# Strategic Reconfigurations

## Building Dynamic Capabilities in Rapid Innovation-based Industries

Edited by Stuart Wall, Carsten Zimmermann, Ronald Klingebiel and Dieter Lange

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# Foreword

## David Teece

More than a decade ago, Jay Barney, Kathleen Eisenhardt, Sydney Winter, myself, and others started to draft a framework that derives the internal essentials of an enterprise as the basis for competitive advantage. I am delighted to introduce a substantial piece of work aimed at the quest of integrating this framework with other theories, as well as reconfiguring it towards an applicable utilization. This includes furthering the dynamic capabilities theory to secure DCV-inspired management tools a permanent place in the practical world. But how do the editorial quadriga of Dieter Lange, Carsten Zimmermann, Ronald Klingebiel and Stuart Wall and their contributing authors go about tackling this mammoth task? How does it differ from books such as those written by Teece (2002), Helfat (2003), or Amin and Cohendet (2004)?

What first strikes the eye is the book's uncompromising way of working at the central issues of DCV. In the first part of this book, the authors try to extrapolate the usefulness of the concept for managerial application in virtually all organisational situations, before moving to specific areas. In that respect, it parts with Teece (2002) and Amin and Cohendet (2004), who focussed on the management of intellectual capital in knowledge-intensive firms. Organisational heterogeneity that drives the sensing, seizing of opportunity and the timely reconfiguration of internal capabilities mirrors the managerial reality in successful companies that could lead to competitive advantage in a wider field of companies than previously advocated.

Because the study of dynamic capabilities has quickly dispersed into various research areas such as organisational learning, entrepreneurialism, emergent planning, and many others, the overall DCV theory was not always comprehensively advanced. By moving forward the body of theory themselves, the book authors do not fall short of bringing together past research advances in the loosely spread out fields of research. In addition, the book in part introduces new ideas to the DCV realm, for example by incorporating powerful ideas of real options theory. This approach is mirrored in the book outline that moves from organisational implications to

entrepreneurial activities and overall innovation, and finally demonstrates empirical showcases of management heuristics under this renewed theoretical umbrella.

The take on innovation in high-velocity environments makes the book particularly informative for managerial practice. The editors have each had numerous years of exposure to fast-paced markets in corporate and consulting positions, which enable them to place the authors' emphasis on the 'hot spots'. Since companies' stimulation for change and reconfiguration is often concentrated in innovation departments, the book explicates the DCV repercussions for the most crucial part of institutions. While this book will not be the last word on managing new ideas, it strongly influences the future research agenda – especially for those scholars that are interested in synthesising the language of practice with theoretically verified examples of DCV application.

In conclusion, I cannot but recommend this timely piece of work as a guideline for academics and practitioners alike. In our ever faster-changing world, the need for simultaneous adaptation will only increase. It is then that we need informed contributions like this book, which can help us make sense of our organisational capabilities and the need for change.

# Introduction

**Stuart Wall, Carsten Zimmermann, Ronald Klingebiel and Dieter Lange**

The chapters in this book seek to meet a major challenge: namely to combine the theory and practice of organisational resource reconfigurations in order to ground the dynamic capabilities view more firmly in managerial reality. Although the processes of change have been observed by academics and practitioners alike, there is no unanimity of view as to the definitions and interpretations that can be legitimately applied to these observations. The impact and development of resource routines that may sustain superior enterprise performance has fascinated researchers investigating phenomena from a diverse range of backgrounds, including entrepreneurship, organisational behaviour, innovation and operations research. Within the field of strategic management, capabilities have been the centre of attention over the past 20 years for those seeking to understand the foundation of business survival, growth and performance.

The dynamic capabilities view, like the resource-based view (RBV), seeks to identify and categorize the prerequisites for preserving a sustainable competitive advantage within global markets. Following Peteraf (1993), such conditions may include imperfect mobility, ex ante and ex post limits to competition as well as resource heterogeneity. The underlying assumption in this respect is that firm-specific knowledge becomes central once strategic decision making for resource utilization, diversification or restructuring is required. Such knowledge is often viewed as being to a large degree 'sticky', since it incorporates tacit processes and learning routines. In this respect a variety of resource-based theorists have highlighted the contributions of Edith Penrose (1959) as regards the critical interactions of resources with diversification mechanisms and company performance. Criticisms of this perspective, however, include the suggestion that it lacks theoretical structure (Priem and Butler 2001) and embraces a tautological cycle as to resource composition and company performance (Eisenhardt and Martin 2000). Moreover the conception of a company as based on bundles of resources is perceived as theoretically indistinct and oversimplified (Williamson 1999). Further, companies that

operate in markets, which are classified as dynamic or as facing constant external shocks, are arguably less likely to accomplish a sustainable competitive advantage (Eisenhardt and Martin 2000).

Hence it is only logical that we focus on the development of these change dynamics in 'Rapid Innovation-Based' Industries, to use the terminology of authors such as Breznitz (2007). These industries are driven by new technology based firms that generate new technologies or are involved in major research and development activities that may act as a catalyst for new technologies. When examining multifaceted managerial phenomena within Rapid Innovation-Based Industries, as for example those of entrepreneurship, innovation, real options or internationalization, the behaviour of companies needs to be analysed as to their sensing, seizing, and reconfiguring capacities (Teece 2007). The microfoundations of such processes have, however, often failed to explain the disappointing outcomes as regards flexibility, value creation or innovation development. Further, there appears to be a contextual dilemma, with an excessive academic emphasis on the order and predictability of phenomena such as entrepreneurship and innovation, in contrast to the academic field researchers, who readily acknowledge the flexibility and diversity of the approaches actually followed within organisations (de Rond 2003).

In the first chapters of our book, we therefore seek to address these paradoxes by referring back to the fundamentals of the dynamic capabilities view, which are based on microfoundations such as procedures and processes, distinct skills, decision mechanisms and disciplines (Teece 2007). To do so, we respond to the apparent paucity in reliable data by reassessing the phenomenon of governance and organisational alignment, incorporating dynamic capabilities as a conceptual framework by which to analyze these phenomena. We also note that the resource-based view is restricted to relatively static environments and may only provide limited explanatory reasoning as to the creation and protection of intangible assets in environments characterised by frequent external shocks. Re-examining company survival and the development of contingent management control systems in these less stable environments may therefore provide a useful interface to indicate the challenges currently encountered by those seeking to conceptualise and theoretically embed dynamic capabilities. Further insights may also result from analysing the risks associated with the development of valuable future capabilities as well as the exploitation of existing capabilities (March 1991).

The central strategic riddle though remains: how can companies develop new creative ideas and knowledge routines in a context of continuous external shocks and novel circumstances emanating from such rapid changes, especially those which are technological or structural in nature. Hence, our second aim is to provide a variety of theoretical and empirical

research accounts on resource combination routines required for the development and implementation of ideas management, entrepreneurship and innovation.

This approach of analysing entrepreneurial behaviour, impacts and performance under the 'macroscope' of combining resources and capabilities provides a possible vehicle for bridging the gap between the dynamic capabilities view and the entrepreneurship and innovation literatures on resource development and exploitation. Moreover, the actual processes and routines of innovation can be seen from this perspective as being shaped by the companies' resource position, evolutionary paths, structural inertia and management commitment (Schreyögg and Kliesch-Eberl 2007). Whilst the accumulation and sole availability of resources is to a large extent the locus of entrepreneurial strategy research at the more micro-level, such an approach narrowly focused on these static observations fails to explain how a company establishes its idiosyncratic innovation advantages. The integration, building and reconfiguration of internal and external competencies (Teece et al. 1997) and the eventual development of associated higher-order routines is arguably a more appropriate approach towards explaining the innovation behaviour of enterprises, which are operating in environments of constant and rapid change.

Our contention is that only a systems-wide perspective of the resource endowments of an organisation, such as intellectual property, technology and intangible assets, and the ways in which such systems have developed over time, can fully capture learning capabilities and provide the basis for the evaluation of strategic alternatives, rather than an emphasis on any individual resource or any changes in its perceived value over time. In the absence of such a systems-wide perspective, replication, copying, codification and eventual knowledge construction in this area of innovation are complex and difficult to disentangle, especially with the theory of capability development or formation still being in its formative stages. However, our future comprehension of the development of dynamic capabilities may have a strong and positive impact on our general understanding of the ability to absorb knowledge and transform that knowledge into routines for imitation and re-alignment. This approach may eventually further lift our perception of company survival, growth or performance from the largely informative level towards a more analytical level and hence provide a basis for successful policy formation and meaningful practitioner applications.

