time, but the company's top managers consider that it is fundamental for the firm's sustained strategic renewal. The results from our quantitative measures, therefore, also provide evidence on our second proposition (Chapter 5) that self-organization positively influences sustained strategic renewal.

10. Investigating Principle 3: Exploitation and Exploration^{*)}

10.1 Introduction

The interplay between exploitation and exploration has emerged as a central concept in organizational research on organizational adaptation, organizational learning and organizational survival (e.g. Burgelman, 1991; Holmqvist, 2004; Burgelman and Grove, 2007). Are exploitation and exploration fundamentally interrelated or are they two different orthogonal aspects? Gupta et al. (2006) contend that such central research question on this dual concept depends on the conceptual definition of exploration and exploitation.

The conceptual definition can be traced back to the study of March (1991, p.71), in which he defines exploration as “things captured by terms such as search, variation, risk taking, experimentation, play, flexibility, discovery, innovation” whereas exploitation includes “such things as refinement, choice, production, efficiency, selection, implementation, execution”. The dominant view in the literature (March, 1991, 2006) is that emphasis on exploration and exploitation reflects trade-offs made to accommodate organizational limitations. To a large extent, the dual concept of exploitation and exploration resembles very closely to the selection and adaptation debate.

In an attempt to tie the two ends of the adaptation-selection continuum, Burgelman (1991) applies an intra-organizational ecology view on strategy making to contend that organizations can achieve enduring success by balancing inertia and flexibility in their strategy making process. The idea is that firms should find a delicate balance between induced and autonomous strategic initiatives. Since induced strategic initiatives capitalize on current competencies and build on past success, they imply exploitation. Autonomous strategic initiatives instead fall outside the current competences and strategic scope which correspond to exploration.

^{*)} Part of this chapter is based on Kwee, Z., Van den Bosch, F.A.J., and Volberda, H.W. (2008). ‘How does top management team’s corporate governance perspective influence strategic renewal trajectories?: a longitudinal analysis of patterns of strategic renewal actions of Royal Dutch Shell plc (1907-2004)’. Working paper submitted to the Journal of Management Studies.

In this chapter, we too reconcile the selection and adaptation perspectives by investigating the central question of balancing exploratory and exploitative strategic renewal actions through our study of two large incumbent firms: Shell (1907-2006) and BP (1970-2006). This relates to our fifth research question (Chapter 1) of how firms balance their exploratory and exploitative strategic renewal actions over time. Accordingly, by investigating this question, we also aim to provide evidence on our third proposition (Chapter 5): balancing exploitation and exploration concurrently over time positively influences sustained strategic renewal.

In this line of inquiry, we follow Mintzberg and Waters' (1985) distinction regarding realized strategies to disentangle managerial intentionality and environmental selection effects operating on actions of strategic renewal. Additionally building on Weick (1995, p.55), we propose to study exploitation and exploration by identifying and analyzing strategic renewal actions of firms, i.e. actions that 'managers do, not what they plan'. As far as strategy is concerned, we thus focus on the realized strategic actions of strategic renewal as they cultivate a clearer understanding of the reified concept of strategy introduced by Mintzberg (1978, 1990). He proposes that strategy could be perceived as the blend of deliberate (intended and planned) and emergent (unintended but realized) strategies progressively forming a pattern of realized strategic actions over time. This is consistent with the study of Volberda et al. (2001a) that also demonstrates that strategic renewal trajectories consist of realized strategic renewal actions.

Furthermore, this chapter also addresses our final research question of the role of top management team (TMT) in influencing the strategic renewal trajectory of a firm. Regarding this, mounting research on strategic renewal has largely focused on how large established firms manage their strategic renewal trajectories over time (e.g. Baden-Fuller and Volberda, 1997; Barr et al., 1992; Flier et al., 2003; Huff et al., 1992; Volberda et al., 2001a, b). Such a broad research question, however, requires a more in-depth examination. For one thing, strategic renewal very much corresponds to management discretion. Top management teams are particularly important determinants of organizational strategic renewal in that they are at the boundary between an organization and its environment (Keck and Tushman, 1993). For another thing, strategic renewal embodies managerial processes. Top management teams mediate between external environmental demands and internal organizational dynamics (Barnard, 1938; Selznick, 1957; Thompson, 1967). In the literature, this is somehow an underexplored dimension of organizational antecedents of strategic renewal (e.g. Hurst et al., 1986; Lewin and Volberda, 1999; Volberda et al., 2001a).

This implies that research on strategic renewal requires a longitudinal study to observe patterns and trajectories of a firm's strategic renewal over an extended period of time, not merely a few years or decades. By far, the number of such empirical research is limited (cf. Flier et al., 2003; Huygens et al., 2001; Jenkins and Floyd, 2001; Kwee et al., 2008; Volberda et al., 2001b). Contemplating these

research gaps, we aim to address the research question of the extent to which top management team's corporate governance perspective matters in shaping a firm's strategic renewal trajectories. To this end, we conducted a longitudinal study of a large, long-lived established firm: the Royal Dutch Shell plc (briefly: Shell). For this particular investigation, our study covers the strategic renewal trajectories of Shell from 1959 until 2004. This is because during the 1959-2004 periods, Shell embodied the board compositions of "Committee of Managing Directors" (CMD). This CMD structure extends our research focus beyond CEO (cf. Stadler et al., 2006), i.e. the focus on the top management team (TMT).

Consequently, the contributions of this chapter are at least three fold. First, case studies or cross-sectional studies that are mostly based on surveys or modeling still dominate research on strategic renewal of exploitation and exploration. Although there are also longitudinal studies, the datasets of these studies comprise limited timescales. The long duration of our studies in Shell (1907-2006) and BP (1970-2006) enables us to contribute to this research stream by providing a much broader scope of longitudinal visualization of strategic renewal trajectories. Second, we contribute to the understanding of the role of top management team (TMT) in regulating the speed and direction of a firm's strategic renewal journeys over time (Volberda et al., 2001a). Third, our findings in this chapter provide empirical evidence on the extant corporate governance literature of Anglo-Saxon and Rhine models (Albert, 1993, 1995; Letza et al., 2004; O'Sullivan, 2000; Smith, 2003; Tylecote and Conesa, 1999; Whittington and Mayer, 2000). The literature, by far, can only provide distinct characteristics of the two models conceptually (cf. Stadler et al., 2006). We explicitly demonstrate the operationalization of those characteristics and empirically test them.

This chapter thus comprises two studies. The first study is a comparative-longitudinal study of exploitation and exploration by using the Shell (1907-2006) and BP (1970-2006) as our case companies. The second study is a longitudinal study of the role of the TMT's corporate governance perspective in managing a firm's strategic renewal trajectories. This latter study is only done in the Shell's case. The key reason is that during 1959-2004 Shell embodied the CMD structure that matches the requirement of studying the influence of TMT's corporate governance perspective on a single firm's strategic renewal trajectories. To structure our discussion, this chapter is organized as follows. Chapter 10.2 discusses what measurement indicators we use to quantify exploitation and exploration and the theoretical foundations to develop these measures. Here we also discuss theoretical foundations of corporate governance for the investigation of TMT's corporate governance perspective followed by presenting a conceptual framework for this particular investigation. Chapter 10.3 expounds on research methods used to analyze the data collected. This is followed by the data analyses and results section (Chapter 10.4). Finally, we draw our conclusion from the key findings in Chapter 10.5.

10.2 Measurement Indicators

Exploitation and Exploration

Exploitation and exploration is our focal study in this chapter. With regard to measurement indicators of exploitation and exploration, we build upon the studies of Volberda et al. (2001b) and Flier et al. (2003) that suggest the dimensions and metrics of strategic renewal. They contend that strategic renewal should be studied as a three-dimensional construct, consisting of the context, content and process dimensions of strategic renewal (cf. Miles and Snow, 1978).

With respect to the dimensions of strategic renewal, it follows that exploitation and exploration constructs are related to the content dimension of strategic renewal. The content dimension focuses on the ‘what’ of strategy by distinguishing exploratory strategic renewal actions from exploitative ones (March, 1991). Exploratory strategic renewal actions, indicating initiatives for long-term strategic renewal, are actions such as entering new markets and innovating new products or services. In other words, exploratory strategic renewal actions add new activities to the current repertoire of the organization’s range of activities and competences and increase the geographic scope of the firm. By contrast, exploitative strategic renewal actions, however, consist of strategic renewal actions that focus on the current range of activities and existing competencies, and implementing within the current geographic scope of a firm. Exploitative strategic renewal actions denote a shorter-term orientation of strategic renewal.

To measure exploration, we use the exploration ratio which is defined as the number of exploratory strategic renewal actions divided by the total number of strategic renewal actions over a time period (Flier et al., 2003; Volberda et al., 2001b). By the same token to measure exploitation, we use exploitation ratio which is defined as ratio of the number of exploitative strategic renewal actions to the total number of strategic renewal actions. The issue of how to obtain the data on exploratory strategic renewal actions is described previously in the methods section (Chapter 6.3 and 6.4).

To investigate and measure the exploitative and exploratory strategic renewal actions (the third key principle), we conducted two longitudinal studies, Shell (1907-2006) and BP (1970-2006). We discuss the findings later in Chapter 10.4.

TMT's Corporate Governance Perspective and Strategic Renewal

In addition to the focal study of exploitation and exploration, in this chapter we also study the influence of top management team (TMT) on strategic renewal actions. This inquiry is based on the idea that the ability of a firm to manage processes guiding strategic renewal trajectories is centered in particular on the firm's top managers. Hambrick and Mason (1984) emphasize the need for studying the role of the top management team in making strategic decisions. In the literature, however, this aspect is somehow underexplored (Hurst et al., 1986; Volberda et al., 2001a; Volberda and Lewin, 2003). In this chapter, we thus aim to contribute to this research by investigating the role of top management teams through their corporate governance perspectives in managing strategic renewal trajectories.

Our line of inquiry of managerial role requires a view of an organization as a complex social construct (e.g. Burrell and Morgan, 1979; Child, 1984; Handy, 1981). In this respect, an organization is influenced by the values and expectations from its society or stakeholders. Top managers play an important role here. They are required to use their social skills in and around the organization to pursue their firm's strategy effectively. In this respect, the values and expectations from the top managers' home base (i.e. a country where the top managers reside) may influence their perspectives on how firms should be governed and on their strategy making.

In the organization research stream, the framework for corporate governance is either market-based, command and control, or a mixture of the two (Albert, 1993; Scott et al., 1994). The two most prominent categories of corporate governance models are the stakeholder (Rhine) model and the shareholder (Anglo-Saxon) model (Albert, 1993; Letza et al., 2004; Smith, 2003). While the Rhine model is associated with companies operating in the continental European countries (such as Germany, Switzerland, Austria, and The Netherlands) and often in Japan; the Anglo-Saxon model is associated with companies operating in the United Kingdom (UK) and the United States (US).

As mentioned before during 1959-2004, our focal company, Shell, had the board compositions of the CMD structure. Legally, the company was embedded in two countries: the Netherlands (a country that is associated with the Rhine model) and the UK (a country that is associated with the Anglo-Saxon model). This implies that top managers that are based in the Netherlands are more orientated towards the corporate governance perspective of the Rhine model. Conversely, top managers with the UK as their home base are more likely to have the Anglo-Saxon-orientated corporate governance perspective. Furthermore during the period 1959-2004, there were two different board models in the company: a two-tier board in The Netherlands-based Royal Dutch and a one-tier board in the UK-based Shell Transport and Trading. Accordingly, our study focuses on the TMT's (instead of the CEO's) corporate governance perspective based on the two corporate governance models: the Anglo-Saxon model (one-tier board) and the Rhine model (two-tier board).

Both corporate governance models tend to result in a different prioritization of key issues. The short-termism of Anglo-Saxon model directs the management board to focus more on the shareholder value (Lazonick and O’Sullivan, 2000; O’Sullivan, 2000) through extensive internationalization, dynamic market orientation, transactions-based focus and fluid capital investment system. Management in this governing body utilizes property or other tangible assets as financial performance indicators. Conversely, the Rhine model is associated with a long-term orientation with strong emphasis on prioritizing stakeholder values (Albert, 1995; Freeman, 1984). As a consequence, boards operating with this model have a more limited internationalization and a less dynamic market orientation with a dedicated capital investment system. Management also uses intangible assets such as investment in knowledge as performance indicators. Table 10.1 summarizes the main differences between these two models.

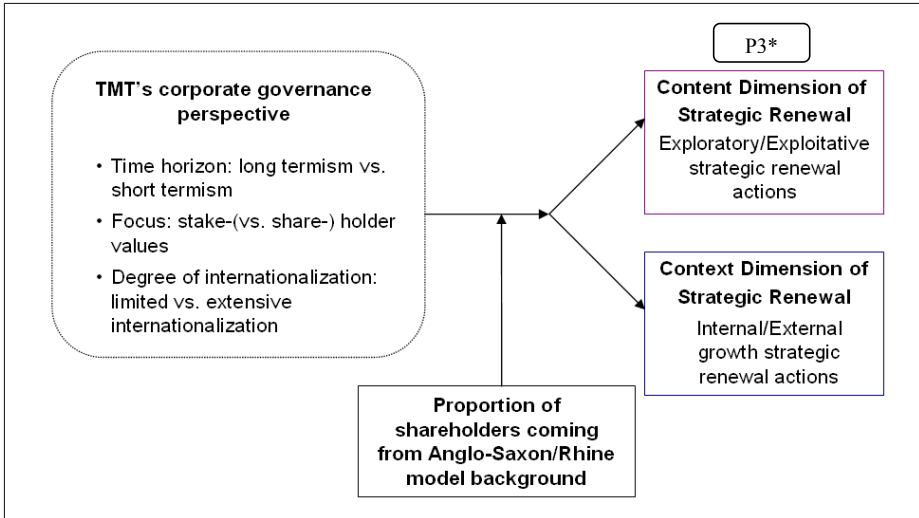
Table 10.1: Differences between Anglo-Saxon model and Rhine model

	Anglo-Saxon model (UK, US)	Rhine model (Germany, Switzerland, Austria, The Netherlands)
<i>Orientation</i>	Short-termism	Long-termism
<i>Priority</i>	Shareholder value	Stakeholder values
<i>Financial performance indicators</i>	Property, tangible assets	Knowledge, intangible assets
<i>Internationalisation</i>	Extensive	Limited
<i>Market orientation</i>	Dynamic	Less dynamic
<i>Focus</i>	Transactions	Relationships
<i>Investment system</i>	Fluid capital	Dedicated capital

(Source: Adapted from Albert, 1993; Clarke and Clegg, 2000; Johnson et al., 2005; Letza et al., 2004; Smith, 2003)

For the purpose of studying the influence of TMT’s corporate governance perspective on strategic renewal trajectories, we develop our conceptual framework as depicted in Figure 10.1. We operationalize the construct of the TMT’s corporate governance perspective into three aspects: time horizon, focus on (stake-)shareholder value(s), and degree of internationalization. In this case, our focus on the TMT comprises the Shell’s CEOs who chaired the Committee of Managing Directors (CMD) and the board members. For a refined study, we also incorporate the proportion of the shareholders coming from the Anglo-Saxon-model or Rhine-model background as a moderating variable. In this respect, we look at the distribution of Shell’s shareholder ownerships based on country.

