Chapter 1

Three Research Objectives:

An Overview

To maintain or to even enlarge competitive advantage it is essential for firms operating in changing environments to adapt their resource base configurations in a well thought out way to external shifts. Dynamic capabilities describe the firms' capacity to accomplish this aim. In my dissertation I pursue three research objectives with regard to dynamic capability research. In chapter 2, I introduce the reader into dynamic capability research, state that no dynamic capability concept exists to investigate empirically dynamic capabilities across industries argue, however, that such an investigation is possible, and outline a first step to do so. In chapter 3, I deal with my second research objective. Using a mathematical model I investigate the value implications of dynamic capabilities. In chapter 4, which comprises my third research objective, I outline a model to solve the fundamental problem to accomplish an optimal ratio of explorative and exploitative activities. Each of these chapters starts with an introduction including the relevant literature, a detailed description of the research objective, the academic and normative implications as well as a detailed description of how I approach each research objective. In the main part of each chapter I pursue the research objective. I conclude each chapter with a discussion of the results, limitations and future research avenues. This chapter serves the reader as a first overview of my research objectives. In the last chapter of my dissertation I provide a general summary.

The efficiency of resources and their intra- and interfirm development might be improved by 'ad hoc problem solving' (Winter 2003), or repetitive utilization (Helfat & Peteraf 2003). However, firms are at risk to be captured by resource configurations which were successful in the past, but - because of environmental shifts - are not able to satisfy present or future demands. In this case, the absence of flexibility, also described as 'structural inertia' might jeopardize the long-term survival of firms (Hannan & Freeman 1984, Burgelman 2002, Gilbert 2005, Lavie & Rosenkopf 2006).

Recognizing the importance of such dimensions as knowledge, time, and innovation to achieve and maintain competitiveness, in the 1990's researchers developed ideas which resulted in the dynamic capability approach (Cohen & Levinthal 1990, Teece & Pisano 1994, Teece, Pisano & Shuen 1997). Indeed, issues related to modifying/adapting a firm's strategic resource base and its capabilities to react to external influences to achieve competitive advantage became a dominant theme in strategy research (Cohen & Levinthal 1990, Grant 1996, Henderson & Cockburn 1994, Kogut & Zander 1992, Nelson 1991, Teece & Pisano 1994, Williamson 1991, Zander & Kogut 1995), and were integrated in Teece et al.'s (1997) comprehensive research contributions. Even though different definitions of dynamic capabilities have been developed in the past years, Teece et al.'s (1997, p. 516) early definition of dynamic capabilities as "the firm's ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments" summarizes comprehensively the basic notion of dynamic capabilities.

With regard to Teece et al.'s (1997) dynamic capability definition the main objective of researchers is, accordingly, to investigate how and under what influence factors a firm

achieves a resource base configuration that is closest to the benefit maximizing configuration determined by internal and external conditions (Lavie 2006). In this context, Teece et al. (1997) describe the dynamic capabilities concept as an integrative approach based on different research streams such as organizational learning (Argyris & Schön 1978), as evolutionary theory (Nelson & Winter 1982), and as the resource-based view (Barney 1991). Beside the efforts of researchers to clarify the nature of dynamic capabilities in order to suggest a comprehensive definition (Helfat 1997, Teece et al. 1997, Eisenhardt & Martin 2000, Griffith & Harvey 2001, Lee, Lee & Rho 2002, Zollo & Winter 2002, Winter 2003), the dynamic capability research is concerned with a multitude of research aspects. For instance, scholars examine the shaping process of dynamic capabilities (Zollo & Winter 2002, Zahra, Sapienza & Davidsson 2006, Ethiraj, Kale, Krishnan & Singh 2005) or investigate the effectiveness of dynamic capabilities on performance (Henderson & Cockburn 1994, Teece et al. 1997, Eisenhardt & Martin 2000, Ni & Wan 2008). Another research aspect is to clarify the structure of dynamic capabilities including insights from related research streams (Grant 1996, Sitkin, Sutcliffe & Schroeder 1994, Harreld, O'Reilly & Tushman 2007, Zollo & Winter 2002, Adner & Helfat 2003, Zott 2003, Schreyögg & Kliesch-Eberl 2007, Teece 2007, Marsh & Stock 2006, Lavie 2006).