It is here that leading academics have simultaneously pointed to the necessity of developing the field of strategic practice, which would speak to, and be driven by, a more practitioner-oriented audience. Despite the successful transition from linear process models to more iterative resource-based models, phenomena such as international mergers and acquisitions

or telecommunications value-chain reconfigurations have been analysed from a comparatively atomistic and rational perspective, focusing on discovering regularities in the varied events (Henderson and Cockburn 1994; Teece et al. 1997; Eisenhardt and Martin 2000). The contextual dilemma arises as to why, on the one hand, the literature has emphasized the order and manageability of these processes, whilst at the same time acknowledging their diversity and unpredictability as to the development and construction of capabilities? Numerous theoretical accounts have therefore invited research into interdisciplinary methodologies, arguing that this may foster a more radical approach towards research in these areas. For example, major attention has been paid to the actual systems of innovation and to their influences on relations between different participants within the innovation process, whilst the dynamics and linkages within the creation of routines and the reconfiguration of capabilities have been largely neglected (Eisenhardt and Martin 2000, Salvato 2003). Also, in-depth case methodology may benefit from the bidirectional stimulation of research questions as well as the further integration of practitioner perceptions and analyses. The final section of the book builds upon the relationship between research and practice and may serve as a step towards a more fruitful dialog between the largely interdependent worlds of theory and practice with opportunities for bi-directional influence, mutual learning and diversity of thought.

## FUTURE PERSPECTIVES

We are delighted to see continued growth in the dynamic capability discourse, with recent books such as by Helfat et al. (2007) and a special issue in *Industrial and Corporate Change* edited by Teece et al. (2009). What seems to be emerging is a degree of eclecticism in assimilating diverse theoretical bases such as Evolutionary Economics and the Resource-Based View, with the competing perspectives such as the Behavioural View and the Knowledge-Based View (Stefano et al. 2009). The struggle over fundamental aspects of the Dynamic Capability View (DCV) seems to be ongoing and presents ample opportunity for further inquiry. In addition, DCV has no exclusive right to the study of strategic reconfiguration, which calls for a broader integration of perspectives to better approach the complex interconnectedness between capability and competitive advantage.

The reader of this book will find that whilst the dynamic capability view still merits further exploration as well as tightening, a case is made for a more lucid theory of competitive advantage which can eventually be translated into actionable practitioner knowledge and routine. At the same time, by accepting the broader principles of the dynamic capabilities

view, researchers are better placed to investigate strategic decision-making and managerial strategy implementation through a lens that is increasingly refined, bearing in mind that virtually any topic involving strategic orientation and change offers opportunities for a dynamic capability interpretation. This book integrates DCV with parts of existing theoretical frameworks of, for example, entrepreneurial activity and, more broadly, the resource-based view. We feel strongly that the dynamic capability view can only gain in importance if it is integrated with existing streams of research, rather than attempting to co-exist independently.

Although a significant number of researchers contributing to this book and to the wider academic community has provided stimulating perspectives on organizational phenomena and their causal mechanisms, their contribution has often been conceptual. For dynamic capabilities are becoming an increasingly serious concern for managers and students of business, a greater empirical focus, aimed at verifying a sophisticated theory, seems warranted. To date, capabilities' messy dispersion across numerous social entities and organisational networks have deterred researchers away from comparative empirics. On a very aggregative level, exemplary contributions such as Adner and Helfat (2003) have given indications of how dynamic capabilities could be captured in future studies. Some authors succeed in depicting individual capabilities and their contribution to performance (Peteraf and Reed 2007). A study of a firm's overall capability levels, however, seems to remain elusive. It is here where the joint research effort of scholars could verify and refine capability concepts of competitive advantage, and thus help the dynamic capability view to gain both conceptual integrity and enable a more intuitive grasp of the theory.

Within all these future research directions, an empirical link between firm performance and the firm's capability set is desirable. Especially underutilised measures such as growth are vehicles for a better understanding of how dynamic capabilities contribute to the evolutionary fitness of firms within evolving environments. In their chapter, Klingebiel and Lange make the case that unless academics provide executives with structured decision-making heuristics, namely (imperfect) responses to lessons learned from powerful empirical observations of causal relationships with performance, the dynamic capability movement remains confined to the scholarly world. We can expect little translation of academic propositions into practice, rather a parallel development of knowledge by practitioner-experts, for as long as academics fail to relate various dimensions of performance with a conscious management effort to navigate the organisational capability base. Nevertheless, all firms need to alter their resource bases at some point during their lifetime. If organisations forsake their current resources and capabilities, they face high costs of obtaining

new resources and capabilities that have an adequate fit with markets. Therefore, the potential opportunity for researchers to make a lasting impact with relevant research at the forefront of the dynamic capabilities perspective could not be greater.

As with other areas of theory development, the dual need of comparative statistical inference and in-depth organisational understanding may prove difficult to satisfy. As some of the authors in this book are already demonstrating, closer interactions with practitioners may hold the key to this challenge. Understanding resource coordination challenges through a practitioner's frame of mind is likely to allow researchers to define and operationalise capability constructs that are more reflective of organisational realities and, therefore, more robust in modelling causal relationships. This exercise stands to benefit econometric approaches seeking to link capability models with performance parameters.

Engagement may also bridge the gulf between academic and practitioner approaches to capability reconfigurations. At present, academics undertake laudable efforts to guard against bias in the analyses by adopting research methods that distance the researcher from the research object. Ironically, the maturing of the dynamic capability view is dependent on a two-way dialogue. Collaborating managers can stimulate collective and public conversations about the purpose of dynamic capability research and its relevance to the firm. They may also enter a dialogue about research findings. If all this happens, the future scholar conducting empirical research in dynamic capabilities will be able to learn about organisational phenomena and their fit with prior theoretical assumptions. There may thus be great potential to nuance dynamic capability concepts and to make them more applicable and ultimately relevant for managers. Given the current incentive structure of academic scholarship, we expect this to be the greatest challenge for the continued development of the dynamic capabilities view.

In sum, the academic community has the chance, as well as responsibility, to explore a plethora of opportunities to further investigate dynamic capabilities over the coming years – an endeavour promising to be both challenging and rewarding.

## ORGANISATION OF THE BOOK

The book contains 11 chapters, organised around three key themes that provide a suitable basis for theory development and practitioner interest. The three themes connect dynamic capabilities with organisational theory, strategic entrepreneurship, and organisational applications.

Chapter One begins with an account of how dynamic capabilities can

extend our knowledge as regards organisational survival over time. The model developed by Ian McCarthy and Brian Gordon helps explain how contingent management control systems leverage the organisational behaviours necessary for developing dynamic capabilities. The chapter makes a timely contribution to the current debate as regards the higher-order capabilities which control the development and re-configuration of capabilities (Schreyögg and Kliesch-Eberl 2007).

In Chapter Two, Michael Horn and Carsten Zimmermann examine the suitability of varying governance structures for radical innovation through dynamic capabilities. They provide a refreshing reappraisal of the corporate governance literature and show how different firm-level corporate governance systems are associated with more effective reconfigurations of routines. Their observations suggest that greater rapidity in the gaining and releasing of productive resources and competences is conducive to more radical innovation. Horn and Zimmermann conclude that this favours 'American' corporate governance systems, which are based on highly variable, performance-based remuneration schemes.

In Chapter Three, Sebastian Raisch and Florian Hotz study 2500 discrete strategic reconfigurations. By focusing on the firm's relative alignment to environmental circumstances as regards adopting explorative or exploitative strategic positions, Raisch and Hotz are able to distinguish between highly dynamic adaptation patterns and less adaptive, more sluggish alignment behaviour. Whilst they find no significant difference in average performance between the two patterns, they establish that more dynamic adaptation leads to greater short-term performance oscillation, increasing both risk and return, whilst less dynamic adaptation decreases earnings potential but safeguards stability. Thus, Raisch and Hotz caution overt enthusiasm for dynamic capabilities by putting into perspective the risks associated with constant strategic flux.

The fourth chapter by Aino Kianto and Paavo Ritala takes a critical stance towards some of the more contentious elements of the dynamic capability argument. In their refined version, they account for the problem that knowledge is socially constructed, especially at top management level. The emerging knowledge-based view provides a more nuanced explanation of the organisational capacity to change dynamically.

In the second section of the book we explicitly deal with the theoretical underpinnings and issues involving strategic management and the economics of entrepreneurship, which are arguably the mainstays of modern economies. The section opens with a chapter by Dan Breznitz and Carsten Zimmermann, who propose that a strategist's imperative to generate dynamic capabilities in order to sustain competitive advantage is not dissimilar to that of a strategic manager with a focus on industrial

development. As in large organisations, Breznitz and Zimmermann argue that the state needs to coerce its multitude of agents to constantly develop and refine the dynamic capabilities that lead to value-growing, non-repeatable strategies, in order to compete successfully with foreign industries. This chapter suggests that the dynamic capabilities theory is capable of explaining the social processes of reconfigurations far beyond the level of the firm. In Chapter 6, Berna Polat examines acquisition mechanisms in the context of venture survival, with a data set of more than 100 companies showing the impacts surrounding early firm entrance.