Figure 10.1: Conceptual framework of the influence of TMT's corporate governance perspective on exploitation-exploration and sustained strategic renewal



Note: * P3 = third key principle: balancing exploitation and exploration simultaneously

We then expect that the TMT's corporate governance perspective may influence the content and context dimensions of strategic renewal actions. As discussed previously in the measurement indicator of exploitation and exploration, the content dimension includes the analysis of exploratory versus exploitative strategic renewal actions (March, 1991). This relates to the third key principle. Next the context dimension looks at the growth orientation of a firm, i.e. growth based on internal firm resources versus external firm resources (Burgelman, 1983; Galunic and Eisenhardt, 1996). The context dimension refers to the 'where' question of strategy. External growth strategic renewal actions are strategic renewal actions taken in cooperation with parties from outside a firm's boundaries. Examples of such actions include mergers, acquisitions, joint ventures, strategic alliances and other cooperative agreements. Internal (organic) growth strategic renewal actions are actions that are originated from and implemented within a firm, for instance launching new products or new services, introducing firm performance enhancement programs, and closing product lines or offices. For the measurement, we use the external/internal ratio as the corresponding metric which is defined as the number of external strategic renewal actions divided by the total number of actions over a time period (Flier et al., 2003).

10.3 Exploitation & Exploration: Impact of Shell's Dual Ownership Structure, 1959-2004

From the management literature perspective, Shell's highly complex structure is a puzzling phenomenon. This is because from an ownership and legal perspective, Shell comprised four types of company: the parent companies, the group holding companies, the service companies, and the operating companies. Considering the company's managerial and operational complexity, how was Shell actually structured and managed? Inspired by this question, Armour and Teece (1976) investigated developments in organization form for firms in the oil industry for the period 1955-1970. They identified and classified Shell's organization structure as one of the first Matrix-organizations. Grant (2002) looked at the structure of Shell in terms of different operating and service companies which comprise the Group and their links of ownership and control. He identified that the structure through which the Group was actually managed did not correspond very closely to the formal structure. He further found that the managerial control of the Group was vested in the Committee of Managing Directors (CMD) which formed the Group's top management team (TMT). The CMD provided the primary linkage between the formal (or governance) structure and the management (or executive) structure of the Group. The CMD also linked together the two parent companies and the group holding companies.

Indeed, one of Shell's distinctive features was its dual ownership structure. This structure was initiated under the presidency of Loudon in the 1950s. At that time, Shell approached an external consultant, McKinsey, to review its management structure. A review by McKinsey in 1959 led to remodeling of the organization. It was when decentralized operating companies were established, responsibilities and authorities were delegated and a formal Committee of Managing Directors (CMD) was established to reach consensus and coordination in the TMT. In principle, the CMD was chaired by a Chairman and had members of a Vice Chairman and other Managing Directors. These members were referred to as the Group of Managing Directors. The chairmanship of the CMD could be either the President of Royal Dutch or the Managing Director of Shell Transport and Trading.

Following the incorporation of Royal Dutch Shell plc in 2004/2005, Shell merged the Group's dual-ownership structure. Under this new structure, the CMD was abolished. At present, the company holds an annual meeting at the executive level (previously at the CMD level), known as the Shell's Annual General Meetings. Consequently, the time periods when the CMD was in existence also mark the duration of our investigation of the TMT's corporate governance perspective, i.e. from 1959 until 2004.

10.4 Analyses and Results

Exploitative & Explorative Strategic Renewal Trajectories of Shell

As mentioned, we calculated the exploration ratio by dividing the number of exploratory strategic renewal actions to the total number of strategic renewal actions. Likewise, exploitation ratio is the ratio of number of exploitative strategic renewal actions to the total number of strategic renewal actions. From the content analysis method, we identified in total 1,537 realized strategic renewal actions for the Shell's case (1907-2006). Note that, however, there is missing data during the Second World War (1939-1945). This is because during the Second World War, Shell did not extensively document its financial and strategic performances. Table 10.2 summarizes the results of the content analysis of strategic renewal actions of Shell.

Table 10.2: Statistics of Shell's strategic renewal actions, 1907-2006

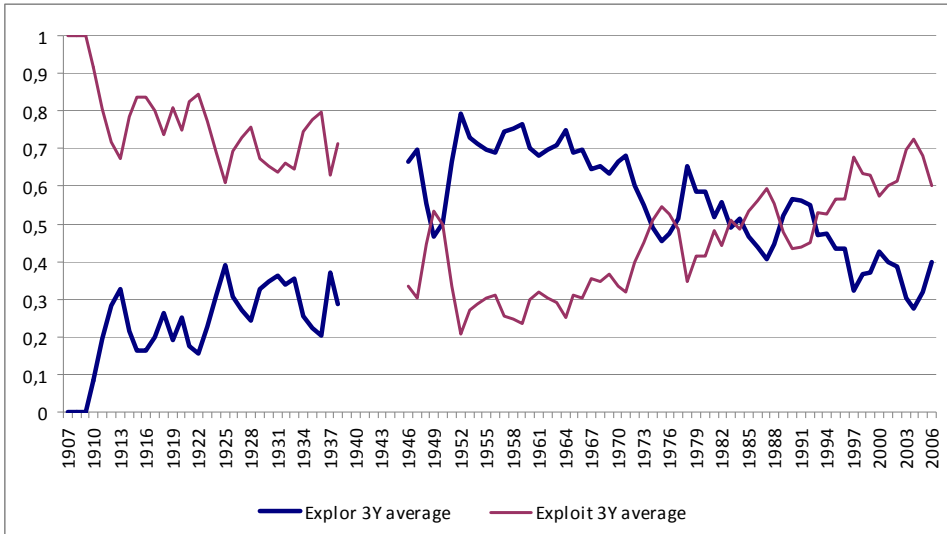
Summary	Shell (1907-2006)
Number of strategic renewal actions	1,537
Missing data in years (For Shell only: from 1939-1945 due to the Second World War)	7
Average number of yearly strategic renewal actions (frequency)	16.36
Volatility (standard deviation of strategic renewal actions)	9.09
Average exploitation ratio	0.41
Average exploration ratio	0.49

Source: Content analysis of Shell's annual reports, 1907-2006

Note: n.a. = not applicable

After the extensive coding of the longitudinal data, we subsequently computed the three-year moving average of the exploration and exploitation ratios for the Shell's case. The reason is that the ratios have high fluctuations and thus we need to smooth out the fluctuations. Next we plot both longitudinal ratios in two graphs. Figure 10.2 depicts the exploratory and exploitative strategic renewal trajectories of Shell (1907-2006).

Figure 10.2: Shell's exploratory and exploitative strategic renewal trajectories (1907-2006), three-year moving average



(Source: Database created by our own content analyses of Shell's annual reports 1907-2006)

The third key principle suggests a need to balance exploitation and exploration simultaneously. This is achieved perfectly when both the exploration and exploitation ratios are equal to 0.5. The exploratory and exploitative strategic renewal trajectories displayed in Figure 10.2 depict that the reasonably balanced exploitation-exploration state was achieved by Shell around the period 1977-1993. Then there was a decreasing pattern in exploratory strategic renewal trajectory until around 2004 before it showed an increasing pattern from 2004-2006.

In sum, over the time, to a varying degree, Shell attempted to balance exploration and exploitation simultaneously. Overall during the period investigated (1907-2006), Shell had an average exploration ratio of 0.49 (see Table 10.2) which indicates a tight close to a balanced exploration-exploitation.

Exploitative & Explorative Strategic Renewal Trajectories of BP

By the same token as in Shell's case, we calculated the exploration ratio and exploitation ratio of BP's strategic renewal actions. From the content analysis method, we identified in total 591 realized strategic renewal actions for the BP's case (1970-2006). Different from the Shell's case, we did not encounter any missing data for the BP's case as the duration of the comparative analysis was shorter, and so not covering the periods before the Second World War. Table 10.3 summarizes the statistics of the content analysis of strategic renewal actions of BP.

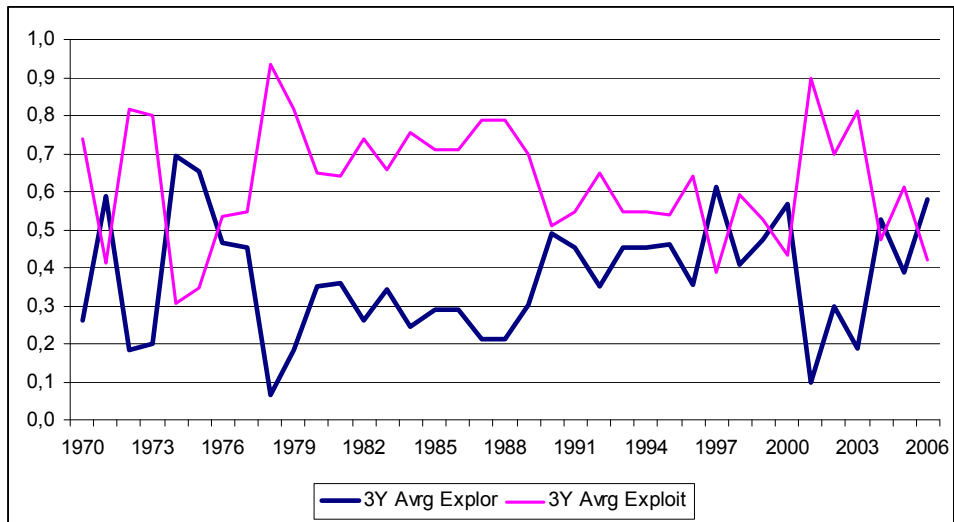
Table 10.3: Statistics of BP's strategic renewal actions, 1970-2006

Summary	BP (1970-2006)
Number of strategic renewal actions	591
Missing data in years	n.a.
Average number of yearly strategic renewal actions (frequency)	15.95
Volatility (standard deviation of strategic renewal actions)	8.51
Average exploitation ratio	0.63
Average exploration ratio	0.37

Source: Content analysis of BP's annual reports, 1970-2006.

Note: n.a. = not applicable

Subsequently, to depict the exploratory and exploitative strategic renewal trajectories we computed the three-year moving average of the exploration and exploitation ratios of the two companies. Similar to the Shell's case, we need to smooth out the fluctuations of the ratios data. Figure 10.3 depicts the exploratory and exploitative strategic renewal trajectories of BP (1970-2006).

Figure 10.3: BP's exploratory and exploitative strategic renewal trajectories (1970-2006), three-year moving average

(Source: Database created by our own systematic document analysis of BP's annual reports 1970-2006)

From Figure 10.3 in BP's case, the reasonably balanced exploitation-exploration can be observed around the periods of 1990-2000 as the patterns of both exploratory and exploitative strategic renewal trajectories are close to the value 0.5 (the ratios that indicate the perfectly balanced exploitation-exploration). Throughout the full period investigated (1970-2006), BP had an average exploration ratio of 0.37 (Table 10.3 and 10.4). This value is less balanced than the one of the Shell's case.

To be more precise, we also made a comparison of the average exploration ratio and exploitation ratio based on the comparable duration between Shell and BP, i.e 1970-2006. Table 10.4 summarizes the results of the full-period and the equal-duration comparisons on the average exploration ratio and average exploitation ratio.

Table 10.4: Summary of full-period (Shell, 1907-2006 vs. BP, 1970-2006) and equal-duration comparisons (Shell vs. BP, 1970-2006)

Average ratio	Shell (Full period, 1907-2006)	BP, 1970-2006	
Average exploration ratio		0.49	0.37
Average exploitation ratio		0.51	0.63
Average ratio	Shell (Comparable period, 1970-2006)	BP, 1970-2006	
Average exploration ratio		0.48	0.37
Average exploitation ratio		0.52	0.63

Source: Content analyses of Shell's (1907-2006) and BP's (1970-2006) annual reports

In conclusion, our findings illustrate how both large incumbent firms in our study attempt to balance exploration and exploitation over time. Since it is difficult to be really in a perfectly balanced state, we can see that at some periods firms focused more on exploitation while at other periods, they focus more on exploration. Nevertheless on average and over time, Shell seems to balance exploration and exploitation slightly better than BP (see Table 10.4).

Influence of TMT's Corporate Governance Perspective on Shell's Strategic Renewal Trajectories

To study the influence of the TMT's corporate governance perspective on Shell's strategic renewal trajectories, we investigate the dual ownership structure of Shell. At the country level, the home bases of the two parent companies of Shell, respectively The Netherlands-based Royal Dutch (two-tier board, Rhine model) and the UK-based Shell Transport and Trading (one-tier board, Anglo-Saxon model), represents the societal heritage of each country.

At the firm level, we consider that the home bases of TMT may influence their corporate governance perspectives. The differing corporate governance perspectives may further influence the TMT's orientation in managing the firm's strategic renewal trajectories. Here we argue that The Netherlands-based (Royal Dutch) CMD chairmen and the board members from the Continental Europe are used to perform strategy within the context of the Rhine-model corporate governance perspective. Conversely, the UK-based (Shell Transport and Trading) CMD chairmen and the board members from the UK or the US are used to perform strategy within the context of the corporate governance perspective of the Anglo-Saxon model.

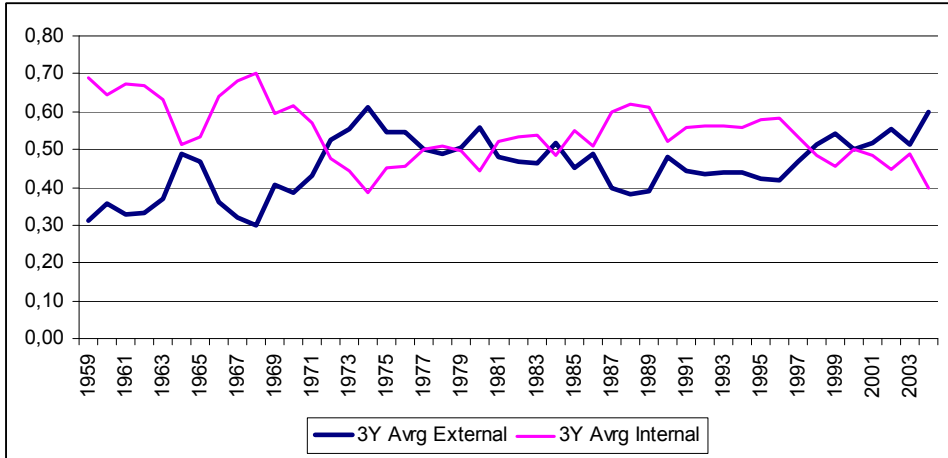
In the Anglo-Saxon model, top managers are assessed based on criteria related to short-term performance and the company's goals are directed towards the near-term focus on the appreciation of shareholder value (Clarke and Clegg, 2000; Lazonick and O'Sullivan, 2000). Operating under such system, top management's strategy tends to focus on measurable company attributes, such as return on investment and price-earning ratios. Such a focus drives the company to pursue, emphasize and augment its existing range of activities within existing geographical scope, i.e. the exploitative type of strategic renewal actions.

The long-term orientation of the Rhine model, however, indicates that the company emphasizes long-term stakeholder values. Although the focus is, to some extent, on increasing productivity and upgrading existing capabilities, the strategic intent is different. To align with its long-term orientation, strategic renewal activities of top management cover a wider range of activities than its current range and perform, besides exploitative, exploratory strategic renewal actions.

Furthermore as indicated in Table 10.1, the "fluid capital" investment applied in the Anglo-Saxon model drives the company to pursue dynamic market orientation with extensive internationalization. Because of such dynamism, the firm needs the involvement of external entities to realize parts of its goals. The extensive internationalization characteristic may, however, put constraints on the firm's ability to realize its strategic goals autonomously. Thus over time, under the Anglo-Saxon model the firm tends to direct its growth towards external growth, such as through acquisitions, rather than internal growth.