Going through the literature of dynamic capabilities, I identified three research objectives. The first reveals that - despite the massive body of research contributions - a generally accepted dynamic capability concept[1] is still missing that enables researchers

[1]In this dissertation, I use the terms 'framework' (a set of principles or ideas used as a basis for one's decisions, etc.), 'concept' (an idea or a principle relating to something abstract), 'approach' (a way of dealing with something, esp. a problem) as synonyms (Crowther 1995).

to investigate dynamic capabilities empirically. Likewise, there exist no empirical research contributions that investigate dynamic capabilities across industries.

The academic interest to investigate this research objective rests upon the assumption that the dynamic capability approach is most promising to reveal the long-term competitive advantage of firms (Teece 2007). Accordingly, the core of my first research aim is to moot *if* an industry-crossing investigation of dynamic capabilities is possible and then to discuss *how* an empirical, industry-crossing investigation of dynamic capabilities can be accomplished.

Besides this academic interest, the research issue has also normative implications. Against the background of increasing environmental uncertainties evoked by large innovation rates and global changes in firms' environments, top managers are forced to pay increasingly attention to the accurate adaptation of the firms' value generating resource base. Therefore, it is on behalf of firms' decision makers to provide and maintain well-functioning, effective, and risk reducing instruments to adapt a firm's resource base to its environment, but also to shape the business environment to the firm's advantage (Teece 2007). Based on an empirically validated concept which describes how firms survive in changing environments researchers are able to identify the essential and most influential factors or even to deduce the principles of how managers should behave to ensure the long-living of "their" firms with regard to continual or disruptive environmental shifts.

I go into this research objective in chapter 2, "Literature Review & a First Step to Operationalize Dynamic Capabilities". To avoid redundance and a too extended overview,

furthermore, to ensure a smooth transition to the main part of this research contribution, and also to provide a more specific literature selection with regard to the considered research contribution I refer the reader to section 2.1, "Introduction to the First Research Objective". Here, I first show the miscellaneousness of dynamic capability research and then lead the reader to the research aim comprising its academic and normative implications. I provide a detailed description of how I accomplish my research aim, including among others the processes of literature review ensuring an inter-subjective selection.

A further central issue in dynamic capability research is to understand the interrelation of dynamic capabilities and firm performance, respectively firm value (Teece et al. 1997, Eisenhardt & Martin 2000, Winter 2003, Zott 2003, Zahra et al. 2006). Despite a plurality of research contributions, the research question if dynamic capabilities possess value similar to the firms' resource base which is responsible for generating the current firm performance - perhaps even in a "dormant" state - is still unanswered. Furthermore, if dynamic capabilities possess value there remains the questions which factors determine the value of dynamic capabilities. In particular, it is of interest if the timing of the dynamic capability application has an impact on the value of dynamic capabilities or even on the firm value.

Summarized, my second research objective is to analyze "The Value Implications of Dynamic Capability" which I do in chapter 3.

To tackle this research objective I use, similar to Kogut & Kulatilaka (2001) and Kyläheiko, Sandström & Virkkunen's (2002), insights from real option theory. I outline

a mathematical model consisting of one firm possessing the options, and therefore, the dynamic capabilities to change its value generating resource base depending on environmental shifts. Assuming that the firm behaves value maximizing, it is crucial to determine the value maximizing point in time in order to apply its dynamic capabilities.

From the results of my model I see that the value of a firm is given by the sum of the present and future value generation of the existing resource base (resource-based view) *and* the firm's ability to adapt this resource base in a value maximizing way (dynamic capability research). Furthermore, I am able to identify several factors which influence the value of dynamic capabilities and recognize that all these value determining factors are externally given. In this context, the point in time to execute dynamic capabilities has an impact not only on the value of dynamic capabilities but also on firm value.

Besides the capacity of my model to deepen the academic understanding of dynamic capabilities, I am able to infer different normative implications. Likewise, the simulations I do may function as a first step to support managers to gain a better understanding of how different factors influence the value of dynamic capabilities and, accordingly, the value of firms. Rather, the results open the field to discuss cost issues of dynamic capabilities with regard to the aim of their application (Winter 2003).