In Chapter seven, Thomas Hutzschenreuter, Fabian Guenther and Johannes Voll examine growth paths and economic success. They show that continuity of development rather than mere growth has a positive influence on performance. Whilst not explicitly framing their study in the dynamic capability perspective, their evaluation of the impacts of positive signals as regards financial results on firms' adaptiveness illustrates that the DCV approach has significant scope to gain from adjacent literatures dealing with the same phenomena.

In the following chapter, Ronald Klingebiel reviews the literature on planning and real options to conceptualise a capability that allows firms to balance the advantages and disadvantages of commitment and flexibility in resource allocation. His contribution involves the delineation of the boundary conditions for flexibility value and the parameters that ought to be optimised during the planning of decision-making. The integration of the literature on planning strategic projects with a real options logic stands to benefit from our understanding of performance-oriented decision-making under uncertainty. To conclude this section, Einar Lier Madson develops a new organisation of dynamic capabilities that is centred around the existing theory of entrepreneurship and the ongoing discussions on exploration versus exploitation.

The final section of the book then develops dynamic capability showcases and reflects the combined efforts of leading practitioners in management as well as academics in the field. Stefanie Düker, Silvia Boßw-Thies, Philipp Zimmermann, and Dieter Lange examine how telecommunications providers configure and reconfigure resources and capabilities amidst rapidly changing business landscapes. They find that for the upcoming challenges of converging devices and services in the telecommunications industry, the DCV is a useful concept to frame executive strategies.

Ronald Klingebiel and Dieter Lange then give an account of a practitioner-driven concept: value chain redefinition. This concept originates from within the practitioner sphere, notably the consultancy sector, and addresses many of the same issues encountered by DCV theorists. Whilst less sophisticated but more manageable and structured, the value

chain redefinition concept provides a tangible tool for aligning companies with market dynamics.

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# PART I

# Dynamic capabilities and organisational theory

# 1. Leveraging dynamic capabilities: a contingent management control system approach

**Ian McCarthy and Brian Gordon**[1]

## ABSTRACT

Dynamic capabilities help explain why some organizations survive over-time. However, they have been mostly viewed as abstract phenomena with limited attention given to the mechanisms that managers might use to create and direct them. In this chapter, we present a model that explains how contingent management control systems leverage the organizational behaviors necessary for dynamic capabilities. We focus on how variations in environmental velocity affect the characteristics of the feedback that these systems receive. This, in turn, influences control system emphasis and the paradoxical forces of exploitation and exploration that guide and direct the capability processes of coordination/integration, learning and reconfiguration.

## INTRODUCTION

Dynamic capabilities are a firm's ability to persistently modify or create organizational configurations for competitive advantage and improved viability (Helfat 1997; Teece and Pisano 1994; Teece, Pisano and Shuen 1997; Eisenhardt and Martin 2000; Zollo and Winter 2002; Winter 2003). They have been defined as 'the ability to integrate, build, and reconfigure internal and external competencies to address rapidly-changing environments' (Teece et al. 1997, 517). Thus, dynamic capabilities are the higher order capabilities that govern the rate of change in competences (ordinary or operational capabilities), which help firms to make a living in the short term (Collis 1994; Winter 2003; Zahra et al. 2006).

However, despite the interest in dynamic capabilities there is limited work (Zollo and Winter 2002; Ethiraj et al. 2005; Subramaniam and

Youndt 2005) on how managers create and maintain them. For like the resource-based view of the firm (Wernerfelt 1984; Barney 1991), which the dynamic capability view extends, research on dynamic capabilities has been described as 'conceptually vague and tautological, with inattention to the mechanisms by which resources actually contribute to competitive advantage' (Eisenhardt and Martin 2000, 1106). So even though the dynamic capability view seeks to add or include the activities of management and leadership to the resource-based view, there is limited knowledge about how managers create and sustain this type of capability.

In this chapter, we argue that management control systems are tools for leveraging the organizational behaviors and outcomes necessary for dynamic capabilities. They are the formal and informal systems that managers use for decision-making and evaluation, and their effectiveness is contingent on various environmental and organizational aspects. We explain how management control uses two forms of feedback processing to provide guidance and understanding about a firm's 'as-is' state, as well some sense of its potential 'to-be' scenarios. These inputs combine to provide information that directs and develops the three processes (coordination/integration, learning, and reconfiguration) that are the essence of a firm's dynamic capabilities (Teece et al. 1997).

To explain how management control systems operate on these processes we use Simons' (1994, 1995) levers of control framework, which consists of four control systems (beliefs, boundary, diagnostic and interactive) that combine to produce different behaviors for directing the operation and performance of firms. These systems provide what March (1976) calls 'technologies of reason' that monitor, reward and direct behavior according to pre-defined goals, and 'technologies of foolishness' that offset organizational rationality by promoting play, experimentation and learning so as to handle uncertainty and change. Together they help a firm's long-term success by exploiting and refining current competences, while simultaneously exploring and installing fundamentally new ones.

We also argue that the operational and environmental context of the firm influences the design and effectiveness of its management control system. That is, different environmental conditions prompt or require firms to emphasize different combinations of belief, boundary, diagnostic, and interactive control system use. In particular, we consider how high-low variations in environmental velocity – the rate and direction of change in a firm's task environment – sway the emphasis that firms place on different control systems to create effective dynamic capabilities. The general theoretical model for these contingent control relationships are shown in Figure 1.1.

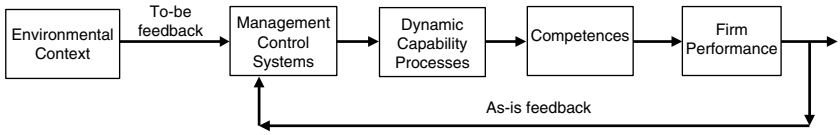


*Figure 1.1 General theoretical model of contingent management control and dynamic capabilities*

This chapter begins with an introduction to the concepts and relationships in Figure 1.1. We then show how high and low environmental velocity conditions produce different types of feedback that encompass different types of control system, which then produce forces for exploration and exploitation that act on the dynamic capability processes. The chapter concludes with an account of the theoretical and practical implications of the model, and areas of future work.

## MODEL CONCEPTS

### Management Control Systems as Dynamic Capability Levers

Dynamic capabilities provide a concept and language for considering why, over time, some firms are more successful than others. As a consequence, there have been a significant number of articles that consider the concept of dynamic capabilities (Teece and Pisano 1994; Teece et al. 1997; Eisenhardt and Martin 2000; Winter 2003) and their influence on firm performance (Helfat and Raubitschek 2000; Klepper 2002; Adner and Helfat 2003). However, despite these contributions, we know relatively little about how managers actually coordinate, integrate and reconfigure existing competencies in accord with changes in the environment (Eisenhardt and Martin 2000; Helfat 2000; Zott 2003). In this chapter we argue that contingent management control systems provide levers or mechanisms that managers can use to enable dynamic capabilities.

Management control systems are the planning, budgeting, measuring and communication systems that managers use for decision-making and evaluation (Langfield-Smith 1997; Marginson 2002). Research concerned with these systems originated from accounting approaches to control (Anthony 1965), but has since developed with inputs from the fields of organizational design and information management (Galbraith 1973), cybernetic control (Hofstede 1978; Edwards 1992), contingency theory (Waterhouse and Tiessen 1978; Otley 1980; Chenhall 2003) and strategic management (Ouchi 1979; Langfield-Smith 1997; Marginson 2002).

This broad view and development of management control has produced a number of insights, two of which we focus on. The first is that firms possess several control components or systems that work together, rather than separately, to influence a range of behaviors and outcomes (Otley 1980; Simons 1995). The second is that contingent management control systems provide information for planning and decision-making that fits the conditions of a firm's life-cycle and strategic and environmental context (Waterhouse and Tiessen 1978; Otley 1980; Chenhall 2003). Together these notions of control contingency and complementarity support our view that management control systems provide levers which managers can use to maintain or alter patterns in organizational activities (Simons 1994). They are the measuring, comparing and intervention mechanisms that direct how firms explore and exploit the intangible (Shuen 1994) or invisible assets (Itami and Roehl 1987) that define their dynamic capabilities. Such control is also central to the learning needed for overcoming structural inertia (Hannan and Freeman 1977, 1984) and replacing or adjusting the 'sticky' resource endowments (Cyert and March 1963; Teece et al. 1997) that restrict the generation of new competences.