In contrast, the "dedicated capital" in the Rhine model has the implication of a less dynamic market orientation and less extensive internationalization. This may become a motivation for the firm to focus on internal strategic actions, actions that can be realized autonomously without the involvement of external entities. In the long-run, it is likely that the Rhine model drives the firm to focus more on the internal growth trajectory compared to the external growth. Figure 10.4 shows the internal and external strategic renewal trajectories of Shell with three-year moving average, 1959-2004.

Figure 10.4: Shell's external and internal strategic renewal trajectories (1959-2004), three-year moving average



(Source: Database created by our own systematic document analysis of Shell's annual reports 1907-2006)

Besides the firm-level analysis, we also incorporated the country-level analysis by looking at the proportion of Shell's shareholders as our moderating variable. Here the shareholders from Continental Europe and Japan were categorized into the Rhine model, while those from the U.S. and the U.K. were categorized into the Anglo-Saxon model. We then ran a correlation analysis. Table 10.5 shows the correlation matrix resulting from the analysis.

Table 10.5: Correlation matrix of strategic renewal actions during the Shell's dual ownership structure (1959-2004)

Variables	Mean	s.d.	1	2	3	4
1. Exploratory strategic renewal orientation	0.52	0.15	1			
2. External growth strategic renewal orientation	0.47	0.13	-0.18	1		
3. TMT with the Anglo-Saxon Corporate Governance Perspective	0.55	0.15	-0.41*	0.48*	1	
4. Proportion of shareholders from the Anglo-Saxon countries	0.54	0.11	-0.61*	0.39*	0.61	1

* Correlation is significant at $p=.01$

As shown in the correlation matrix (Table 10.5), we found significant (at $p=.01$) negative correlations between the TMT's corporate governance perspective of the Anglo-Saxon model with the exploratory strategic renewal orientation (-0.41) and between the moderating variable (proportion of shareholders from the

Anglo-Saxon background) with the exploratory strategic renewal orientation (-0.61). On the contrary, we found significant (at $p=.01$) positive correlations between the TMT's corporate governance perspective of the Anglo-Saxon model with the external growth strategic renewal orientation (0.48) and between the moderating variable with the external growth strategic renewal orientation (0.39). The results demonstrate that under the leadership of the TMT with a corporate governance perspective of the Rhine model, Shell focused more on exploratory strategic renewal actions and less on the externally-oriented growth while under the leadership of the TMT with a corporate governance perspective of the Anglo-Saxon model, Shell focused less on exploratory strategic renewal actions and more on the externally-oriented growth.

To perform a robustness check, we zoom in on the period of 1985-1991 when the chairman of CMD was from the RD and respectively on the period of 1998-2004 when the chairman of CMD was from the STT. We justify our choice based on two arguments. Our first argument is that these two periods have equal time length, i.e. seven years, which enables the pair-wise comparison. In this respect, we assume that the Rhine model of RD-leadership in the CMD at the end of 1980s governed the strategy to a large extent and that the Anglo-Saxon model of STT-leadership governed the CMD strategic initiatives at the end of 1990s. Our second argument is that we take into account the period of 1997 when Shell Oil Company in the US was integrated into the group. From the perspective of societal context, there is a high likelihood that the Anglo-Saxon model is adopted by most firms in the US. This may support the latter point in our first argument that the Anglo-Saxon model has stronger influence than the Rhine model in the company during the period of 1998-2004.

Table 10.6 shows the results of the computed average exploration and external ratios during the two different leaderships of the CMD at Shell. The results from the fine-grained analysis (1985-1991 and 1998-2004) concur with the previous findings (1959-2004).

Table 10.6: Robustness check - exploratory and external growth strategic renewal actions respectively during the RD-leadership (1985-1991) and the STT-leadership (1998-2004)

	Average ratio of exploratory strategic renewal actions	Average ratio of external strategic renewal actions	Frequency of strategic renewal actions	Volatility of strategic renewal actions
RD-leadership (1985-91)	0.43	0.55	28.29	4.42
STT-leadership (1998-2004)	0.33	0.64	25.57	4.12

Finally for an additional robustness check, we conducted a series of interviews with key senior managers of Shell and retired executives from Shell. They concurred with our findings that the shareholder orientation is getting stronger in the company over time especially in the 1990s. One of the executives of in the Shell's top management team shared with us his experience of the changes to a stronger shareholder value:

"I think if we look back until, say 1990s, the shareholders were there and the shareholders were very much respected. But the shareholders didn't have a lot of influence before they got a lot more influence in the mid 1990s."

(Interview with a Shell's top executive, 14 May 2007)

His statement was further added by a senior manager of Shell in research and development about when the shareholder became stronger in the company:

"I see that the focus on shareholder values has become stronger since the last 15 years due to among others the shareholder orientation that resulted from the integration of Shell Oil, US in 1997."

(Interview with a Shell's top manager at the research department, 3 April 2007)

A retired executive of Shell with a 30-year period of service supported the above statement, stating that:

"I think the shareholder orientation was particularly very strong in the 90s. We became more Anglo-Saxon. I really saw this move toward a stronger shareholder orientation in the mid 90s. It arrived at the peak at the end of the integration of Shell Oil in 1997."

(Interview with a Shell's former top executive, 29 March 2007)

In sum, our findings of the exploitative and exploratory strategic renewal trajectories have illustrated the third key principle. More specifically over time, the studies of Shell and BP have illustrated how the two large incumbent firms attempt to simultaneously balance exploratory and exploitative strategic renewal actions. The balance state, however, is not easy to achieve. As March suggested although firms are often confronted with balancing exploitation and exploration concurrently, most firms seem to exhibit an asymmetric preference for short-term exploitation improvements. The findings at the BP's case in this chapter also illustrate such asymmetric preference. This asymmetric preference, however, is less obvious in the Shell's case (Table 10.4).

Additionally, our study of the influence of TMT's corporate governance perspective on Shell's strategic renewal trajectories suggests that TMT with the long-term orientation of Rhine corporate governance perspective is associated with pursuing exploratory and internal growth strategic renewal actions while TMT with the short-term orientation of Anglo-Saxon corporate governance perspective is associated with focusing on exploitative and external growth strategic renewal actions. Additional insights about this issue are also reflected through the interviews we conducted at Shell.

10.5 Discussion and Conclusion

To survive in constantly changing environment, firms must embed concurrently improvements in current competences (exploitation) and flexibility to explore new competences (exploration) through their strategic renewal actions (Eisenhardt, 1989a; Volberda, 1998). Furthermore, the research theme of how organizations through their top managers manage their strategic renewal trajectories in order to thrive over time has long been central to both strategy and organizational scholars. This chapter has addressed and studied these two research themes.

In the first place of central importance is the issue of how firms accommodate the need for making trade-offs between exploration and exploitation (Gibson & Birkinshaw, 2004; Gupta et al., 2006). We address this issue by proposing to measure exploration and exploitation through two ratios built on the studies of Volberda et al. (2001b) and Flier et al. (2003), i.e. exploration and exploitation ratios respectively. The results of our analyses from two large long-lived firms, Shell (1907-2006) and BP (1970-2006) show how both firms attempt to balance their exploitative and exploratory strategic renewal actions. Table 10.7 summarizes the key findings of the exploration and exploitation at Shell and BP.

Table 10.7: Summary of key findings of exploration and exploitation of Shell (1907-2006) and BP (1970-2006)

Average ratio	Comparison based on full period of investigation		Equal-period comparison	
	Shell (1907-2006)	BP (1970-2006)	Shell (1970-2006)	BP (1970-2006)
Average exploration ratio	0.49	0.37	0.48	0.37
Average exploitation ratio	0.51	0.63	0.52	0.63

Source: Content analyses of Shell's (1907-2006) and BP's (1970-2006) annual reports

Table 10.7 shows that the longest duration is conducted through a longitudinal content analysis of strategic renewal actions in Shell of 100 years, from 1907 until 2006. The comparison between Shell and BP was made based on the full period of investigation (Shell 1907-2006 vs. BP 1970-2006) as well as based on the equal-period investigation (Shell vs. BP, 1970-2006). Both types of comparison that over time Shell seemed to be better in balancing exploration and exploitation than BP as its average exploration ratio is close to 0.50 (a perfectly balanced exploration-exploitation).

In the second place through the Shell's study, this chapter has also explored the role of top management team's corporate governance perspective in guiding the direction of a firm's strategic renewal journeys over time (Volberda et al., 2001a). The TMT role can be one of the means of managerial discretions about how to balance exploitation and exploration simultaneously. Table 10.8 summarizes the key findings of this study of the role of TMT's corporate governance perspective on Shell's strategic renewal trajectories.

Table 10.8: Summary of key findings of the correlations of the role of TMT's corporate governance perspective on Shell's strategic renewal trajectories, 1959-2004

Shell TMT's corporate governance perspective, 1959-2004	Exploratory strategic renewal trajectory	External growth strategic renewal trajectory
Rhine model	+	-
Anglo-Saxon model	-	+

Source: Erasmus Strategic Renewal Centre

Our findings demonstrate that the TMT's corporate governance perspective does influence a firm's strategic renewal trajectories. In the Shell study, we found that TMT with the corporate governance perspective of Anglo-Saxon model is more inclined to pursue exploitative (over exploratory) and external (over organic) growth of strategic renewal trajectories. Conversely, TMT with the corporate governance perspective of Rhine model appears to put a stronger emphasis on exploratory and organic growth of strategic renewal trajectories.

Through this latter study, we have provided complementarily empirical evidence on the upper echelon perspective (Hambrick and Mason, 1984) and the extant corporate governance literature of Anglo-Saxon and Rhine models (Albert, 1993, 1995; Letza et al., 2004; O'Sullivan, 2000; Smith, 2003; Stadler et al., 2006; Tylecote and Conesa, 1999; Whittington and Mayer, 2000). Through our empirical study of Royal Dutch Shell plc, we looked at the provenance of Shell's CMD chairmen and board members as an operationalization of the TMT corporate governance perspectives. Our findings have shown that it is possible to provide explicit proofs to the conceptual characteristics of both corporate governance models.

Accordingly, the results in this chapter provide an answer to our fourth research question of how firms balanced their exploitative and explorative strategic renewal over time. The findings in this chapter also illustrate our third proposition in Chapter 5: balancing exploration and exploitation positively influences sustained strategic renewal. In terms of contribution, the novelty of our study on exploitation and exploration lies on an extensive scope of longitudinal visualization of strategic renewal trajectories. By taking this challenge, we hope to encourage scholars to do more longitudinal research. This approach has a crucial theoretical implication of studying the evolvement of a firm's strategic renewal trajectories with regards to the adaptation with the firm's changing environment.

Regarding managerial implications, we contribute to the understanding of the role of top management team and their perspectives on corporate governance models in a firm's strategic renewal. To conclude, as Baden-Fuller and Stopford (1994) pointed out that strategic renewal capacity of a firm is subject to its concurrent and balanced resourcefulness in pursuing novel innovations, capitalizing its current capabilities, and rejuvenating its mature business; our findings make clear the corporate governance model in use also has a strong impact on the strategic renewal capacity of a firm. By doing this, we contend that the three key principles are essential antecedents for a firm to sustain its strategic renewal over time.

Part V: Conclusion

11. Discussion and Conclusion

11.1 Introduction

Long-lived firms are not simply idiosyncratic outliers of populations of organizations. Their long existence in society lies in their strategic ability to renew themselves over time. This PhD research has argued that research on organizational longevity could be treated as viewing longevity as a firm's strategic capacity to sustain strategic renewal over time. Such capacity may be best investigated by combining the dual perspectives of selection and adaptation that are reconciled in a coevolutionary perspective. This is because the coevolutionary perspective takes into account both internal characteristics of organizations to strategically enhance its survivability as well as the forces in their environments that set limits on organizational discretion.

More specifically in this PhD study, we incorporate both selection and adaptation perspectives. We propose that firms be assessed not just with respect to their performance but respect to their long-term survival which is defined here as sustained strategic renewal. To this end, this PhD study intends to investigate the dynamic relationships between a firm and its environment in the context of sustained strategic renewal by developing a conceptual framework and propositions by conducting a longitudinal and comparative case study of large incumbent long-lived firms. The focus is on the fundamental scientific questions about three key principles of self-renewing organizations (Volberda and Lewin, 2003) to explain the sustained strategic renewal phenomenon of large, long-lived incumbent firms. In this PhD study, the three key principles are considered as the key prerequisites of sustained strategic renewal.

Based on the discussed research aim, our study is rooted in the following five research questions:

RQ1: Based on a selection-and-adaptation (coevolutionary) perspective, how do firms develop their *competences* to strategically renew themselves over time?

RQ2: Based on an adaptation perspective, how do firms *learn* and adapt in the context of changing knowledge environment?

RQ3: How do large incumbent firms regulate their internal *rates of change* to match up with the external rates of change?

RQ4: How do firms manage *self-organization* to sustain their strategic renewal over time?

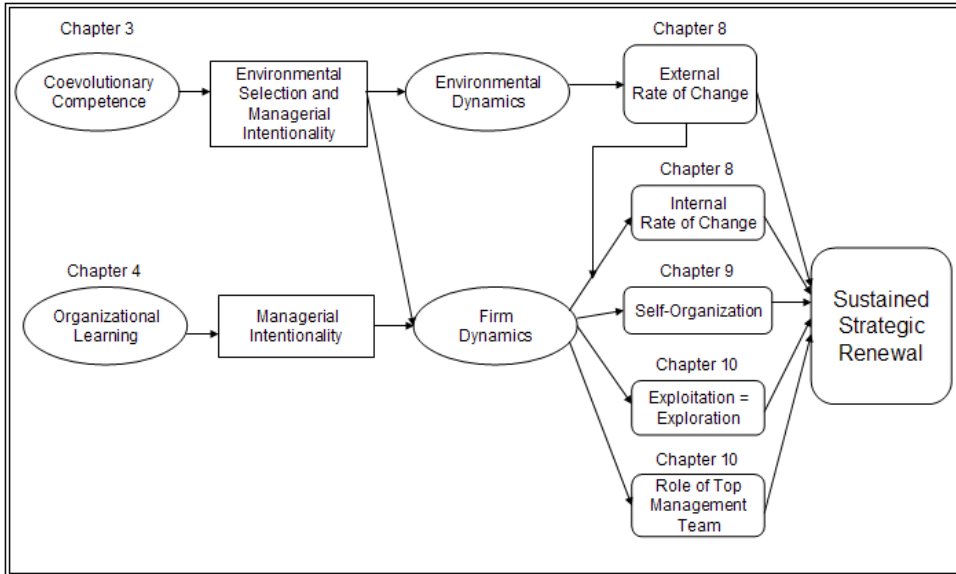
RQ5: How do firms balance their *exploratory and exploitative* strategic renewal actions over time?

RQ6: To what extent does *top management team* influence the strategic renewal trajectory of a large incumbent firm?

Guided by these five research questions, we conducted the study by first exploring the three key principles from a coevolutionary perspective (Chapter 3) and an adaptation perspective (Chapter 4). This is followed by our choice to investigate and operationalize the three key principles through quantitative measurements as well as in-depth qualitative analysis. For this purpose, in Chapter 5 we developed three propositions related to each of the three key principles and substantiated the three key principles through the enabling antecedents introduced by Lewin and Volberda (2004). Based on our research design of a comparative-longitudinal and multilevel approach (Chapter 6) and empirical settings (Chapter 7), we have measured and analyzed the three key principles in Chapter 8, 9, and 10.