Furthermore, linked with insights of different research contributions (Eisenhardt & Martin 2000, Adner & Helfat 2003, Winter 2003, Zahra et al. 2006, Teece 2007) my model seems to be suitable to explain the existence of management consultancies. Indeed, based on my deliberations I suggest that firms' decision makers are well advised to hone the

contact to management consultancies in order to be supported at the appropriate point in time in case a resource base change should be necessary. This approach seems to be a way to keep the firm value high, while avoiding costs to develop highly sophisticated dynamic capabilities (Winter 2003).

Again, to avoid redundance and a too extended introduction with regard to the other research gaps also, to ensure a smooth transition towards the main part of this research contribution and to provide a more specific literature selection with regard to the considered research contribution I refer the reader to the section "Introduction to the Second Research Objective 3.1" . In this section, I introduce the reader to the relevant literature with regard to my second research objective, point out the research gap, summarize my approach to solve the problem of the research gap, and refer to the empirical and normative implications of my research results.

My third research objective deals with ambidextrous organizations. The basic notion of ambidextrous organizations is to ensure or even enlarge long-term competitive advantage by deploying exploitation and exploration simultaneously (Duncan 1976, March 1991, Tushman & O'Reilly 1996, O'Reilly & Tushman 2007). Simplified, exploitation means to ensure current competitive advantage through technology and product improvement. Exploration means to invest in the development of new technologies or products that are distinctive from the existent ones (March 1991).

Besides the integration of exploitation and exploration (Raisch & Birkinshaw 2008) "the basic problem confronting an organization is to engage in sufficient exploitation to

ensure its current viability and, at the same time, devote enough energy to exploration to ensure its future viability" (March 1991, p. 105).

In other words, firms are challenged to find the optimal balance of exploitative and explorative activities. Since the extent and consequently the ratio of both activities are given by the degree of resource investments in exploitation and exploration, the firms' capacity to act in an ambidextrous way depends on the firms' ability to adapt its resource base with regard to external shifts (O'Reilly & Tushman 2007). According to this line of reasoning, to balancing of exploitative and explorative activities, for instance with regard to declining and emerging markets, must be considered as a specific dynamic capability.

This central challenge to balance the exploitative and explorative activities in an optimal way with regard to environmental shifts represents the link between ambidexterity and dynamic capability research. This challenge to firms is also the subject of my third research objective which I pursue in chapter 4, "Optimal Timing of Resource Adaptation".

To approach my third research objective I outline a formal model describing a firm selling a product in a declining market and at the same time possessing the option to enter an emerging market. To exploit the declining market as long as it is profitable the firm deploys exploitative activities. To maintain and hone the option to enter the emerging market the firm deploys explorative activities. Since it is the aim of firms to maximize long-term profit I choose the maximization of the firm's profit as target dimension.

The first challenge to firms' decision makers now is to *determine* the profit maximizing point in time when to discard the exploitative activities to the benefit of resources

or a scrap value, as well as to determine the profit maximizing point in time when to discard the explorative activities respectively to transform these activities into exploitative activities. Since the development of the declining and emerging market is subject to uncertainty, real option theory comes forward to solve this problem.

However, to prepare the resource base adaptation and to avoid conflicts due to resource allocation and finally to ensure the optimal ratio of exploration and exploitation, it is of crucial interest to managers to predict the profit maximizing point in time to execute a resource base adaptation. Therefore, the second challenge to firms' decision makers is to *predict* the profit maximization of dynamic capabilities. Since my former model only provides the possibility to determine the profit maximizing point in time in real time, I develop a mathematical instrument to predict the value maximizing point in time to introduce a newly developed product into a prospering market and to withdraw an exploited product from a declining market.

This first overview of my third research objective shows the academic and normative implications of my approach: Apart from the potential of my model to close a central research gap in ambidextrous research, an appropriate adapted model could serve managers as an instrument to deduce the optimal balance of exploitative and explorative activities. Based on this information managers should be able to improve the allocation of resources with regard to the firm's short- long term aims.

Likewise to the first and second research objective I refer the reader to the section "Introduction to the Third Research Objective 4.1" where I provide a detailed introduction

including the decisive literature, emphasizing the research objective, the academic and normative implications of my research objective and how I approach it.