To explain the relationships between management control, capability processes and competence change, we use Simons's (1995) 'levers of control' framework with its four types of control system: beliefs systems for core values, boundary systems for behavioral restrictions, diagnostic systems for monitoring and measurement, and interactive systems for consultation and proactiveness (Table 1.1). Together, these systems provide procedures and activities for exercising 'adequate control in organizations that demand flexibility, innovation and creativity' (Simons 1995, 80). They are complementary levers that combine to create dynamic tensions or forces that alter and enhance organizational capabilities (Henri 2006). These forces produce what Winter (2000) calls 'aspiration levels' that influence how far a firm intends to explore and create new competences, as opposed to the exploitation and refinement of existing competences. This in turn affects the type and level of coordination, integration, learning and reconfiguration.

In Table 1.1 the beliefs and interactive systems combine to produce behaviors that are central to the exploration and innovation needed to ensure the future survival of firms. The beliefs systems establish the purpose of the firm, by setting the domain of relevant strategic opportunities and providing an overarching framework for organizational identity and action. This involves determining the 'explicit set of organizational definitions that senior managers communicate formally and reinforce systematically to provide basic values, purpose, and direction for the organization' (Simons 1995, 34). Such control helps create the shared

*Table 1.1 The relationships between control system foci and capability forces and emphasis*

| Control system | Behavior focus | Organizational goal | Capability forces and emphasis |
|---|---|---|---|
| Beliefs | Communicate core values and goals | Establish purpose and the activities to be performed | A force that promotes exploration and innovation for significantly transforming existing competences or creating completely new ones |
| Interactive | Promote search, learning and communication | Perform new activities | |
| Boundary | Specify and enforce rules of the game | Define the acceptable domain of activity | A force that promotes exploitation and efficiency for refining or adjusting existing competences |
| Diagnostic | Determine and support targets | Perform the correct activities well | |

*Source:* Adapted from Simons (1995).

expectation and necessary unity to search for the opportunities that realize strategies (Pearce 1982; Widener 2007).

The interactive systems work in tandem with the beliefs systems to promote communication, learning and the emergence of new ideas and strategies. They help build an understanding of the strategic uncertainties facing the firm at any particular juncture in its history. This generates a form of organizational outwardness that enables the firm to search and understand its information climate, shorten the feedback cycles and influence its environment. It is a form of control that promotes sensemaking (Weick 1988) and helps reduce the negative consequences of limited, infrequent and degraded feedback by detecting and warning managers of any significant perturbations (Aguilar 1967; Daft and Weick 1984).

The diagnostic systems and boundary systems coalesce to help firms focus on competences that ensure efficiency and survival in the short-term. The diagnostic systems motivate, measure and reward progress towards specified goals. They also identify nonconformance and adjust organizational behaviors accordingly. This makes them important instruments for supporting the execution of intended strategies (Merchant 1990) and ensuring that firms perform the right activities well. However, this focus on efficiency can constrain innovation and opportunity seeking, hence why Simons (1995) argued that firms also need appropriate interactive and belief systems to encourage search and learning.

Boundary systems 'are like an organization's brakes' (Simons 1995, 84), they help restrain and focus employees to ensure that the firm does not constantly wander off course. They use rules, policies, codes of conduct and operating directives, to explicitly delimit what portions of the strategic opportunity space will not be sought by the firm and what is the acceptable domain of activity (Simons 1994). This helps prevent firms from over exploring and becoming stretched and unfocused; as well as helping prevent the occurrence of institutionalized and systematic rule breaking that can sometimes occur as firms strive to consistently achieve ever-increasing performance goals.

**As-Is and To-Be Feedback**

For the process of control to exist there must be some form of 'cybernetic validity' (Beer, 1981), whereby negative feedback loops act as sensors and regulators. This feedback stimulates action to negate any discrepancies between environmental conditions and the performance of the firm (Beer 1981; Green and Welsh 1988; Edwards 1992). Without cybernetic control (Wiener 1948; Ashby 1966) firms are unable to self-regulate or reconfigure their competences in accord with any discrepancies they may have with their external environments. The result would therefore be stasis or inertia, which over time leads to firm mortality (Hannan and Freeman 1977).

For self-regulation to function, firms receive two types of negative feedback: 'to-be' feedback, which provides information about the conditions of the external environment (e.g. strategic scanning and acquisition of information about industry events, relationships and trends); and 'as-is' feedback, which provides information about the operational, financial and market performance of the firm. Together these two types of feedback provide signals and measurements that management control systems use to measure, compare and alter any inconsistencies between the as-is state, and potential to-be scenarios. Assuming that appropriate resources and abilities are in place, any discrepancy between these feedback conditions will energize a firm's management control system to maintain or alter the distinctive processes (how a firm coordinates, integrates, learns and reconfigures its resources) that govern its position (the firm's existing strategic assets and configuration) and potential paths (where a firm can go based on its current position) (Teece et al. 1997). In Table 1.2 we show how as-is and to-be feedback act on the three organizational and managerial processes, proposed by Teece et al. (1997): coordination/integration, learning and reconfigurability.

Coordination and integration provide two complementary activities. Coordination is concerned with how firms allocate, plan and efficiently

*Table 1.2 Affect of feedback on dynamic capability processes*

| Distinctive processes | Types of feedback and examples of associated behaviors and outcomes | |
|---|---|---|
| | *As-Is* | *To-Be* |
| **Coordination/ integration**<br>Acquiring, allocating and coordinating and assimilating resources | Exploitation: error-control, efficiency, productivity and reliability<br>Lean operations: removal of waste | Exploration: search, discovery and innovation<br>Organizational slack: a cushion or excess of resource that enables firms to adapt |
| **Learning**<br>Repetition and experimentation that enables tasks to be performed better | Single loop or adaptive learning: the detection and of errors without changing the organization | Double loop or generative learning: the detection and correction of errors combined with organizational change |
| **Reconfiguration**<br>Altering resources and routines to refine or transform competences | First-order change: evolutionary, incremental, continuous and enhancing | Second-order change: revolutionary, discontinuous, radical and disrupting |

organize resources and activities. Integration is the activity of obtaining, assimilating and developing new resources (e.g. acquisitions or alliances for accessing technology) to generate new routines or patterns of current practice.

The process of learning provides different types of exploration and experimentation. It is a process that enables existing tasks to be performed better, quicker and more efficiently; or to produce novel thinking and resources that allow new competences to be identified and adopted. While such learning is inherently a multi-level, self-organizing social activity, it also requires management control to promote common values and goals (beliefs systems) and to manage search procedures (interactive systems).

The process of reconfiguration is at the heart of a dynamic capability. It draws upon coordination/integration and learning, so as to scan for and monitor opportunities and threats. It then initiates the necessary change to ensure a better fit with the environment. As change is costly, the process of reconfigurability benefits from management control that calibrates and implements the change in a congruent, timely and efficient manner.

Each of these three dynamic capability processes receives as-is and to-be feedback which influences different process activities. For instance,

as-is feedback prompts internal error-control behaviors, which measure, compare and alter process activities to help ensure the firm is in conformance with predetermined objectives and goals. Thus, behaviors induced by as-is feedback (see column of Table 1.2) are normalizing, refining and modulating in nature. They include behaviors such as exploitation, whereby firms improve, optimize, upgrade or execute existing competences (March 1991); lean operations which focus on removing waste from existing competences (Womack et al. 1991); single loop (Argyris and Schön 1978) or adaptive (Senge 1990) learning whereby incremental change is implemented without transforming core aspects of the firm. This as-is feedback induced activity also directly promotes continuous or first-order reconfigurability (Watzlawick, Weakland and Fisch 1974; Meyer 1982), whereby firm change is relatively incremental or conserving/entrenching in nature (Abernathy and Clark 1985).

As firms are complex open systems that interact with their environments, this firm-environment dependence also generates to-be feedback that complements and works with the as-is feedback. The to-be feedback is searching and anticipatory in nature. It stimulates behaviors (see the third column of Table 1.2) that help lessen the negative consequences of uncertainty by providing adequate notice and information of changing environmental conditions for generating new organizational configurations. For example, firms might maintain excess or slack resource levels which are used for exploring and developing new knowledge (Barnard 1938; Thompson 1967; Bourgeois 1981). Such resource conditions promote double-loop (Argyris and Schön 1978) or generative learning (Senge 1990) where both the competences and the norms of the firms are challenged and changed.