To this end, we use an in-depth contextual data to investigate the influence of external environment to internal corporate change and an extended duration of data in order to offer a longitudinal and comparative analysis. Since we investigate both the environment and firm conditions, our study also takes a multilevel method in particular on the industry and firm levels.

To combine both selection and adaptation perspectives, we propose to develop a conceptual framework that helps us to identify and map demonstrable constructs into quantifiable indicators. Figure 11.1 which is recaptured from Figure 5.1 depicts the constructs derived from the three key principles. The framework also reflects the environmental and firm dynamics that are indicated in both selection and adaptation perspectives.

Figure 11.1: Conceptual framework, recaptured from Figure 5.1

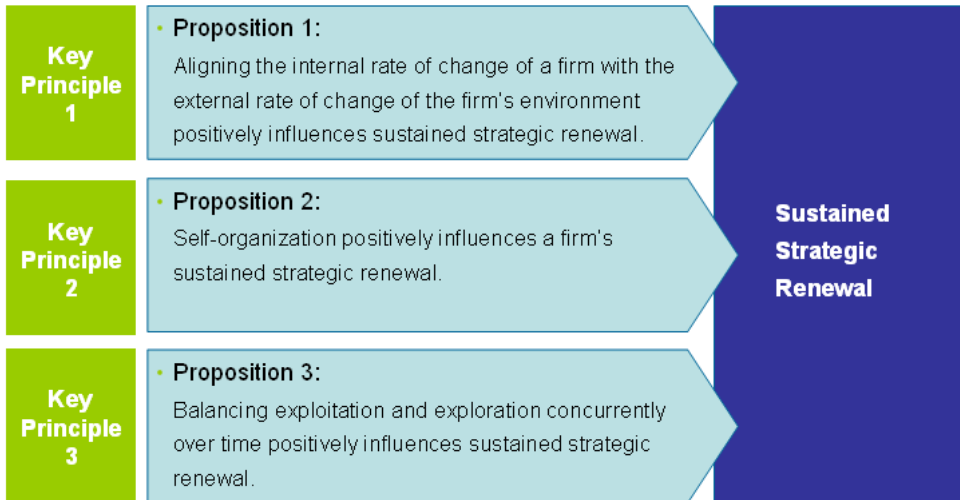
The remaining of this chapter is structured as follows. First, we incorporate and integrate the key findings of the three key principles. We then highlight limitations of this research and accordingly put forward suggestions for future research. Reflecting on the key findings of this PhD study, we suggest managerial implications that may help firms (through their managers) to build a frame of thought towards sustained strategic renewal. Finally, we draw our conclusions at the end of this chapter.

11.2 Key Findings: Integrating Three Key Principles

Firms do not exist in isolation. They are influenced by external forces from their environments. Over time, they need to be able to sense and create a different pattern of alignment between their internal characteristics with the changing conditions of their operating environments. Environmental turbulence requires firms to create a new order through self-organization. Additionally, firms need to simultaneously balance the need to address today's challenges by exploiting their existing competences with the need to manage their future by exploring new competences. To study this complex phenomenon, we advance the three key principles of self-renewing organizations (Volberda and Lewin, 2003).

As a starting point rooted in literature, we developed three propositions related to each of the three key principles as shown in Figure 11.2. From a research standpoint, propositions are useful for crystallizing and exploring the demonstrable constructs of the three key principles. They enable us to operationalize and calibrate the constructs into measurable proxies. To substantiate the three key principles, we also discussed the enabling antecedents of each of the principles (Lewin and Volberda, 2004) at the dimension of strategy, structure, managerial process, and leadership (see Table 2.4 in Chapter 2; and Table 5.1, 5.2 and 5.3 in Chapter 5).

Figure 11.2: Summary of propositions of the three key principles and sustained strategic renewal



In the first place, of central concern in corporate longevity or sustained strategic renewal research is the understanding of how temporal changes in environment affect the survival of constituent organizations. This concern deals with the issue of alignment between the internal rate of change (IRC) of the firm and the external rate of change (ERC) of the environment in which the firm is embedded (Chapter 8). In real environments, equilibrium positions can change. To remain or to become long-term viable, firms must change when the factors that change the equilibrium point change. In this respect, the central question is how fast firms should undergo changes relative to environmental changes. We investigated this question in Chapter 8 by doing longitudinal and comparative study of two large incumbent firms: Shell and BP. The study took place in two levels of analysis: (1) the oil industry level as an indicator to assess the external rate of change; and (2) the firm level as an indicator to assess the internal rate of change.

Additionally we developed measures that comprise homogeneous and heterogeneous measures (refer to Table 6.6 and Table 8.1). Homogeneous measures are concerned with similar measures both at the industry as well as the firm level. Heterogeneous measures, however, are concerned with different measures between the industry level and the firm level. For a comparison, in both homogeneous and heterogeneous measures we compared the average ERC of the industry with the average IRC of the case companies (Shell or BP). To this end, we took the average of the industry's ERC across all measures from both homogeneous and heterogeneous measures and by the same token, the two firms' IRC. Finally we calculated the average differences between the average ERC and the average IRC. The idea is that an average, i.e. across various indicators, the average IRC must be equal or higher compared to the ERC from our comparative-longitudinal study of the oil industry, Shell and BP. Table 11.1 summarizes the key findings of comparison between IRC and ERC across all measures.

Table 11.1: Summary of the key findings of the first principle across measures

Measures of RC and Period	Industry	Shell	BP
Homogeneous measures			
Oil Production, 1922-2000	4.90	6.06	6.92
Patents, 1975-2007	-1.37	0.59	-4.23
R&D Intensity, 1981-2007	-0.37	0.83	3.73
External Venturing, 1986-2008	4.73	16.30	10.08
Heterogeneous Measures			
ERC Oil prices, 1907-2007	4.47	-	-
ERC Competitive diversity, 1907-2000	7.74	-	-
IRC New products & services, 1970-2007	-	7.91	8.32
IRC New process, 1970-2007	-	8.62	6.20
IRC Organizational structure, 1970-2007	-	1.41	2.44
IRC Internal venturing, 1970-2007	-	4.66	-1.05
Average annual RC across measures	ERC = 3.35	IRC_{Shell} = 5.80	IRC_{BP} = 4.05
Difference of average IRC– average ERC (ΔRC) across measures		Δ RC _{Shell} = 2.45	Δ RC _{S/BP} = 0.70
Key finding (Shell and BP):		IRC-ERC \geq 0; or IRC \geq ERC	

Source: Erasmus Strategic Renewal Centre; Adapted from Table 8.17

Altogether through our quantitative analysis, we found that over time and to a varying degree, both Shell and BP managed to align their internal rates of change with the external rates of change of the oil industry. The Δ RC of Shell, however, is higher than the Δ RC of BP. This means that although the IRC of both Shell and BP exceed the ERC of the oil industry, Shell moves even faster than BP with respect to aligning the IRC with the ERC. In addition to the quantitative analysis, we also conducted interviews with both former and active top managers of Shell (see Table 6.3). The analyses of the interview quotes confirm the central premise of the importance to align the IRC with the ERC. In sum, the results thus demonstrate that to a large extent the average internal rates of change (IRC) of both Shell and BP are aligned with the oil industry's average rates of change. This provides an empirical support to the first principle and to our first proposition, i.e. the alignment of the internal rate of change of a firm with the external rate of change of the firm's environment positively influences the firms' sustained strategic renewal efforts.

In the second place, we investigated the key principle of self-organization (Chapter 9). To assess the degree of self-organization over time, we developed some measurement indicators that are based on the opposite features of self-organization, i.e. centralization of authority (through the measures of hierarchical level and chief executive's span of control) and administrative authority (through the administrative intensity measure). By using these measures, we could indicate or assess the level or degree of self-organization over the years. For this purpose, we focused on the Shell's case as we have an internal access to the company's archives. To complement the results from the quantitative analyses, we also presented the evidence on the key principle through in-depth interviews with the Shell's top managers (see Chapter 9.3). Table 11.2 summarizes the key findings of the investigation of the self-organization principle.

Table 11.2: Summary of the key findings of the second principle

Measures	Self-Organization Indication		
	1985-1994 or 1985-1997	1998 – 2005	2006-2008
Hierarchical level	++	–	+
Chief executive's span of control	++	n.a.	n.a.
Administrative intensity	++	–	+

Recaptured from Table 9.6

Note: ++ = a stronger indication of an increase in self-organization than the sign +
 – = an indication of a decrease in self-organization
 n.a. = data not available

The results in Table 11.2 show that from the year 1985 until around 1997/8 the self-organization of Shell increased over the years as the three measures showed a decreasing trend. During the period 1998/9-2005, however, the self-organization of Shell seemed to decrease before it depicted a slight increase in the past two years, 2006-2008. In comparison with the past two years, the level of increase during the period 1985-1997/8 seemed to be higher, meaning that there was a stronger indication of an increase in self-organization during the period 1985-1998 than in the period of 2006-2008. In sum, our results indicate that over time, to a varying degree Shell was able to encourage self-organization. This provides an empirical evidence on the second principle.

Finally, we investigated the key principle of concurrently balanced exploration and exploitation (Chapter 10). For this particular inquiry, we employed longitudinal content analysis method (Chapter 6) to identify exploitative and exploratory strategic renewal actions from the annual reports triangulated with data from multiple sources. Chapter 10 also addressed our fifth research question of how the top management team's (TMT's) corporate governance perspective influences a firm's strategic renewal trajectory. Table 11.3 summarizes the key findings of the third key principle and the fifth research question.

Table 11.3: Summary of key findings of the third principle (Shell, 1907-2006 and BP, 1970-2006) and TMT's corporate governance perspective (Shell, 1959-2004)

Average ratio	Comparison based on full period of investigation		Equal-period comparison	
	Shell (1907-2006)	BP (1970-2006)	Shell (1970-2006)	BP (1970-2006)
Average exploration ratio	0.49	0.37	0.48	0.37
Average exploitation ratio	0.51	0.63	0.52	0.63

Shell TMT's corporate governance perspective, 1959-2004	Exploratory strategic renewal trajectory	External growth strategic renewal trajectory
Rhine model	+	-
Anglo-Saxon model	-	+

Source: Erasmus Strategic Renewal Centre

In principle, we conducted the analyses for both Shell and BP in different duration of analysis: Shell (1907-2006) and BP (1970-2006). The comparison between Shell and BP was made based on the full period of investigation (Shell 1907-2006 vs. BP 1970-2006) as well as based on the equal-period investigation (Shell vs. BP, 1970-2006). Both types of comparison show that over time Shell seemed to be better in balancing exploration and exploitation than BP as its average exploration ratio is close to 0.50 (a perfectly balanced exploration-exploitation). Nevertheless both firms strive to balance their exploitative and exploratory strategic renewal actions. In this case, Shell seemed to show a more balanced exploratory-exploitative strategic renewal trajectory than BP. These findings provide empirical evidence on the third principle of balancing exploitation and exploration simultaneously. Additionally Table 11.3 also shows that the TMT's corporate governance perspective of the Rhine model is associated with exploratory and internal growth strategic renewal trajectory; while the one of the Anglo-Saxon model has a focus on exploitative and external growth strategic renewal trajectories. Altogether, Table 11.4 summarizes the overall key findings of the three key principles. Altogether, they give evidence on our three propositions (Figure 11.1).

Table 11.4: Key findings of the three key principles

Key Principle	Shell (Period)	BP (Period)
1. IRC-ERC	≥ 0 (1970-2008)	≥ 0 (1970-2008)
2. Self-organization	+ (1985-2007)	n.a.
3. Average exploration ratio*	Almost balanced, 0.49 (1907-2006)	Less balanced, 0.37 (1970-2006)

Note: IRC = internal rate of change; ERC = external rate of change
n.a. = not available in this study
* Balanced exploration-exploitation if the ratio is exactly equal to 0.50

Based on the above key findings and the resulting propositions, we conjecture that the three key principles are fundamental antecedents that may result in sustained strategic renewal. In this respect, we contend that firms have to do equally well in all three key principles for sustained strategic renewal. Regarding this, we attempt to provide an explanation from an empirical perspective as well as from a conceptual perspective.

Empirically, our investigation of the three key principles shows the first evidence that to a varying degree, the two long-lived firms in our study (Shell and BP) have demonstrated an attempt to advance the three key principles altogether. Yet the attainment of sustained strategic renewal is difficult, for instance in the face of an accelerating rate of environmental change. The complexity of such a dynamic perspective makes the empirical investigations of the three key principles even more difficult. Thus our empirical investigation does not yet provide an explanation of why the three principles are simultaneously needed for sustained strategic renewal. However, we can complement this through a conceptual argument.

Conceptually at its core, sustained strategic renewal needs to be anchored in the three key principles on the whole (Volberda and Lewin, 2003). The central premise here is that the three key principles are interrelated. This can be demonstrated through the interrelationships among the enabling antecedents of the three key principles (Lewin and Volberda, 2004). At the same time, although the enabling antecedents of three key principles together may somehow look overlapping, they can also be contradicting. This can be seen through the tensions between change and stability, hierarchy and self-organization, exploitation and exploration. Although getting the dynamic balance right can be difficult, there are many ways to achieve this end.

Ambidexterity literature, for instance, suggests that it is possible for an organization to do two different things at the same time although at the different level of organizational units. This is referred to as structural ambidexterity. In principle, structural ambidexterity is an organizational form that separates structural subunits for exploration (that indicates changes) and exploitation (that indicates stability) by establishing different competences, systems, incentives, processes and cultures for each unit (Benner and Tushman, 2003; Jansen et al. 2009). In the case of Shell and BP, for example, upstream units such as production may have a tendency in exploitation and stability while downstream units such as sales and marketing may have a tendency in exploration and changes. Regarding the hierarchical level, scholars of structural ambidexterity (e.g. Benner & Tushman, 2003; Jansen et al. 2009; Tushman & O'Reilly, 1996) show that top-level managers should engage in both exploration and exploitation activities while business-unit-level managers should focus on either exploration or exploitation. Additionally, Mom et al. (2007) illustrate that in a firm characterized by this spatial separation, top-down knowledge inflows would be of particular value for managers in places focusing on exploitation, whereas bottom-up and/or horizontal knowledge inflows would be of particular value for managers in places focusing on exploration.