**Environmental Velocity**

As management control research recognizes that contingency impinges on the design (Waterhouse and Tiessen 1978; Otley 1980; Chenhall 2003), the interdependent use (Merchant 1990; Otley 1999) and the emphasis placed (Merchant 1990; Widener 2007) on different control systems, we enrich our model by explaining how a specific characteristic of a firm's context, environmental velocity, can influence the function and emphasis of its management control system.

Environmental velocity is defined as the rate and direction of change in demand, competition, technology and/or regulation (Bourgeois and Eisenhardt 1988). We focus on this environmental characteristic for three reasons. First it is a contingency factor that affects management control in terms of the decision-making processes (Bourgeois and Eisenhardt 1988;

Judge and Miller 1991; Eisenhardt 1999) and the decision rules (Eisenhardt and Sull 2001; Oliver and Roos 2005) that firms use. Second it is an environmental characteristic that is central to Teece et al.'s (1997) notion of 'rapidly-changing environments' and related environmental phenomena such as turbulence (Dess and Beard 1984), hyper-turbulence (McCann and Selsky 1984), clockspeeds (Fine 1998) and hyper-competition (D'Aveni 1994). And thirdly, for the reason that researchers have argued that there is a misconception that dynamic capabilities are useful only in rapidly changing, or high velocity environments (Moorman and Miner 1998; Zahra et al. 2006).

While this emphasis on high-velocity has been both valid and interesting, we agree with Moorman and Miner (1998) that it has overshadowed other scenarios, specifically the value of dynamic capabilities for organizations that face uncertainty and constraints from low rates of environmental change. Thus, with our model we contrast how high-low variations in environmental velocity affect the feedback that management control systems receive, which in turn influences how control systems combine and work to produce exploration and exploitation forces that act on dynamic capability processes.

To explain how high and low velocity environments differ in terms of characteristics and consequences, we can consider differences in the contexts of new technology-based firms. These organizations have internal and external conditions that span the temporal and innovation-based characteristics that demand dynamic capabilities. They are young, small, independent ventures that focus on the development and exploitation of technology (Bollinger et al. 1983; Rickne and Jacobsson 1999) and face liabilities of newness (Stinchcombe 1965) and smallness (Hannan and Freeman 1984). These conditions warrant some form of management control, which is regarded as a sign of legitimacy and professionalism and is positively related to firm survival and growth (Baron, Burton and Hannan 1996; Flamholtz and Randle 2000).

As new technology-based firms develop and exploit a technology independent of its newness or novelty (Bollinger et al. 1983), they can be concerned with leading edge science-driven research and radical innovations, or with applied product development and incremental innovations. Such variations in the basic-science intensity and the newness of the technology are crudely associated with different levels of environmental velocity. For instance, new technology-based firms concerned with basic-science research activity (e.g. biotechnology and nanotechnology firms) tend to operate in low-product velocity environments with lead-times in the region of 10–20 years. New technology-based firms concerned with applied research and development activities (e.g. computer games and

consumer electronic firms), typically face high-velocity environments with product development lead-times of about 1–3 years.

These high-low variations in environmental velocity entail particular forms of technological and market uncertainty that produce to-be feedback which has variations in 'grain' (Hannan and Freeman 1977). That is to say, a high-velocity environment generates to-be feedback that is frequent and short in duration (fine-grained) and firms operating in such environments require management control systems that cybernetically adjust, but also remain focused on core activities. Low-velocity environments produce to-be feedback that is sporadic, degraded and long-term in nature (coarse-grained), requiring management control systems to emphasize organizational purpose and activities such as search, learning and communication.

## CONTINGENT MANAGEMENT CONTROL AS A DYNAMIC CAPABILITY INSTRUMENT

This section provides a detailed theoretical model of how contingent management control leverages dynamic capabilities (Figure 1.2.). It extends the relationships depicted in Figure 1.1 by combining the effects of environmental context with control system foci (Table 1.1) and the role of different types of feedback (Table 1.2).

As previously mentioned, variations in environmental velocity generate different forms of uncertainty and to-be feedback. The rapid and irregular change found in high-velocity environments tends to produce to-be feedback that is frequent and discontinuous in nature, as markets quickly change or new ones regularly emerge (Moriarty and Kosnik 1989). These conditions make it difficult for firms to develop a clear and comprehensive understanding of their environment, as the feedback soon becomes inaccurate, unavailable, or obsolete (Bourgeois and Eisenhardt 1988).

To search for, receive and process this type of to-be feedback, firms must be outward and responsive, but also formal, rational and comprehensive in terms of their internal planning and control (Bourgeois and Eisenhardt 1988; Eisenhardt, 1999). Such requirements call for management control systems that allow firms to process to-be feedback in a vigilant and sagacious manner, so as to monitor and restrict any inappropriate reactions to the frequent and discontinuous change. Therefore, we propose that in high-velocity environments, a joint emphasis on boundary systems and diagnostic systems will help screen, restrict and adjust organizational behaviors in line with environmental changes. The diagnostic systems promote adaptive and corrective action. While the boundary systems

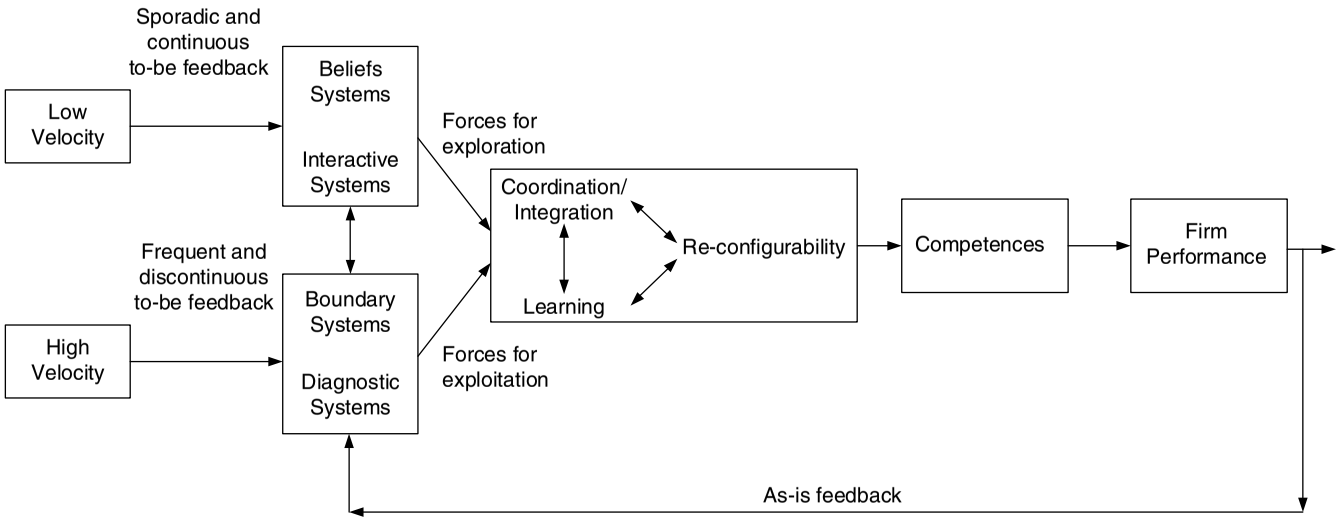


*Figure 1.2 The relationships between environmental velocity, management control and dynamic capability processes*

proscribe and limit strategically undesirable behaviors that may be triggered by the diagnostic systems as they continually consider and respond to high-velocity changes.

In contrast, low-velocity environments produce to-be feedback that is sporadic and expected in nature. Such long-term changes produce a perceived environmental stability that make it difficult to monitor and predict the patterns that eventually give rise to industry change. Thus, low-velocity environments produce to-be feedback that imposes unique cognitive challenges upon firms in terms of their ability to understand their environment through systematic scanning (Bogner and Barr 2000; Nadkarni and Narayanan 2007).

This type of to-be feedback necessitates a management control system that mutually emphasizes beliefs and interactive systems. The beliefs systems promote purpose and core values that enthuse employees to search, explore and create opportunities. Meanwhile the forward looking interactive systems watch for threats and opportunities, thus allowing for emergent strategy to serve changes in the environment (Widener 2007). Consequently, we propose that beliefs and interactive systems combine to help focus and motivate employees to achieve appropriate searching for and processing of feedback in low-velocity environments. This is necessary because coarse-grained to-be feedback demands organizational behaviors that promote structuration and exploration for present and future time frames.