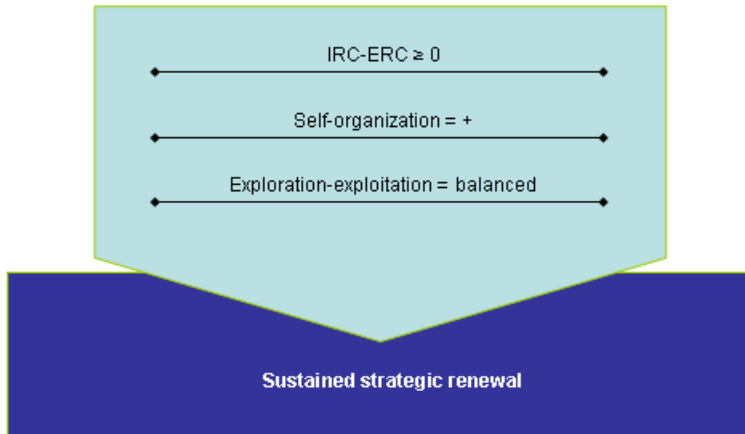
Alternatively, ambidexterity literature also suggests the concept of contextual ambidexterity (Gibson and Birkinshaw, 2004). In this case, the suggestion is to create organizational units in which the tensions between exploration and exploitation are reconciled. Whilst the structural ambidexterity posits dual structure to do two different things, contextual ambidexterity proposes establishing a

collectively selective set of systems and processes across the business unit of an organization to enable individual employees to consider both exploration and exploitation simultaneously. Contextual ambidexterity also demonstrates that both alignment and adaptability are possible across the business units (Gibson and Birkinshaw, 2004). Alignment is concerned with coherence among all patterns of activity whereas adaptability is concerned with a firm's capacity to reconfigure activities quickly to meet changing demands in the task environment (Simsek, 2009). This is related to our first key principle. Regarding contextual ambidexterity, Mom et al. (2007) contend that in firms or units aiming at synthesizing exploration and exploitation, a combination of both top-down and bottom-up, or a combination of both top-down and horizontal knowledge inflows would be of particular value for managers. Additionally, Lubatkin et al. (2006) propose a top management team behavioral integration that acts as a forum to openly and freely exchange differing ideas and resolve conflicts to create a set of shared perceptions to facilitate organizational ambidexterity. This indicates a self-organizing process.

Advancing the concepts of structural and contextual ambidexterity, studies of technological innovation and strategic renewal indicate that firms may deal with tensions between exploration and exploitation by temporally separating the two (Audia et al., 2000; Burgelman, 2002). This implies for managers that they shift their focus over time from pursuing incremental innovations or stability to pursuing radical innovations or strategic renewal, or vice versa. This is an indication of how to deal with the tension between stability and change. Thus it relates to our first key principle of managing the internal rate of change to match or exceed the external rate of change. Mom et al. (2007) show that in such a temporal separation structure, top-down knowledge inflows would be of particular value for managers in time periods focusing on exploitation, whereas bottom-up and/or horizontal knowledge inflows would be of particular value for managers in time periods focusing on exploration.

Reflecting on the above empirical and conceptual argument, we advance a mode that suggests that it is necessary for firms to comply with each of the three key principles but it will not be sufficient if firms only do well in one or more of the three key principles. To put it another way, firms have to perform well in all of the three key principles in order to achieve sustained strategic renewal. We visualize our conjecture in Figure 11.3.

Figure 11.3: Three key principles as antecedents to sustained strategic renewal



Furthermore to achieve sustained strategic renewal, we also contend that a firm not only has to perform well in all the three key principles, but they also need to implement the three key principles consistently over time. This is also reflected in the following interview quote:

“In my opinion, a company that has longevity means that it is capable to renew itself through a long period of time. Just doing it once doesn’t give you longevity but if you are capable to do it repeatedly and then you will have a long-lasting company.”

(Interview with an executive in the planning department, 14 March 2007)

In the next section, we highlight the limitations of the current PhD research and how future research may advance such limitations to provide a more in-depth understanding of sustained strategic renewal.

11.3 Limitations and Future Research

The results from our study highlight several limitations and at the same time open relevant promising avenues for future research. We will highlight the limitations based on our study of the three key principles of self-renewing organizations.

In the study of the first principle, we use the industry level as a proxy to measure the external rate of change. We do not yet distinguish the external rate of change between the meso level of institutional environment and macro level of global environment (social, political and technological environment) as suggested by Lewin et al. (2003). Neither have we delineated the level of change (e.g. corporate level strategy, business level strategy, unit level strategy, operational level strategy, etc.). Therefore there may be measures to strategic change as well as measures to operational change. For instance, on the one hand the oil production may be a measure of operational change considering that it is associated with an operational activity. On the other hand, the oil production may also be a measure of strategic change as oil is a strategic resource for the oil industry/firms. In addition, we do not address the issue of a firm's resources in environmental scanning. Future research may study for instance the question of how difference in resources endowments may impact on a firm's initiative to align its internal rate of change with the external rate of change. This question is particularly relevant as changing the environment by being the first mover to outrun the environmental speed standard, however, can be risky (Mintzberg and McHugh, 1985). To initiate and implement internal change to beat the external change, older and larger firms need to mobilize the resources that they have accumulated over the years and by the goodwill inherent in established long-term relationships with key stakeholders such as customers, partners, and suppliers. Future research is needed to assess a criticality range of the internal rate of change to match or exceed the external rate of change. The last point is that although we examined changes in form in response to environmental change, we did not explicitly examine how organizations perform during the change from one form to another form or how they allocate slack resources to initiate the change.

In the study of self-organization, we limit ourselves to a single-firm context. With this respect, we do not have a benchmark. In the future research, it is necessary to employ comparative research on the degree of hierarchical structure of industrial organizations (Evans, 1963; Pugh et al., 1968). The second limitation is that we do not address the challenging issue of investigating the role of manager in self-organization (Anderson, 1999b). In self-organizing system, Nonaka (1988) for instance, contends that middle management occupies a key position, equipped with an ability to combine macro (context-free) strategic information and micro (context-specific) hands-on information. This is an important area for future research as the middle management is regarded as the nuclei of self-organizing groups and an agent for change in an organization's self-renewing process. By incorporating the middle management level, middle management may help to effectively eliminate the

fluctuation and chaos within an organization's information creation structure by serving as the starting point for action to be taken by upper and lower levels. Taking a middle management level also may contribute to the underexplored question about managerial agency and the legitimacy of hierarchical structures (Wooldridge et al., 2008). Future research of this theme may help to provide a more in-depth understanding of self-organization.

In the study of exploration and exploitation, we do not yet address the issue of the magnitude of exploratory and exploitative strategic renewal actions. In our study, we assume that each strategic renewal action has the same weight (Volberda et al., 2001b; Flier et al., 2003). This study has not yet incorporated a method to control for the magnitude of individual strategic renewal actions. Future research is needed on this issue. Our study of the influence of TMT's corporate governance perspective on a firm's strategic renewal also has a limitation. In this respect, a potential issue for future research is to advance our study to a more context-dependent understanding of corporate governance (Filatotchev, 2007). As Malerba (2004, 2005) and Teece et al. (1997) propound that strategic path also depends on the specific sector in which it takes place, bringing in the sector context may be useful. It is possible that due to differences among sectors (e.g. managers, knowledge, technology) (Malerba, 2004, 2005) may modify the effect of the TMT's corporate governance perspective on how firms in different sectors conduct strategic renewal differently. For instance, in science-intensive sectors (e.g. pharmaceuticals, electronics) that requires a lot of high risk capital for research and development may somehow encourage the exploratory strategic renewal actions even if the top management of the firms in these sectors have a corporate governance perspective of Anglo-Saxon model.

When integrating the three key principles, we thought of two key suggestions. The first suggestion is to separately measure the sustained strategic renewal which is considered here as a dependent variable. In this research, we only indicate the sustained strategic renewal through the three key principles but not really measure the sustained strategic renewal. The second suggestion would be to investigate the interrelationships of the enabling antecedents of the three key principles and how such interrelationships may result in sustained strategic renewal. As indicated before in this study, we have not yet dealt with this issue. More specifically, we have not yet investigated how the enabling antecedents can foster the internal rates of change, promote self-organization, and help to balance exploration and exploitation and how altogether the three key principles may contribute to sustained strategic renewal. Future research may benefit from investigating such antecedents.

The final limitation lies in our retrospective approach by looking into the historical context. Because of the inherent limitations of both published histories and retrospective interviews, future research may explore the use of surveys or questionnaires regarding changes that took place during the same period in the same organization (e.g., Miller and Friesen, 1980a, b). Also the sheer labor intensity

required to conduct a longitudinal comparative research over an extended period of time limits us to studying no more than two cases at a time. This is due to the difficulty of selecting other cases on spatial and temporal criteria that permit meaningful comparisons with the findings from the longitudinal case (Leonard-Barton, 1990). Future research may consider using time-series analyses technique developed for analyzing many variables on many cases at many points in time.

11.4 Managerial Implications

Research with managers on their perceptions of their environment has indicated that managers have different perceptions of problems depending on whether they are viewed retrospectively or contemporaneously. Through this PhD study, we have indicated that the demand for a firm's managers to maximize their own organization's chances of survival as a drive for change is certainly needed. Thus the task of managers should go beyond the classical strategic management of focusing only on the firm's internal characteristics.

What is needed here is managers need to have an understanding of both their internal and external environments (Johnson & Scholes, 2002; Williamson et al., 2004). The implications for managers in thinking about long-term survival are that it focuses their attention on the long-term impact of actions and events in specific ways. Part of the management task is to identify and assess changing economic, business, and political conditions, and formulate and implement new strategies to improve the firm's competitive performance.

Another far-reaching implication is that our study helps managers, especially those of large incumbent firms, to realize the importance of the three key principles for their firms' sustained strategic renewal. More specifically, our study implies that firms through their managers have to do equally well in all three key principles for sustained strategic renewal. To this end, we substantiated managerial implications based on the enabling antecedents of the three key principles (Table 5.1-5.3). Figure 11.4 presents the managerial implications derived from the enabling antecedents of the three key principles. The implications are categorized into dimensions of strategy, structure, managerial process and leadership. By substantiating these dimensions, we hope to provide managers with an insightful understanding of how to advance the three key principles of sustained strategic renewal.

Figure 11.4: Managerial implications derived from enabling antecedents of three key principles

Managerial Implications		
<p>• Key Principle 1 IRC ≥ ERC</p>	<i>Strategy</i>	Consider early mover strategy (Eisenhardt, 1989a; Suarez & Lanzolla, 2007), leapfrogging strategy (Beinhocker, 1999; Hackbarth & Kettinger, 2004), focus on internal growth (Hitt and Ireland, 1985; Hitt et al., 1996)
	<i>Structure</i>	Design modular flexible structures (Pascale, 1990, 1999; Volberda, 1998)
	<i>Managerial process</i>	Pace rhythms for change (Eisenhardt, 1989a), seize benchmarking processes, promote rapid learning, allow room for experimentation (De Geus, 1999) and stretch goals (Maira & Thomas, 1999)
	<i>Leadership</i>	Act as a facilitator/context setter (Pascale, 1999) rather than a central authority; be a detector of new dominant logics (Prahalad & Bettis, 1986)
<p>• Key Principle 2 Self-Organization</p>	<i>Strategy</i>	Focus on internal growth (Hitt & Ireland, 1985; Hitt et al., 1996), long-term strategic planning (Schoemaker, 1992, 1995), knowledge integration capacity (Van den Bosch & Volberda, 2006)
	<i>Structure</i>	Encourage semi-structures/ low hierarchy (Nonaka, 1988; Kauffman, 1995), cross-functional interfaces (Maira & Thomas, 1999; Gupta & Govindarajan, 2000)
	<i>Managerial process</i>	Facilitate emergent process (Pascale, 1990, 1999), reduce number of rules (Eisenhardt, 1989a), and encourage freedom of new ideas (Child, 1984; Orton & Weick, 1990)
	<i>Leadership</i>	Take the role of a steward/ guided controller (Volberda & Lewin, 2003; Pascale, 1999), facilitator/context setter (Pascale, 1999; Carroll, 1999); transformational leadership (Van den Bosch & Volberda, 2006)
<p>• Key Principle 3 Exploitation= Exploration</p>	<i>Strategy</i>	Balance slack resource allocation through ambidexterity (Janssen et al., 2008; Sidhu et al., 2004; Smith & Tushman, 2005) and punctuated equilibrium (Burgelman, 2002)
	<i>Structure</i>	Design internal corporate venturing structure (Burgelman, 1983; Burgers et al., 2009), ambidextrous structure (Tushman & O'Reilly, Jansen et al., 2009), structural differentiation (Lawrence & Lorsch, 1967; Gilrty, 2005; Burgers et al., 2009; Jansen et al., 2009)
	<i>Managerial process</i>	Incorporate venture capital metrics (Beinhocker, 1999; Burgelman, 2002; Burgers et al., 2009), encourage ambidextrous learning (Gilbert, 2006; Westerman et al., 2006), balance short-term and long-term perspective (March, 1991)
	<i>Leadership</i>	Act as an autonomous entrepreneurs (Burgelman, 1983) and employ transformational leadership (Jansen et al., 2008)

Source: Adapted from Lewin and Volberda (2004); see also Table 5.1, 5.2 and 5.3

First with regard to the enabling strategy of the first key principle, managers need to be able to formulate strategies that can escalate their internal rates of change particularly in times of high rate of environmental change. The strategies can range from being a pioneer or an early mover (Eisenhardt, 1989a; Suárez and Lanzolla, 2007), for instance by introducing new services, products, or processes; to adopting a leapfrogging strategy (Beinhocker, 1999; Hackbarth and Kettinger, 2004) in times of intensified competition. Firms may also need to consider a strategy that is directed towards fostering internal growth (Hitt and Ireland, 1985; Hitt et al., 1996). Internal growth means growth and development of a firm through the use of internal resources within the firm’s boundary. To carry out such strategies, managers may need to consider designing modular structures (Pascale, 1990, 1999) in their organization. Such structures promote flexibility (Volberda, 1998) to interact with

their internal and external stakeholders effectively. The first key principle also requires managerial processes that can detect and adjust a right rhythm for change (Eisenhardt, 1989a). Eisenhardt and Martin (2000), for instance, has illustrated this process through their study of how US firms deal with high-velocity industries primarily through simple rules or patching. Managers may need to try out dynamic processes such as seizing benchmarking processes, promoting rapid learning, allowing room for experimentation, and even stretching goals (Maira and Thomas, 1999). Finally, managers may consider adopting leadership styles such as facilitators, context setters that are able to guide their organizational members to scan and interpret signals from the environment. Leaders need to be able to detect emergence of new dominant logics (Prahalad and Bettis, 1986), manage the adaptive tension of driving momentum for changes and actually engage in changes.

Second with regard to self-organization, managers can promote self-organization by among others focusing on internal growth (Hitt and Ireland, 1985; Hitt et al., 1996) and long-term strategic planning such as scenario planning (Schoemaker, 1992, 1995). While focusing on internal growth may help to create firm distinctive competence (Hitt and Ireland, 1985), focusing on long-term strategic planning may help to extend the orientation window of firms so that firms can build readiness through change through probing future (Schoemaker, 1992, 1995). Furthermore managers could strategize on increasing knowledge integration capacity as it may contribute to self-organization (Van den Bosch and Volberda, 2006). In terms of enabling structures, instead of a traditional authority form managers may consider designing low hierarchical structures to streamline the information flows (Nonaka, 1988; Kauffman, 1995). Such structures also enable managers to build cross-functional interfaces (Maira and Thomas, 1999; Jansen et al., 2009) that may help to stimulate a more intensive and effective interaction among organizational members. Furthermore, self-organization requires managerial processes that are able to facilitate emergent processes (Pascale, 1990, 1999). The low hierarchical structure also enables the managerial process of reducing or minimizing the number of rules. Such process can also help to promote freedom of experimenting with new ideas (Child, 1984; Orton and Weick, 1990). Finally, in encouraging self-organizing processes, managers may take the role of stewards or guided controllers, instead of as central controllers (Volberda & Lewin, 2003; Pascale, 1999). Additionally, like in the first key principle, leaders act as facilitators or context setter rather than as authoritative commander (Pascale, 1999). This is also reflected in the transformational leadership style as suggested by Van den Bosch and Volberda (2006).