Thus, for the first part of the model we posit that high-velocity conditions produce frequent and discontinuous to-be feedback that requires firms to jointly emphasize their diagnostic and control systems; and low-velocity conditions generate infrequent and sporadic feedback that requires firms to jointly empathize their interactive and beliefs systems. Such relationships are consistent with Simons's (1995) arguments that the four control systems create complementary tensions. The beliefs and interactive control systems create positive energy for exploration and innovation, and the boundary and diagnostic systems produce a negative energy for exploitation and efficiency. This combination of feedback processing and control system emphasis provides stimuli for proactively and reactively achieving a dynamic capability (Hayes and Clark 1988; Dierickx and Cool 1989; Prahalad and Hamel 1990; Chandler 1990; Teece 1993; Teece et al. 1997).

The next stage of the model is concerned with how beliefs and interactive systems, and boundary and diagnostic systems, collectively act on dynamic capability processes to induce appropriate levels of exploitation and exploration (March 1991). This ambidextrous capacity (Duncan 1976; Tushman and O'Reilly 1997) is the basis of a dynamic capability, as firms

must 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, 105).

As shown in Table 1.1 the beliefs and interactive systems work in tandem to promote forces for the scanning, searching, discovery and innovation activities that define exploration. The diagnostic and boundary systems work together to generate forces for the error-control, efficiency, productivity and reliability activities that define exploitation. Both the exploration and exploitation forces act on a firm's resources via the distinctive processes of coordination/integration, learning and reconfigurability; and the emphasis between exploration and exploitation that these processes receive is dependent on the control system leverage. Thus, our theoretical model articulates how contingent management control systems facilitate the ambidextrous balance of exploration and exploitation required by a dynamic capability.

As different forces for exploration and exploitation act on the three distinctive capability processes, this will trigger different approaches to assigning resources and tasks, synchronizing activities, and searching for, acquiring and exploiting knowledge (see Table 1.2). This control over the dynamic capability processes helps initiate a process of reconfiguration that refines or transforms competences in accord with the management control force imposed. Thus, we propose that if a firm's management control system is organizationally and environmentally congruent, it will be a significant determinant of dynamic capabilities and differential firm performance.

The final part of the model addresses the role of as-is feedback, which provides performance information that works with and complements to-be feedback. Consequently, as-is feedback is a control loop that directly connects firm outputs to the diagnostic part of the model to ensure that organizational processes receive sufficient cybernetic control. This provides goal oriented feedback that involves setting performance goals, measuring actual performance and comparing actual performance to the goals. It is a feedback cycle that provides motivational properties when discrepancies between actual performance and desired performance exist, thus altering or transforming organizational processes to reduce or eliminate the identified performance discrepancy.

Whereas to-be feedback helps firms to predict and compensate for disturbances that could create performance discrepancies, the as-is feedback detects errors or deviations from strategic and operational goals, after they have occurred. Thus, as-is feedback complements to-be feedback by counteracting any accrual of to-be errors that might occur as the firm responds to perturbations from the environment. And likewise for as-is feedback to

function according to goals, the firm via its management control system, receives to-be information to form strategic scenarios.

Since as-is feedback focuses on performance measurement and conformance it tends to only prompt exploitive and reactive behaviors. These create changes in competences that are incremental or first-order in nature. If this corrective process keeps pace with the rate of performance discrepancies that a firm encounters, then single-loop learning and first-order change could be sufficient to ensure survival. However, if the discrepancy delta is too large for first-order change, then as-is and to-be feedback combine, via the management control system, to shift the forces for exploitation to exploration.

In summary, the relationships in Figure 1.2 provide a picture of the interplay between variations in environmental velocity, interdependent control system components and the three dynamic capability processes. The model shows how these factors combine to process different types of to-be feedback, which produce and direct exploitation and exploration forces that ensure the current and future viability of a firm. We posit that this contingent management control approach provides a theoretical framework for addressing some of the ambiguities about how managers develop, maintain and direct dynamic capabilities.

## CONCLUSIONS AND IMPLICATIONS

In the years since Teece and Pisano (1994) asked us to think about how firms extend, modify or create competences, and Simons (1994, 1995) proposed his levers of control framework, it has generally been recognized that individually each of these frameworks is positively associated with firm performance. However, the significance of combining the two has been overlooked. The aim of this chapter has been to help address this gap by integrating both frameworks with contingency theory. The resulting model helps explain how this contingent management control provides guidance and coordination that is both exploitative and explorative for achieving dynamic capabilities.

The model presents a number of broad and related contributions that have implications for both theory and practice. First, it represents how management control systems act as levers for dynamic capabilities, in a similar way to which Eisenhardt and Martin (2000, 1118) argue that 'dynamic capabilities are best conceptualized as tools that manipulate resource configurations'. These control levers process feedback and generate forces that prompt and direct exploitative and explorative behaviors for refining or transforming existing competences.

A second core contribution is the notion that dynamic capabilities are achieved via multiple interdependent and complementary control systems. Specifically, we used Simons 'levers of control' framework to show that beliefs and interactive systems coalesce to promote apt search, discovery and learning, via the dynamic capability processes. Working in tandem with these two control systems are boundary and diagnostic systems, which combine to monitor, measure and if necessary restrict or alter the behaviors induced by the beliefs and interactive systems. These systems promote exploitation and the correction of performance discrepancies, while allowing exploration within pre-defined limits of freedom.

A third contribution of our model is that a firm's organizational and environmental contexts will functionally and causally influence the effectiveness of its management control system and the potential for a dynamic capability. In particular, we argue that variations in environmental velocity affect control systems because of differences in the decision horizons, information quality and rates of change. High-velocity environments produce frequent and discontinuous to-be feedback, which suits the regulating and controlling nature of boundary and diagnostic systems. And low-velocity environments generate to-be feedback that is relatively sporadic and expected. This necessitates a commitment to organizational purpose and experimentation and learning, via the beliefs and interactive systems.

The practical implications of this work are that managers should note the characteristics of their environments and design management control systems to encourage process behaviors that ensure current and future survival. This contingency view recognizes that management control requires particular kinds of feedback to operate well, which also means that the environmental context acts as a filter that selects or permits fit management control systems, while rejecting unfit ones. Thus, regardless of the functional or causal influence, management control system contingency means that in some environments particular aspects of a management control system will work well, while in others they could be relatively ineffective at best, or pernicious at worst.

We also help to inform practice by explaining how contingent management control relates to a firm's dynamic capability potential. In particular, it indicates how managers might overcome the challenge of creating and managing the ambidextrous organizational form that is deemed central to a dynamic capability. We suggest that contingent management control also requires a 'dynamic' or adaptive perspective to achieve this organizational form. That is, the configuration and use of a management control system, like a firm's processes and competences, can be changed over

time to produce behaviors and outputs in accordance with environmental expectations.

This notion of dynamic and contingent management control is also the essence of capability learning, whereby the control systems act as levers for starting, stopping and re-directing different types of learning (Winter 2000). The degree of deviation from a desired performance level provides stimuli that influence the aspirations to new competences, the level of adjustment required and the amount of organizational energy needed. These factors affect a firm's ability to adapt to changing circumstances and alter their resources and routines over time.

Furthermore, the acknowledgement that management control systems and corresponding competences should learn and adapt, helps avoid unfit legacy systems that maintain existing coordination/integration practices and keep the firm rooted to existing competences. To overcome such inertia, management control systems can be adjusted to redirect the resources and routines for attaining the coordination/integration, learning and reconfiguration needed for strategic renewal.

While this chapter highlights and explains the role of contingent management control systems in enabling dynamic capabilities, there are some limitations which provide opportunities for further research. First, this study is deliberately restricted in environmental scope, in that it focuses only on variations in velocity. Although this was intentional to illustrate the effect of a relevant environmental characteristic, it is acknowledged that this introduces a simplification. Further research might consider the effect of other environmental characteristics such as munificence (Aldrich 1979; Castrogiovanni 1991) and complexity (Emery and Trist 1965; Cannon and St John 2007) on management control system effectiveness.

In summary, the problem of achieving and using dynamic capabilities involves a number of strategic and organizational issues. By focusing on management control systems, we suggest that its scope and influence are broad enough to balance a firm's as-is feedback and to-be feedback processing. This is essential for resolving the ambidexterity demands of dynamic capability, as control systems harmonize the energies and tensions that drive and balance exploitation and exploration. This helps avoid the effects of too little feedback (to-be and as-is) that would fix a firm to its current configuration, while limiting the consequences of excessive to-be feedback that keeps the firm in a constant flux, unable to deliver value.