Third concerning the principle of balanced exploitation and exploration, managers could attain the balance through slack resource allocation by establishing cross-fertilization across exploratory and exploitative strategic renewal actions (Jansen et al., 2008; Sidhu et al., 2004; Smith and Tushman, 2005). As discussed in Chapter 11.2, this refers to ambidexterity, i.e. the simultaneous pursuit and

combination of exploratory and exploitative innovations within organizations (Tushman and O'Reilly, 1996; Gibson and Birkinshaw, 2004). In addition to ambidexterity, Burgelman (2002) contends that punctuated equilibrium is another way to balance exploration and exploitation simultaneously. To this end, punctuated equilibrium contends that the balance can be achieved through a sequential pattern of longer periods of exploitation and short bursts of exploration. Therefore with respect to structure, managers may benefit from an internal corporate venturing structure, ambidextrous structure, and/or structural differentiation. Internal corporate venturing structure refers to a structure that stimulates the creation of new business within existing firms (Sharma and Chrisman, 1999) through the creation of new competencies and capabilities underlying new products and services (Zahra et al., 1999). Through internal corporate venturing, scholars have suggested that an ambidextrous structure design by creating separate units within the corporate structure to facilitate new venture development (Tushman & O'Reilly, 1996; Jansen et al. 2009; Westerman et al., 2006). Such design corresponds also to structural differentiation as previously discussed in Chapter 11.2. Structural differentiation may help ambidextrous organizations to maintain multiple competences that deal with paradoxical demands such as exploration and exploitation (Gilbert, 2005; Burgers et al., 2009; Jansen et al., 2009). In consistent with the internal corporate and ambidextrous structures, to balance exploitation and exploration simultaneously managers can consider managerial processes such as incorporating venture capital metrics (Beinhocker, 1999; Burgelman, 1983; Burgers et al., 2009) and encouraging ambidextrous learning (Gilbert, 2006; Westerman et al., 2006; Kwee et al., 2006/Chapter 4 of this thesis). Venture capital metrics help to create relatively robust level for venture managers to manage the stages from pre-venture to commercialization fruitfully (Burgelman, 1983). Whereas ambidextrous learning enables managers to action learning that concurrently balances exploitation and exploration either in low or high levels of balance aligned with the pertaining knowledge environment. With reference to enabling leaderships, managers may adopt and encourage autonomous entrepreneurial activities (Burgelman, 1983). This is particularly relevant for helping managers to manage renewal through internal development. Alternatively, managers can employ transformational leadership style to stimulate the effectiveness of senior team social integration in ambidextrous organizations.

To conclude, it is necessary for managers to comply with each of the three key principles but it may not be sufficient if managers only do well in one or more of the three key principles. Managers need to ascertain that they manage the three key principles altogether to achieve sustained strategic renewal. This means that to be able to sustain strategic renewal, over time managers have to align their internal rates of change with the rates of change from their environment, managing self-organization, and balancing concurrent exploratory and exploitative strategic renewal actions. Although this can be a difficult effort, there are few anchor points

that can be used by managers. As discussed in Chapter 11.2, the anchor points can be demonstrated by organizational ambidexterity literature to explain how the enabling antecedents interact and complement one another in bringing about sustained strategic renewal.

11.4 Conclusion

Explaining corporate longevity, defined in this PhD research as sustained strategic renewal requires an encompassing strategic perspective. Such perspective takes into account both internal characteristics of organizations as well as the forces in their environments that set limits on organizational discretion and thus, the possibility of influencing the environmental forces strategically to increase the chance of organizational survival. Combining selection and adaptation perspectives produces a deeper, more nuanced understanding of the dynamics of firm strategy than either perspective alone. The surge of attention to reconcile these two perspectives can be attributed to the need to incorporate both the internal dimension of a firm and the external dimension of the firm's environment. Consequently, the essence for organizational scholars is to seek to understand how firms and its environment evolve over time by tracking changes in key variables.

In this study, we addressed the research questions about sustained strategic renewal by combining both selection and adaptation perspectives. More specifically, our research questions comprise the issue of the development of firm competences, organizational learning and adaptation, followed by the investigation of the three key principles of self-renewing organizations (Volberda and Lewin, 2003). Concerning the three key principles, over time firms are challenged to renew themselves by aligning the firms' internal rates of change with the external rate of change of their environments, encouraging and managing self-organization, and balancing exploration and exploitation concurrently.

The research questions that we posed requires an integrative and comprehensive research approach that enables us to investigate the three key principles of sustained strategic renewal from multiple methods and levels of analysis (cf. Lewin & Volberda, 1999). First, we chose a longitudinal method as it allows us to incorporate a temporal analysis in studying dynamic processes of sustained strategic renewal over an extended period of time. Second, because this study focuses mainly on the 'how' research questions of strategic renewal, we used a case study methodology (Yin, 1984) that examines changes in strategy over long periods of time (e.g. Miles and Cameron, 1982; Mintzberg and Waters, 1982; Mintzberg and McHugh, 1985). Third, due to the long time span covered in our study, we use a retrospective longitudinal approach (Pettigrew, 1990) as it facilitates a broader longitudinal scope for investigating changes in a firm's strategy over time.

Fourth, we employed a triangulated method by gathering different types of data that can be used as cross-checks. The triangulated method is possible here as we combined qualitative and quantitative data from varying sources. Finally, we also used a multilevel method when incorporating both selection and adaptation perspectives. In particular to study the complex and dynamic interaction among organizational and environmental forces, we chose to focus on an industry level as well as on a firm level. More specifically, we selected the oil industry as our case industry and Shell and BP as our case companies. This is mainly because they had experienced a radical transformation of their industry environment from one of stability and continuity to one of uncertainty and turbulence (Grant, 2003).

Rooted in the research methodology, we aimed to collect data, as suggested by Pettigrew (1990), that are processual (an emphasis on patterns of strategic renewal actions over time), comparative (two case companies in single industry), historical (take into account the historical setting of case industry and case companies) and contextual (examine the reciprocal relations between processes and historical and industry contexts). Our data sources comprise primary and secondary data sources (cf. Ginsberg, 1988). As a primary data source, we used historical data collected from internal and external sources of the target organization. The data include the organizational annual reports and other internal documents, books, journals and databases. As a secondary data source, we used retrospective data collected directly from members of the target organization through interviews. As far as the data analysis method is concerned, we chose the longitudinal content analysis technique. The content analysis technique allows us to render the rich meaning associated with organizational documents combined with powerful quantitative longitudinal analysis (Duriau et al., 2007) by quantifying historical data (Ginsberg, 1988).

Accordingly, we developed measurement indicators to quantitatively assess the three key principles. With respect to the first key principle, we developed measures that comprise homogeneous and heterogeneous measures (refer to Table 6.6 and Table 8.1) in an attempt to quantify the internal and external rates of change. Through a cross-measure comparison, we found that the average internal rate of change of Shell and BP seemed to be aligned with the average external rate of change of the oil industry. This provides an empirical support to the first principle. With respect to the second principle, due to the data accessibility constraint, we used a single firm context, i.e. Shell. The results indicate that over time, to a varying degree Shell was able to encourage self-organization; which provides the first evidence on the second principle. With respect to the third key principle, although difficult both Shell and BP strive to balance their exploitative and exploratory strategic renewal actions. In this case, however, Shell seemed to show a more balanced exploratory-exploitative strategic renewal trajectory than BP. Additionally, we also found that the top management team's (TMT's) corporate governance perspective appears to play a role in a firm's strategic renewal trajectory. TMT with

a corporate governance perspective of the Anglo-Saxon model appeared to have focused on exploitative and external growth of strategic renewal actions while those with a corporate governance perspective of the Rhine model appeared to have focused on exploratory and internal growth of strategic renewal actions.

One of the most interesting conjectures that emerge from this PhD study is that to achieve sustained strategic renewal, firms need to advance the three key principles simultaneously. First, this conjecture emerges from the empirical investigation of the three key principles. We found that to a varying degree, the two long-lived firms in our study (Shell and BP) have demonstrated an attempt to advance the three key principles altogether. Internal firm strategies, structures and processes together with external market/industry conditions are important determinants of sustained strategic renewal. Second, this conjecture is suggested conceptually that sustained strategic renewal are anchored in the three key principles on the whole (Volberda and Lewin, 2003). The three key principles are interrelated through the interrelationships among the enabling antecedents of the three key principles (Lewin and Volberda, 2004). Although getting the dynamic balance right can be difficult, there are many anchor points to achieve this end. One of them is rooted in the organizational ambidexterity literature. Ambidexterity literature helps to explain how it is possible for an organization to do two different things at the same time but at the different level of organizational units or at different unit of analysis.

By exposing trends in the pattern of strategic renewal, we also show that strategic renewal trajectories of a firm are subject to the changing contexts in the firm's environment. Regarding this, a suggestion is that strategic management should involve the study of firms in the context of their environmental situation. Such study should seek to understand how firms and its environment evolve over time by tracking changes in key variables.

To conclude, this research has provided the first empirical evidence on the three key principles. The longitudinal approach developed in this thesis proves to be fundamental to study the evolvement of a firm's strategic renewal trajectory. It is a promising research design for researchers to study how the interrelationships among three key principles on the whole may affect sustained strategic renewal over time. Firms that can perform well in these three key principles are able to increase their long-term survivability through sustained strategic renewal. It is these features that distinguish second-order renewal with the first order-renewal (Table 1.1) and enable managed selection coevolutionary adaptation processes (Volberda and Lewin, 2003). Yet the attainment of sustained strategic renewal requires continuous efforts to enlist the support of managers and organizational members at all levels of organization. Because of this specific requirement, it is not always easy for firms to survive.

Appendices

Appendix A: Interview Questions

1. Could you briefly give an overview of your relationship to Royal Dutch Shell (RDS) such as years involved, which subsidiary/department, and primary responsibilities held?
[*Visual aid:* Organization Chart of RDS; the “Who is Who” system at Shell]
2. In your opinion, what does the word “longevity” mean to you in the context of organizations? Do you have the definition of your own?
3. What do you see as the top three organizational factors or organizational capabilities that contributed to or caused the sustained strategic renewal of Shell during the years ____ (e.g. ten years before transition) to ____ (e.g. ten years after transition)?
[*Visual aid:* Historical Timeline of RDS]
4. Could you please elaborate on the first main factor or organizational capability? Could you please give me specific example(s) that can illustrate the factor/capability?
5. Based on your experience at Shell, what have been some important initiatives and changes that Shell has engaged in?
6. [*Internal antecedent of strategic renewal:*] Did the company make a conscious decision to initiate a major change of strategic renewal or transition(s) during this time frame? (e.g. development of new products/explorations, utilization of new technology, joint venture, mergers and acquisitions, etc).
[*External antecedent of strategic renewal:*] Or did any of the transition(s) happen because of any particular environmental forces?
7. [If a conscious decision or due to internal antecedent:] To the best of your recollection, who initiated and when were the key decisions taken that led to the (major) transition?
8. [External antecedent:] What external/environmental forces that drove management to undertake a major transition? Who took the initiative in this sense? Could you please give an illustration?
9. If you reflect on the changes discussed, how have the internal changes been aligned to the changes in the oil industry?
10. What was the decision making mechanism during the transition era (e.g. who developed key strategies and who ran the implementation)? How were this organized?
11. What was your involvement or what role did you have during these periods? Can you cite a specific example of how this took place?
12. What was the role, if any, of outside consultants and advisors in making the key decisions? Were they involved in the implementation stage as well?

13. How did the company manage tensions such as between the need to explore and invest in new competences with the need to improve existing competences?
14. How did the company manage the short-term pressures of shareholder values while making long-term investments of stakeholder values?
15. In your opinion, what factors that distinguish Shell from other oil companies? Or what are the similarities and differences of Shell's renewal initiatives compared to other oil companies, say, for instance, in comparison with BP?
16. Are there any questions that we did not ask, but should have?
17. Who else would you strongly recommend that we interview?
 - Inside management during and after the transition(s)
 - External board members or other key outside people/consultants
 - Others: _____

Appendix B: Coding Rules of Content Analysis

General coding rules:

1. 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. Also do not code rumors, speculations, assumptions, etc.
2. Actions that do not relate to strategic changes, but that are part of daily operations (e.g., continuation of restructuring project; drilling a second well in an existing field, extension of production capacity), are not considered strategic actions and should thus not be coded. The same goes for constructions that are not aimed at expanding activities (e.g., construction of the second oil platform, fourth crude oil distillation plant) and for acquisition or sale of (stakes in) non-strategic businesses e.g., participation in hospitals, sawmills, banking and information technology.
3. In some instances two (or more) potential strategic actions are addressed in one text unit. In case these actions are discussed separately, they should be coded separately. In case the discussion of the two or more strategic actions is general, implying they fall within the same category, they should be coded as one action (e.g. opening of five foreign branches in a country is coded as one action, exchange of assets).
4. Strategic actions that are complementary should be coded as a single action e.g., the establishment of a research consortium/ joint venture and the subsequent start of production are to be coded as one strategic action.
5. Deciding on dates: first, look for official date of implementation. If not available, look for date of agreement/ signing of contract or the article date. Check other sources for triangulation.
6. In case an action is detected which took place in the period under review, but cannot be precisely dated, it should be coded in the year of detection. If an action probably took place outside the time period, do not code this action.
7. Strategic renewal actions taken by subsidiary companies in which the parent has majority control (more than or equal to 50%), are considered as actions of the parent and should be coded. Actions of minority holdings (less than 50%) are not to be coded.
8. A merger or an amalgamation counts as one strategic action.
9. Strategic renewal actions resulted from interorganizational relationships as (strategic) alliances, joint ventures or research consortia are considered to be external strategic actions.
10. Do not code actions that do not refer to concrete strategic actions. This includes quotes like 'streamlining operations'; 'cost ratio went down'; 'sales of a number of assets', etc. that do not have concrete or specific descriptions.
11. Pure financial actions such as bonds and warrants issues are not to be coded.

Specific coding rules:

12. When a Letter of Intent is signed, the go-ahead for a project is given (e.g. exploratory wells were drilled following the Letter of Intent), there is not enough information to consider a strategic action implemented. Only when an exploration block was commercialized, that implies the materialization of a strategic action, it can be coded as a strategic renewal action.
13. Programs or campaigns such as community involvement programs, accreditations and other rewards programs are not coded.
14. The introduction of a new installation at an existing plant/ refinery is an implemented strategic action and each additional installation that is already operational at that site is just an extension of the production capacity. If a new installation/ plant contains a technology that is new for that particular market (i.e., country), it is to be coded as *exploration*.
15. Strategic projects started up or planned in a joint venture, production-sharing agreement or a consortium are to be coded as *external* strategic actions because they are always undertaken in conjunction with other organizations. Actions exclusively conducted by fully-owned subsidiaries, on the contrary, are always *internal* strategic actions.
16. If Shell/BP or one of its subsidiaries obtains a license (internal), this implicates the materialization of a strategic decision. Licenses are agreements with the government and we assume that the corporation will start commercial operations in the contract area. Licenses are internal strategic actions, because we consider the government as a reactive participant in the process of obtaining/ acquiring licenses.
17. Acquisitions of interests/ territories are always to be coded as *external* strategic actions since they imply participation of parties outside Shell/BP.
18. Joint ventures that are established for the purpose of experimenting with new technologies or operating in new markets should be coded as *exploration*. If it is not clear for what purpose a joint venture is established, it should be coded as *exploitation*.
19. Regarding actions related to production of oil and gas, an action such as drilling in a new oilfield is considered strategic activity and drilling additional wells is considered operational activity.
20. Actions related to manufacturing or refining of oil products, e.g. an introduction of a new process installation at an existing plant is coded as a strategic action and each additional installation that is already available at that site is just an operational extension of the production capacity.
21. An oilfield in a new unexploited country is considered *exploration*, each additional oilfield in that country is considered *exploitation*. An exception to this rule is when operations ceased in a country for a significant time period (i.e., five years or more) and production in existing or new wells starts up again. In this case, the strategic action is *exploration*.

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Summary

How do long-lived firms strategically renew themselves over time? To address this issue, this PhD thesis refers to corporate longevity as sustained strategic renewal. In particular, we investigate three key principles of self-renewing organizations (Volberda and Lewin, 2003) to understand and explain sustained strategic renewal of large incumbent firms. These three key principles are the principles of matching internal rates of change with external rates of change, managing self-organization, and synchronizing concurrent exploration and exploitation. To this end, this PhD study aims to investigate the dynamic relationships between a firm and its environment in the context of sustained strategic renewal by developing a conceptual framework and propositions by conducting a longitudinal and comparative case study of large incumbent long-lived firms in the oil industry.

Driven by the challenge to operationalize the three key principles and to develop metrics to quantitatively assess the principles, this dissertation intends to address the following research questions. (1) Based on a selection-and-adaptation (coevolutionary) perspective, how do firms develop their competences to strategically renew themselves over time? (2) Based on an adaptation perspective, how do firms learn and adapt in the context of changing knowledge environment? (3) How do large incumbent firms regulate their internal rates of change to match up with the external rates of change? (4) How do firms manage self-organization to sustain their strategic renewal over time? (5) How do firms balance their exploratory and exploitative strategic renewal actions over time? (6) To what extent does top management team influence the strategic renewal trajectory of a large incumbent firm?

Chapter 2 provides key theoretical foundations of sustained strategic renewal from two perspectives: environmental selection and adaptation perspectives. First, we provide a broad overview of prior research on organizational longevity. Second, we integrate three parallel research streams of selection perspective, adaptation perspective, and a combined selection-and-adaptation (i.e. coevolutionary perspective). Finally, the incorporation of the coevolutionary perspective leads us to the discussion of three key principles of sustained strategic renewal.

Chapter 3 explores the three key principles from a coevolutionary perspective through the construct of coevolutionary competence. Coevolutionary competence is defined here as the ability to sustain the coordinated deployment of assets aimed at achieving a firm's goals by coevolving with the environment. This construct raises the awareness of management to focus on the three key principles. To illustrate the coevolutionary competence construct, we conduct two longitudinal case studies: The Hudson's Bay Company (HBC) and Royal Ten Cate (RTC). We employ the five competence modes introduced by Sanchez & Heene (2002) and Sanchez (2004) to illustrate the interplay between managerial intentionality and environmental selection over time. Based on the analyses, we propound that firms developing coevolutionary competence use the joint impact of managerial intentionality and environmental selection on their competence modes to implement the three key principles.

Chapter 4 explores the three key principles by focusing in more depth on an adaptation perspective, i.e. through the organizational learning perspective. Simultaneously, it addresses the second research question of how firms learn and adapt in the context of changing knowledge environment. Building on the literature of organizational learning, we identify five types of organizational learning through the dimensions of types of knowledge environment and types of action learning. Rooted in the three key principles, we propose the notion of ambidextrous learning which provides firms with requisite ability to adapt to the changing knowledge environment.

In Chapter 5, we develop a conceptual framework and three propositions related to the three key principles. The first proposition suggests that aligning the internal rate of change of a firm with the external rate of change of the firm's environment positively influences sustained strategic renewal. The second proposition conjectures that self-organization positively influences a firm's sustained strategic renewal. The third proposition suggests that balancing exploitation and exploration concurrently over time positively influences sustained strategic renewal. Additionally, we substantiated key antecedents of the three key principles that comprise enabling strategy, structure, managerial process and leadership.

Chapter 6 outlines and discusses research methodology in carrying out this PhD study. We start with elaborating the research methodology and research design that used in this research. We also point out how we selected our case industry (i.e. the oil industry) and case companies (i.e. Shell, 1907-2008, as our focal company and BP, 1970-2008, as our comparative company), data collection methods, and data analysis techniques. In sum, we employ (a) a longitudinal content analysis method that covers a long period of time, 1907-2008; (b) a triangulated method of both qualitative and quantitative data from various sources: archival data (like Annual Reports and other documents) and interviews; and (c) a

longitudinal, multilevel, and comparative research design to quantitatively operationalize and measure the three key principles.

Chapter 7 provides a brief historical account of the oil industry by highlighting its competitive landscape (industry level). It also provides a historical background of Shell and BP by highlighting the key firm-level events. This is followed by an overview of empirical investigation of three key principles that comprises a brief description of variables, methods, levels of analysis, time frame, and data sources (Table 7.6).

Chapter 8 consists of the empirical study of the first key principle as well as the third research question, i.e. an investigation of how large incumbent firms manage their internal rate of change to match or exceed the external rate of change of their environments. To this end, we use a multilevel method (at the industry and firm levels) and a comparative study of Shell and BP. To assess the first principle, quantitatively, we developed measurement indicators that comprise homogeneous and heterogeneous measures. While homogeneous measures are concerned with similar measures both at the industry level as well as the firm level, heterogeneous measures are concerned with different measures between the industry level and the firm level. Our results (Table 8.17) suggest that at different rates, Shell and BP have managed to align their internal rates of change (IRC) with the external rates of change (ERC) of the oil industry. More particularly, although IRC of both Shell and BP exceed the ERC of the oil industry, Shell moves faster than BP. In addition, we conducted interviews with Shell's top managers to provide qualitative insights of the rate of change principle. Altogether, the results provide first evidence on the first proposition.

Chapter 9 investigates the second key principle and the fourth research question, managing self organization. To investigate self-organization, firm-specific data that can only be obtained from an internal access to a firm is required. Since we only have the access to Shell, for the second key principle, we use a single case study of Shell. The idea of self-organization to delayer organizational hierarchies leads us to develop three measures to indicate the degree of self-organization in Shell over time: (a) hierarchical level; (b) chief executive's span of control; and (c) administrative intensity. The results show that to a varying degree Shell was able to encourage self-organization. Combining with the qualitative insights from the interviews, our results provide first evidence on the second proposition.

Chapter 10 focuses on the issue of how to synchronize exploitation and exploration concurrently (the fifth research question). Our results demonstrate that both Shell and BP strive to balance their exploitative and exploratory strategic renewal actions. In this case, Shell appeared to have a more balanced exploratory-exploitative strategic renewal trajectory than BP. Additionally using the qualitative insights from the interviews, our results provide first evidence on the third principle. Besides that, in Chapter 10 we also incorporate the managerial

intentionality by investigating the role of top management team in guiding a firm's strategic renewal trajectories over time (the last research question). We found that the TMT's corporate governance perspective of the Rhine model is associated with exploratory and internal growth strategic renewal trajectories while the one of the Anglo-Saxon model is associated with exploitative and external growth strategic renewal trajectories.

Chapter 11 summarizes the key findings of the three key principles and concludes the thesis by presenting our research contributions, managerial implications (based on the enabling antecedents of the three key principles), research limitations and accordingly suggestions for future research. Based on the key findings of the three key principles and the literature of organizational ambidexterity, we conjecture that firms need to advance the three key principles simultaneously. To conclude, we suggest that the attainment of sustained strategic renewal requires continuous efforts of managers and organizational members at all levels of an organization.

Nederlandse Samenvatting (Dutch Summary)

Hoe passen lang bestaande bedrijven hun strategie aan over de tijd? Om deze vraag te beantwoorden, neemt dit proefschrift de drie kernprincipes van zelfvernieuwende organisaties (Volberda en Lewin, 2003) als uitgangspunt. Deze drie kernprincipes zijn de principes van matching mate van verandering van interne verandering met mate van verandering van externe verandering, zelf-organisatie, en het synchroniseren van exploratie en exploitatie. Aan de hand van deze drie kernprincipes wordt de dynamische interactie tussen een bedrijf en zijn omgeving in de context van duurzame strategische vernieuwing geplatest. Daarnaast ontwikkelt het proefschrift een conceptueel kader en proposities. Hierbij wordt gebruik gemaakt van een longitudinale en vergelijkende case study van gevestigde bedrijven in de olieindustrie.

Dit proefschrift richt zich op de volgende onderzoeksvragen. (1) Hoe ontwikkelen bedrijven hun vermogen om strategisch te vernieuwen vanuit een selectie-en-aanpassings (co-evolutionair) perspectief? (2) Hoe leren en passen bedrijven zich aan in de context van een veranderende kennisomgeving vanuit het aanpassingsperspectief? (3) Hoe stemmen gevestigde bedrijven hun mate van interne verandering af op de externe mate van verandering? (4) Hoe passen bedrijven hun organisatie over de tijd om zo hun strategische vernieuwing te ondersteunen? (5) Hoe vinden bedrijven gelijktijdig een evenwicht tussen hun exploratieve en exploitatieve strategische vernieuwingsacties? (6) Hoe en in welke mate oefent het Top Management Team invloed uit op het proces van strategische vernieuwing?

Hoofdstuk 2 biedt de theoretische basis van dit proefschrift. Hierbij wordt gebruik gemaakt van twee perspectieven: omgevingsselectie en aanpassingsperspectieven. Ten eerste, bieden wij een overzicht van eerder onderzoek naar organisatorische levensduur. Ten tweede, integreren wij drie theoretische perspectieven, te weten het selectieperspectief, het aanpassingsperspectief, en de gecombineerde selectie-en-aanpassing (d.w.z. co-evolutionair perspectief). Tot slot leidt de integratie van het co-evolutionaire perspectief ons tot de bespreking van de drie kernprincipes van duurzame strategische vernieuwing.

Hoofdstuk 3 onderzoekt de drie kernprincipes vanuit een co-evolutionair perspectief. Hierbij wordt gebruik gemaakt van het concept van co-evolutionaire competentie. Co-evolutionaire competentie wordt hier als capaciteit om de gecoördineerde plaatsing van activa gedefiniërd te ondersteunen die op het bereiken van de doelstellingen van een bedrijf door met de omgeving worden gericht coëvolving. Ter illustratie van het concept van co-evolutionaire competentie worden twee casussen beschreven: The Hudson's Bay Company (HBC) en Koninklijke Ten Cate (RTC). Wij illustreren de vijf competenties die door Sanchez & Heene (2002) en Sanchez (2004) zijn ontwikkeld. Gebaseerd op de casussen, concluderen wij dat bedrijven die beschikken over co-evolutionaire competenties beter in staat zijn om de drie kernprincipes te implementeren door die omgeving te selecteren die het beste aansluit bij de doelstellingen van het management.

Hoofdstuk 4 onderzoekt de kernprincipes vanuit het aanpassingsperspectief waarbij bedrijven leren van en zich aanpassen aan de omgevingsveranderingen. Dit hoofdstuk behandelt de tweede onderzoeksvraag. Hoe leren en passen bedrijven zich aan in de context van veranderende kennisomgeving? Voortbouwend op de literatuur van het organisatorische leren, onderscheiden wij vijf manieren waarop bedrijven leren aan de hand van de dimensies van de kennisomgeving en de wijze waarop actie leren wordt toegepast. Gebaseerd op de drie kernprincipes, ontwikkelen wij het concept van het ambidextere leren waarbij bedrijven de vereiste competentie ontwikkelen om zich aan de veranderende kennisomgeving aan te passen.

In Hoofdstuk 5 ontwikkelen wij een conceptueel kader en drie proposities met betrekking tot de drie kernprincipes. De eerste propositie stelt dat afstemming van de interne mate van verandering op de externe mate van verandering een positieve invloed heeft op duurzame strategische vernieuwing. De tweede propositie stelt dat zelf-organisatie een positieve uitwerking heeft op duurzame strategische vernieuwing. De derde propositie stelt het in balans brengen van exploratie en exploitatie een positief effect heeft op strategische vernieuwing. Daarnaast verankeren wij de antecedenten van de drie kernprincipes die strategie, structuur, bestuursproces en leiderschap faciliteren.

Hoofdstuk 6 bespreekt de onderzoeksmethodologie inzake dit proefschrift. Wij beginnen met het uitwerken van de onderzoeksmethodologie en de onderzoekopzet. Wij bespreken hoe wij de bedrijfstak hebben geselecteerd (d.w.z. de olieindustrie) alsook hoe wij tot onze casussen zijn gekomen (d.w.z. Shell, 1907-2008, als ons bedrijf van studie en BP, 1970-2008, als ons vergelijkend bedrijf). Daarnaast bespreken we de methodes van de gegevensinzameling en de technieken van de gegevensanalyse. In het bijzonder gebruiken wij (a) een longitudinale inhoudsanalyse die de jaren 1907-2008 beslaat; (b) een triangulaire

onderzoeksmethode van zowel kwalitatieve als kwantitatieve gegevens uit diverse bronnen: archivalische gegevens (zoals jaarverslagen en andere documenten) en gesprekken; en (c) longitudinaal, multilevel, en een vergelijkende onderzoeksopzet waarbij de drie kernprincipes worden gekwantificeerd.

Hoofdstuk 7 presenteert een korte historische bespreking van de ontwikkeling van de olieindustrie. Het hoofdstuk verschaft ook de historische achtergrond van Shell en BP door de belangrijkste historische gebeurtenissen te bespreken. Dit wordt gevolgd door een overzicht van empirisch onderzoek omtrent de drie kernprincipes welke een korte beschrijving van variabelen, methodes, niveaus van analyse, tijdskader, en gegevensbronnen omvat (zie Tabel 7.6).

Hoofdstuk 8 presenteert de resultaten van onze empirische studie naar het eerste kernprincipe evenals de derde onderzoeksvraag. Hoe stemmen gevestigde bedrijven hun mate van interne verandering af op de externe mate van verandering? Daartoe analyseren wij de data op verscheidene niveaus (op het niveau van de bedrijfstak en het niveau van de onderneming). Daarnaast maken wij een vergelijking tussen Shell en BP. Om het eerste kernprincipe te kwantificeren maken wij gebruik van homogene en heterogene maatstaven. De homogene maatstaven zijn soortgelijke maatstaven die betrekking hebben op zowel het niveau van de bedrijfstak als het bedrijfsniveau. De heterogene maatstaven verschillen tussen het industriële niveau en het bedrijfsniveau. Onze resultaten (zie Tabel 8.17) tonen dat Shell en BP erin zijn geslaagd om hun interne mate van verandering (IRC) zijn af te stemmen op de externe mate van verandering (ERC). Echter Shell past zich hierbij sneller aan dan BP. Wij voeren gesprekken met de hoogste managers van Shell om zo nader kwalitatief inzicht te verwerven in het proces van verandering.

Hoofdstuk 9 onderzoekt het tweede kernprincipe en de vierde onderzoeksvraag. Hoe passen bedrijven hun organisatie over de tijd om zo hun strategische vernieuwing te ondersteunen? Hiertoe wordt gebruik gemaakt van bedrijfsspecifieke informatie die niet publiek beschikbaar is. Wij bestuderen hier alleen de Shell casus omdat wij alleen interne toegang hebben tot deze onderneming. Het idee van zelf-organisatie ter ontmanteling van hiërarchische structuren brengt ons ertoe om drie maatstaven te ontwikkelen om de mate van zelf-organisatie van Shell te meten: (a) het hiërarchisch niveau; (b) de spanwijdte van de bestuursvoorzitter; en (c) de administratieve intensiteit. De resultaten tonen aan dat Shell tot op zekere hoogte in staat is om zelf-organisatie te bevorderen. In combinatie met de kwalitatieve inzichten vanuit de gesprekken met topmanagers, ondersteunen onze resultaten de tweede propositie.