## NOTE

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# 2. The impact of opposing governance systems on radical innovation: insights from the dynamic capabilities view

**Michael Horn[1] and Carsten Zimmermann[2]**

## ABSTRACT

We critically examine the influence of conflicting firm-level corporate governance systems on the development of dynamic capabilities and their association with radical innovation. In contrast to linear models within the theories of innovation, case study evidence from the pharmaceutical industry suggests that architectural organization, integration, and reconfiguration capabilities, involving both internal and external resource routines, are critical for the development of radical innovation. We incorporate recent theoretical advancements within the relevant body of strategy research, thereby seeking to remedy the perceived imbalance towards uni-dimensional innovation models at the expense of more contextual characteristics in the area of firm-level corporate governance systems. Our contribution is twofold: first, we show how different firm-level corporate governance systems in the area of incentive systems are associated with integration, reconfiguration and architectural organization routines. Second, we argue that more 'American' firm-level corporate governance systems and the 'uncertainty' associated with them, drive, rather than hinder, the emergence of relatively simple routines underlying radical innovation.

## INTRODUCTION

The question of how innovation systems give rise to innovative capabilities in different industries has been a highly contentious issue in advanced industrial economies throughout the 1990s (Hollingsworth 1997; Whitley 2000). In particular, it has been argued that some firms seem to be more radical in their innovation performance, i.e. outperforming in high-technology

industries where technological paradigms are shifting. In contrast, other firms are more successful at incremental innovation, outperforming in more established industries with more stable technological paradigms (Streeck 1992; Whitley 1996; Soskice 1997; Whitley 2000, 2002). One key system that has received particular attention for influencing the incentives for innovation is that of corporate governance. O'Sullivan (2000a) argues that in the absence of corporate governance systems which support organizational control over knowledge and money, firms will not be able to develop and utilize innovation capabilities through strategic investment in organizational learning processes. Corporate governance systems determine who makes investment decisions in firms, what form of investments they make and how the return on investment is distributed (O'Sullivan 2000a).

We are particularly interested in firm-level corporate governance systems, which include management, monitoring, corporate financing, or incentive systems. Various studies have explored the relationship between different corporate governance systems on the one hand and the development of specific approaches to innovation in firms on the other (O'Sullivan 2000a; Vitols 2001a; Casper and Whitley 2002; Carpenter, Lazonick et al. 2003; Casper and Matraves 2003). According to this literature, corporate governance systems play a central role for firms in the United States that have tended to innovate radically and, in contrast, for firms in Germany that have tended to innovate more incrementally. Researchers who studied this association have argued that it must be explained through differences between types of owner control (Whitley 2000; Casper and Matraves 2003), incentive systems (Carpenter, Lazonick et al. 2003; Casper and Matraves 2003), ownership coordination (Whitley 2000), CEO decision power (Carpenter, Lazonick et al. 2003; Casper and Matraves 2003), authority sharing with employees (Vitols 2001a; Casper and Matraves 2003), or corporate financing (Carpenter, Lazonick et al. 2003; Casper and Matraves 2003). However, we are lacking in a mediator that helps in establishing precisely how firm-level corporate governance systems and innovation may be associated. We argue that such a mediator can be found in the formation and reconfiguration of routines that are at the center of firm behavior. By focusing on firm-level corporate governance systems involving incentives we try to answer two related research questions: How can we justify the development of radical innovation within firms, whilst at the same time acknowledging the high failure rate in radical innovation activity. Why has the linear and uni-dimensional character of this relationship been highlighted, whilst simultaneously the dynamic nature of this relationship is evident? One way to remedy this dilemma could be to re-examine the effects of institutional incentive systems within the paradigm of corporate governance (Hoskisson et al. 2002), taking a more contextual

research perspective. Additionally, the capability development that influences an enterprise as it actively pursues radical innovation activities has not been fully assessed, even though a deeper understanding of the development of resources and capabilities in this context would yield valuable insights in terms of our understanding of the fundamentals of innovation in the context of corporate governance.

Hence the purpose of this chapter is threefold. First, we examine the initial logic for establishing conflicting governance systems, following the exposition of Hoskisson et al. (2002) as regards the effects on corporate innovation strategies. We try to open up the 'black box' explaining the association between incentive systems and innovation. More specifically, the objective of this research is to contribute to a better understanding of how opposing incentive systems can support radical innovation characteristics.

Second, by taking a dynamic capabilities perspective (Teece et al. 1997; Eisenhardt and Martin 2000) we seek to identify the ways in which major routines are associated with corporate governance structures via corporate culture and incentive interventions. More specifically, by comparing two different governance systems (American and German), the study seeks to empirically focus on the ways in which integration, reconfiguration and architectural capabilities can be formed that interact with the formation of radical innovation characteristics.

Third, our research methodology responds to the calls for more contextual characteristics (de Rond 2003) to provide empirical evidence as to the relevance of resource-based factors within innovation. Specifically, the review within the governance literature illustrates the importance of these more profound characteristics for learning mechanisms that underlie the innovation process and the constituent elements of resources and dynamic capabilities.

We begin with a brief literature review, specifically relevant to dynamic capabilities in the context of corporate governance, emphasizing gaps and challenges in the literature. Drawing upon this review, we illustrate the methodology we employ – contrasting case analysis with elements of embedded research. Our case environments are then introduced and propositions as regards incentive systems drawn – as they relate to radical innovation. The results are then critically discussed and we conclude with suggestions for to possible future research.

## LITERATURE

In the following review, we will draw upon recent research streams in innovation and corporate governance research that provide the basis for

our investigation. However, we do not attempt to provide a comprehensive review of the corporate governance literature, nor of the resource-based perspectives. We have rather tailored the review to meet our major research aim, namely to reassess the phenomenon of radical innovation within corporate governance while building upon recent theoretical developments within the dynamic capabilities literature.

## Corporate Governance Institutions

The concept of 'corporate governance' was rarely encountered before the 1990s. The underlying problem of corporate governance as recognized by the early research of Smith (1776), Marshall (1920), and Berle and Means (1932), lies with the separation of ownership and control in the corporation. In the absence of any real consensus on the definition of corporate governance in the literature, Maw, Horsell et al. (1994) comment on a breadth of taxonomies: '[s]ome commentators take too narrow a view, and say corporate governance is the fancy term for the way in which directors and auditors handle their responsibilities towards shareholders'. For the purpose of this research, corporate governance is understood in its most expansive sense, including the societal, market, and firm-level arrangements that determine the control and management of firm assets and the pattern of interaction between different stakeholders within the firm (Lane 2003). Society-level corporate governance institutions comprise, for instance, contractual obligations, norms and values, and the frame of reference. Market-level corporate governance institutions involve, for example, industrial relations, employee representation, and the stock market. Firm-level corporate governance institutions include, for instance, management institutions, monitoring, corporate financing, or incentive systems.

Historically, corporate governance systems in the United States have differed significantly from those in, for example, Germany and other countries in the world (Walsh and Seward 1990; Gedajlovic and Shapiro 1998). One system, associated with the United States, can be best characterized by the widespread institutional ownership of shares (Useem 1996), an emphasis on equity financing (Demirguc-Kunt and Levine 2001), the existence of active markets for corporate control (Hitt, Hoskisson et al. 1996), and strong incentive systems for managers (Murphy 1999).The other, associated with Germany, can be best characterized by relatively greater ownership concentration (Gedajlovic and Shapiro 1998), an emphasis on debt and internal financing (Maher and Andersson 2002), and a lesser role for markets for corporate control as well as for incentive systems for managers (Walsh and Seward 1990). Our research will focus on an in-depth

comparison of both, taking a dynamic capabilities perspective as called for by a variety of authors (e.g. Hoskisson et al. 2002)

**Dynamic Capabilities View within Innovation**

The concept of 'innovation' has been recognized by the early research of Tarde (1890; 1894; 1901) who focused on inventions by individuals as well as Schumpeter (1911; 1939; 1942) who built on Tarde's postulate and focused on the innovative entrepreneur who, by creating 'new combinations' of productive resources, could disrupt the 'circular flow of economic life as conditioned by given circumstances'. The strategic paradigm as regards innovation has increasingly shifted away from the prevalent market-based theory of innovation in the 1980s (Kotler 1983; 1984; Baker 1985; Mintzberg 1989; Porter 1990) towards the resource-based theory of innovation.[3] The resource-based theory of innovation is based on the fundamental premise that organizational resources, competences, capabilities, and dynamic capabilities are those elements that underlie and determine a firm's capacity for innovation. More specifically, organizational resources (tangible and intangible) are assumed within this theory to provide the input that is combined and transformed by capabilities, competences, and dynamic capabilities to produce innovations. The resource-based theory of innovation has featured in the contributions of Rumelt (1984) and Teece (1986a), which initially focused strongly on technological innovation, an element that later became less prominent in favor of a general focus on strategy (Teece 1987, 1988a, 1988b; Jorde and Teece 1991; 1992; Rumelt, Schendel et al. 1994). The resource-based theory[4] has much in common with the Teece-Rumelt tradition of the resource-based theory of innovation, because it also considers many elements in the explanation of firm innovation (Mahoney and Pandian 1992; Hamel and Prahalad 1994; Teece, Pisano et al. 1997; Eisenhardt and Martin 2000; Zollo and Winter 2002). For the purpose of this research, innovation is understood as the process of dynamic capabilities enabling the integrating and reconfiguring of competences and productive resources, which can lead to competitive advantage in the form of customer benefits and/or lower costs that may in turn generate improved firm performance (Tushman et al. 2003).