Hoofdstuk 10 concentreert zich op de vraag hoe exploitatie en exploratie gelijktijdig afgestemd kunnen worden (de vijfde onderzoeksvraag). Onze resultaten tonen aan dat zowel Shell als BP ernaar streven om hun exploitatieve en exploratieve strategische vernieuwingsacties in balans te brengen. Shell volgt hiertoe een evenwichtiger aanpak dan BP. Deze bevinding ondersteunt het derde

kernprincipe. Hoofdstuk 10 beschouwt tevens de doelstellingen van het Top Management Team (TMT) en hoe deze doelstellingen relateren aan duurzame strategische vernieuwing (de laatste onderzoeksvraag). Wij vinden dat het model van ondernemingsbestuur van belang is. Als er wordt gekozen voor een Rijnlands model ligt de nadruk op exploratieve en interne groei terwijl de keuze voor een Angelsaksisch model gepaard gaat met exploitatieve en externe groei.

Hoofdstuk 11 vat de belangrijkste bevindingen omtrent de drie kernprincipes samen en besluit met een bespreking van onze onderzoeksbijdragen, praktische aanbevelingen voor managers, de beperkingen van het onderzoek en aanbevelingen voor toekomstig onderzoek. Wij stellen dat ondernemingen de drie kernprincipes gelijktijdig moeten implementeren. Wij besluiten met de stelling dat het bewerkstelligen van duurzame strategische vernieuwing onafgebroken inspanningen vergt van managers op alle niveaus binnen de organisatie.

Ringkasan (Summary in Indonesian)

Bagaimana perusahaan yang berumur panjang memebaharui strategi mereka dari waktu ke waktu? Dissertasi ini mempelajari tema ini dengan melihat kelanggengan perusahaan dari cara mereka memperbaharui strategi mereka secara berkelanjutan. Khususnya, kami menyelidiki tiga prinsip utama tentang perusahaan yang memperbaharui diri (Volberda dan Lewin, 2003) untuk mengerti dan menerangkan pembaharuan strategi perusahaan besar yang sudah lama berdiri. Tiga prinsip utama ini adalah prinsip menyesuaikan laju perubahan internal perusahaan dengan laju perubahan external perusahaan, mengelola self-organisasi, dan menyesuaikan eksplorasi dan eksploitasi secara bersamaan. Untuk mencapai tujuan ini, studi dari riset ini bertujuan untuk menyelidiki hubungan dinamis perusahaan dan lingkungannya dengan mengembangkan kerangka konseptual dan proposisi dengan mengadakan studi kasus longitudinal dan perbandingan perusahaan besar yang berumur panjang di industri minyak.

Untuk mengoperasionalisasi ketiga prinsip utama dengan mengembangkan metrics untuk mengevaluasi ketiga prinsip ini secara kuantitatif, disertasi ini bermaksud menyelidiki enam pertanyaan penelitian berikut. (1) Berdasarkan perspektif seleksi-dan-adaptasi (co-evolutioner) perspektif, bagaimana perusahaan mengembangkan kompetensi mereka untuk melakukan pembaharuan strategis dari waktu ke waktu? (2) Berdasarkan perspektif adaptasi, bagaimana perusahaan belajar dan menyesuaikan diri dalam konteks perkembangan pengetahuan? (3) Bagaimana perusahaan besar mengatur laju perubahan internal agar sebanding dengan laju perubahan eksternal? (4) Bagaimana perusahaan mengelola self-organisasi agar pembaharuan strategis berkelanjutan dari waktu ke waktu? (5) Bagaimana perusahaan menyeimbangkan dua tindakan strategis yaitu eksplorasi dan eksploitasi? (6) Sejauh mana pengaruh tim management dalam hal pembaharuan strategis yang berkelanjutan dari perusahaan besar tersebut?

Bab 2 memberikan landasan teoritis pembaharuan strategis yang terus-menerus dari dua perspektif: perspektif seleksi dan adaptasi. Pertama, kami melakukan peninjauan luas tentang penelitian terdahulu mengenai topik umur panjang perusahaan. Kedua, kami mengintegrasikan tiga perspektif penelitian yaitu seleksi, adaptasi, dan gabungan seleksi-dan-adaptasi (atau perspektif co-evolutioner). Akhirnya, penggabungan perspektif co-evolutioner membawa kami ke diskusi tentang tiga prinsip utama dari pembaharuan strategis secara terus-menerus.

Bab 3 menjelajahi ketiga prinsip utama dari perspektif co-evolutioner melalui konsep kompetensi ko-evolutioner. Kompetensi ko-evolutioner di sini didefinisikan sebagai kemampuan untuk mempertahankan kelanjutan penggunaan asset yang dikoordinasikan untuk mencapai tujuan perusahaan melalui konsep keharmonian dengan lingkungan. Untuk menjelaskan konsep kompetensi ko-evolutioner, kami melakukan dua longitudinal studi kasus: Hudson's Bay Company (HBC) dan Royal Ten Cate (RTC). Kami menggunakan kelima competence mode yang diperkenalkan oleh Sanchez & Heene (2002) dan Sanchez (2004) untuk menjelaskan interaksi antara manajer dengan perubahan lingkungan dari waktu ke waktu. Berdasarkan hasil analisa, kami mengemukakan bahwa perusahaan yang mengembangkan penggunaan kompetensi ko-evolutioner menggunakan dampak bersama dari interaksi manajer dengan lingkungan untuk melaksanakan ketiga prinsip utama.

Bab 4 menjelajahi ketiga prinsip utama dengan bfokus pada perspektif adaptasi, yaitu perspektif organizational learning. Secara bersamaan, bab ini menanggapi pertanyaan penelitian yang kedua: bagaimana perusahaan belajar dan menyesuaikan diri dalam konteks perkembangan pengetahuan. Berdasarkan literatur, kami mengenalkan lima macam organizational learning melalui dimensi tipe pengetahuan dan cara belajar. Berdsarkan ketiga prinsip utama, kami mengusulkan bahwa ambidextrous learning mempersiapkan perusahaan dengan kemampuan untuk menyesuaikan diri bila lingkungan pengetahuan berubah.

Di Bab 5, kami mengembangkan kerangka konseptual dan tiga proposisi yang berhubungan dengan ketiga prinsip utama. Proposisi pertama mengusulkan bahwa penyesuaian laju perubahan internal perusahaan dengan laju perusahaan eksternal secara positif mempengaruhi pembaharuan strategis yang berkelanjutan. Proposisi kedua mengusulkan bahwa self-organisasi secara positif mempengaruhi perusahaan untuk mempertahankan pembaharuan strategis. Proposisi ketiga mengusulkan bahwa penyeimbangan eksploitasi dan eksplorasi secara bersamaan dari waktu ke waktu secara positif mempengaruhi pembaharuan strategis yang berkelanjutan. Lebih lanjut, kami membahas tentang key antecedents dari ketiga prinsip utama yang terdiri dari strategi, struktur, proses manajerial dan kepemimpinan.

Bab 6 membahas metodologi penelitian yang digunakan dalam riset PhD ini. Kami mulai dengan menguraikan metodologi penelitian dan bentuk penelitian. Kami juga menunjukkan bagaimana kami memilih kasus industri kami (industri minyak) dan kasus perusahaan (Shell, 1907-2008, sebagai perusahaan utama dan BP, 1970-2008, sebagai perusahaan perbandingan), metode koleksi data, dan teknik analisa data. Singkatnya, kami menggunakan (a) metode longitudinal content anaysis yang meliputi jangka waktu yang panjang, 1907-2008; (b) metode triangulasi dari data kualitatif maupun kuantitatif dari berbagai sumber: data kearsipan (seperti Laporan Tahunan dan dokumen lain) dan wawancara; dan (c)

longitudinal, multilevel, dan pola penelitian perbandingan untuk menilai secara kuantitatif ketiga prinsip utama.

Bab 7 membahas secara singkat sejarah industri minyak dengan menyoroti persaingan di industri tersebut. Bab ini juga membahas latar belakang sejarah Shell dan BP dengan menyoroti peristiwa pokok dari kedua perusahaan tersebut. Ini diikuti oleh peninjauan luas tentang penelitian empiris ketiga prinsip utama yang terdiri dari deskripsi ringkas variabel, metode, tingkat analisa, jangka waktu, dan sumber data (Table 7.6).

Bab 8 terdiri atas penelitian empiris prinsip pertama serta pertanyaan penelitian ketiga, yaitu perusahaan besar mengelola laju perubahan internal dengan menyesuaikan atau melebihi laju perubahan eksternal. Untuk mencapai tujuan ini, kami memakai metode multilevel (tingkat industri dan tingkat perusahaan) dan penelitian perbandingan antara Shell dan BP. Untuk menilai prinsip pertama secara kuantitatif, kami mengembangkan metrics yang terdiri dari metrics homogen dan heterogen. Metrics homogen mencakup tingkat industri dan perusahaan sedangkan metrics ukuran heterogen mencakup secara metrics yang berbeda antara tingkat industri dengan tingkat perusahaan. Dari hasil analisa (Table 8.17), kami menyarankan bahwa walaupun dengan laju yang bervariasi, Shell dan BP mampu menyesuaikan laju perubahan internal (IRC) mereka dengan laju perubahan eksternal (ERC) di industri minyak. Sebagai tambahan, kami juga mengadakan wawancara dengan top manajer di Shell untuk memberikan wawasan kualitatif tentang prinsip pertama. Secara keseluruhan, hasil analisa menyediakan bukti awal atas proposisi pertama.

Bab 9 menyelidiki prinsip kedua dan pertanyaan penelitian keempat yaitu tentang self-organisasi. Untuk menyelidiki self-organisasi, kami memerlukan data perusahaan yang hanya bisa didapatkan dari akses internal perusahaan. Berhubung kami hanya mempunyai akses di Shell, untuk penelitian prinsip kedua kami memakai satu studi kasus, yaitu Shell. Dengan gagasan bahwa self-organisasi mengurangi hirarki organisasi, kami mengembangkan tiga metrics untuk menunjukkan tingkat self-organisasi di Shell dari waktu ke waktu: (a) tingkat hirarki; (b) chief executive's span of control; dan (c) intensitas administratif. Hasil menunjukkan bahwa dalam derajat yang bervariasi, Shell mampu mengadakan self-organisasi. Ditambah dengan wawasan kualitatif dari wawancara, hasil kami menyediakan bukti awal atas proposisi kedua.

Bab 10 berfokus atas persoalan bagaimana caranya untuk menyeimbangkan eksploitasi dan eksplorasi secara bersamaan (pertanyaan penelitian kelima). Hasil kami menunjukkan bahwa baik Shell maupun BP bekerja keras untuk menyeimbangkan eksploitasi dan eksplorasi. Di kasus ini, Shell lebih mampu menyeimbangkan eksplorasi dan eksploitasi daripada BP. Melalui penggunaan wawasan kualitatif dari wawancara, hasil kami menyediakan bukti awal atas prinsip ketiga. Lagi pula, di Bab 10 kami juga menyelidiki peran manajer dalam menuntun jalan perusahaan untuk pembaharuan strategis yang berkelanjutan

(pertanyaan penelitian terakhir). Kami menemukan bahwa perspektif corporate governance berdasarkan Rhine model lebih berfokus pada eksplorasi dan perkembangan internal sedangkan untuk Anglo-Saxon model lebih berfokus pada eksploitasi dan perkembangan eksternal.

Bab 11 meringkaskan kesimpulan dari hasil analisa ketiga prinsip utama dan menguraikan sumbangan penelitian kami, implikasi manajerial (berdasarkan enabling antecedents dari ketiga prinsip utama), keterbatasan penelitian dan saran untuk penelitian berikutnya. Berdasarkan hasil analisa ketiga prinsip utama dan literature organizational ambidexterity, kami mengusulkan bahwa perusahaan perlu mengelola ketiga prinsip utama secara bersamaan. Sebagai kesimpulan, kami mengusulkan bahwa pencapaian pembaharuan strategis yang berkelanjutan menghendaki usaha terus-menerus dari manajer dan semua karyawan di setiap tingkat organisasi.

About the Author

Zenlin Kwee was born in Tanjung Balai, Indonesia on May 27th, 1975. In 1998, she received her BSc degree (cum laude) from Pelita Harapan University (UPH), Indonesia majoring in Industrial Engineering. After working as a lecturer at UPH, as a consultant and later as a business development manager in Jakarta for four years, she was awarded a StuNed (*Studeren in Nederland*) scholarship that facilitated her to come to the Netherlands in August 2002. With the scholarship she did her two-year Master study at Delft University of Technology (TU Delft).



For her Master thesis project, Zenlin conducted a joint research project between TU Delft and Accenture on corporate longevity. Since then, she started her research journey on long-lived firms. In August 2004, she graduated cum laude from TU Delft for her MSc degree in Systems Engineering, Policy Analysis and Management. To further pursue her research interest in corporate longevity, Zenlin joined the Department of Strategy and Business Environment at RSM Erasmus University in November 2004 as a PhD candidate, working together with Prof.Dr. Frans van den Bosch and Prof.Dr. Henk Volberda.

During her PhD research trajectory, Zenlin conducted an extensive research project at Royal Dutch Shell plc. Her research has been published at Research in Competence-Based Management and ERIM working paper series. She has presented her research at prominent international conferences such as the Annual Meeting of the Academy of Management, Strategic Management Society Annual International Conference, Journal of Management Studies Conference, European Academy of Management Annual Conference, European Group for Organizational Studies Colloquium, and Competence-Based of Management Conference.

At present, Zenlin works as an Assistant Professor at the Department of Economics of Innovation at Delft University of Technology. She is in preparation to submit her works to international journals. Her research interests include corporate longevity, strategic renewal, strategic adaptation, innovation, organizational learning, and longitudinal study.

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INVESTIGATING THREE KEY PRINCIPLES OF SUSTAINED STRATEGIC RENEWAL A LONGITUDINAL STUDY OF LONG-LIVED FIRMS

How do long-lived firms strategically renew themselves over time? Viewing organizational longevity as sustained strategic renewal, this PhD research investigates three key principles of self-renewing organizations. Building on the coevolutionary perspective that incorporates both selection and adaptation perspectives, we developed a comprehensive framework to investigate these three key principles in the oil industry as our case industry, with Shell (1907-2008) as our focal case company and BP (1970-2008) as our comparative case company. Besides the multilevel and comparative case study methods, we employed the method of longitudinal content analysis to incorporate the temporal analysis of sustained strategic renewal over an extended period of time. First, we investigated the principle of matching the internal rate of change with the external rate of change. Our results suggest that aligning the internal rate of change of a firm with the external rate of change of the firm's environment positively influences the firms' sustained strategic renewal. Second, environmental turbulence requires firms to renew their organizational structure and develop self-organization. Our findings propound that self-organization positively influences sustained strategic renewal. Third, we investigated exploratory and exploitative strategic renewal trajectories as well as the role of top management team (TMT) in influencing these trajectories. We found that balancing exploration and exploitation positively influences sustained strategic renewal and that the TMT's corporate governance perspective (shareholders / stakeholders) does influence strategic renewal trajectories. Finally, we substantiated managerial implications based on the enabling antecedents of the three key principles.

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