Dynamic capabilities, by which firm managers 'integrate, build, and reconfigure internal and external competencies' (Teece et al. 1997, 516) are the drivers behind the recombination of resources into new sources of competitive advantage (Henderson and Cockburn 1994; Teece et al. 1997; Eisenhardt and Martin 2000). These capabilities are evidenced by the ability to develop 'antecedent strategic routines' by which the management exploits its resource base – acquires and sheds resources,

integrates them, and recombines them – to generate new value-creating strategies (Grant 1991; Winter 2003). According to Teece et al. 1997, a firm's corporate governance is argued to be associated with contextual characteristics, which include specific procedural[5] (Day 1990; Christensen 1997), structural[6] (Burns and Stalker 1961; Mintzberg 1979; Cooper 1994; Ettlie 1997; Abetti 2000; Casper and Whitley 2002), and cultural[7] (Kanter 1983; Ekvall 1991; Newbert 2005), as well as various combinations of these elements (Ettlie, Bridges et al. 1984; Dewar and Dutton 1986; Van de Ven 1986; Roberts 1988; Jelinek and Schoonhoven 1990; Dougherty and Hardy 1996; McDermott and O'Connor 2002; Huizenga 2004). Following Lawson and Samson (2001), we focus our attention on integration and reconfiguration and architectural change routines, within which we have further categorised key areas in the context of radical innovation and corporate governance, based on the earlier classifications of Eisenhardt and Martin (2000) and Teece et al. (1997) (see Table 2.1).

## METHODOLOGY

Our analysis highlights the importance of social phenomena that underly the innovation process. Furthermore, the corporate governance literature is underdeveloped in terms of its understanding of the nature of corporate governance required for innovation. In view of this, case studies were deemed the most appropriate design when dealing with complex phenomena that are poorly understood, requiring a holistic, in-depth investigation and contextually sensitive approach (Bonoma 1985; Dyer and Wilkins 1991; Feagin, Orum et al. 1991; Yin 1994).

Our data acquisition process included three key stages of activity, making use of mixed methods and triangulation to seek construct validity. Overall, a total of 42 interviews were conducted in the pharmaceutical sector to achieve a sufficient degree of insight into the innovation phenomenon. We used an inductive methodology, following the concepts and guidelines of Eisenhardt (1989) and Miles and Huberman (1994), since a contextual approach would have otherwise been inappropriate to employ.

We started with a small pilot research study in 2002 and extensive semi-structured interviews with industry experts, government officials as well as leading academics in the field, to provide a solid basis from which to embark on our research project. The use of published, governmental and archival data helped to achieve a degree of external validity. We further informed our initial findings with existing studies in order to enlarge our understanding of governance and dynamic capabilities.

*Table 2.1 Literature matrix on dynamic capabilities and radical innovation*

| | Teece et al. (1994) | Teece et al. (1997) | Newbert (2005) | Eisenhardt and Martin (2000) | Huizenga (2004) | Winter (2003) | Lawson and Samson (2001) | Zollo and Winter (2002) |
|---|---|---|---|---|---|---|---|---|
| **Integration of Resources** | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | |
| Product development routines | | | | ✓ | | | | |
| Strategic decision making | | | | ✓ | | ✓ | | |
| **Reconfiguration of resources** | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | |
| Transfer processes including routines for replication and brokering | | | | ✓ | | | | |
| Capability transfer across borders | | | | ✓ | | | | |
| Resource allocation routines | | | | ✓ | | | | |
| Synergistic resource combinations | | | | ✓ | | | | |
| Patching | | | | ✓ | | | | |
| **Gain Resources** | ✓ | ✓ | ✓ | ✓ | ✓ | | | |
| Knowledge creation routines | | | ✓ | ✓ | ✓ | | | |
| Knowledge acquisition, distribution and interpretation | | | ✓ | ✓ | ✓ | | ✓ | |
| Routines that bring external sources into the firm | | | | ✓ | | | | |
| **Release Resources** | ✓ | ✓ | | ✓ | | | | |
| Exit routines | | | | ✓ | | | | |
| **Organizational Architecture** | ✓ | ✓ | | ✓ | | | ✓ | ✓ |
| Changes in architecture | | | | | ✓ | | | |
| Changes in knowledge components | | | | | | ✓ | | |
| Capability deployment | | | | | | ✓ | | ✓ |
| Capability upgrading | | | | | | ✓ | | ✓ |
| Structures and systems | | ✓ | | | | | ✓ | |
| Culture and climate | | | | | | | ✓ | |

*Table 2.2 Selection criteria for incentive system characteristics*

| Incentive system characteristics | |
|---|---|
| 'High-powered' | 'Low-powered' |
| • Highly variable<br>  • >50% of total remuneration<br>  • Linkage to net earnings, share price<br>• Highly equity-based<br>  • Emphasis on stock options, employee shares, stock appreciation rights | • Moderately variable<br>  • <50% of total remuneration<br>  • Linkage to earnings, personal targets<br>• Moderately equity-based<br>  • Emphasis on bonus payments, employee shares |

We then carried out 42 semi-structured, face-to-face interviews with firms to explore the integration and reconfiguration behavior that eventually affects radical innovation within the pharmaceutical sector. In order to provide external transparency as well as a measure of reliability, all interviews were protocolled and later transcribed. Since strategy is increasingly recognized as inextricably interwoven with the internal dynamics of an organization, invariably involving human beings and their socio-cognitive perspectives, this approach seemed appropriate (Pettigrew et al. 2002). Though our interviews had an open-ended characterization, we organized our questions around key topics within the governance literature, including incentive systems and governance structures. As regards the selection criteria for corporate governance institutions in the area of incentive systems, we distinguished between 'high-powered' and 'low-powered' incentive systems (Table 2.2).

We then engaged in embedded research, acting as informants researching detailed practices, as proposed by Johnson, Melin and Whittington (2003) as well as Balogun, Huff and Johnson (2003). Facilitation, one of the prerequisites of such a research design, was conducted by a 'gate-keeper' responsible for academic reflection as well as rigor in data collection and interpretation. The process included group meetings as well as reflection cycles that challenged current values within the company, encouraged dialog and reflected upon assumptions and procedures (Torress and Preskill 2002). The focus of these interviews was the factual experience of each individual with innovation cases and their opinion of resource development and capability configuration. In this final stage we again relied on in-house material, consulting presentations and internet-based data sources.

Building upon these primary and secondary sources, this chapter seeks to explore some of the micro-level routines for the evolution of dynamic

capabilities affecting radical innovation behavior. To analyse our data, we first created notes on the emerging topics regarding dynamic capabilities and radical innovation. Following Miles and Huberman (1994) a number of case study narratives were created on the basis of our most promising interviews. We then coded our raw interview data according to these themes and the topics highlighted earlier in the literature. We relied on explicit wording in our coding to limit interpretive bias (Salk and Shenkar 2001). We used this coding for triangulation with data acquired from informants that were well positioned to have specific knowledge in a particular area, as in the case of industry experts. When reviewing theoretical developments within this chapter, the approach was iterative and inductive, with a focus on innovation routines developed by companies. We also touched upon governance structures, incentive systems and contextual environments. This approach allowed for an observation of innovation on a real-time basis with an a posteriori reconstruction of events that led to the current status of internationalization. Following Giddens (1989), the reconstructions of past events and cases should be consistent with a number of criteria, among them a strong intimacy with the detailed area of research providing an accurate process of events, using verbatim quotations to illustrate and support specific events and occurrences.

## THE CASE ENVIRONMENT

### The Pharmaceutical Industry – Importance and Complexity

The importance of the pharmaceutical industry lies not so much in its absolute size, but rather in the fact that it is an industry that is highly dependent on innovation activities. While research and development (R&D) expenditure as a percentage of sales was on average 8 per cent in 1980, it grew to 17 per cent by 2005. In addition, the pharmaceutical industry has been subject to continuous innovatory change, with recent developments comprising a rapidly changing scientific base, diverse research collaborations, and a shift towards biotechnology firms as a source for innovation. More specifically, since the early 1980s, biotechnological research techniques have been displacing traditional 'chemical' capabilities such as chemical compounds screening and rational drug design. Further, developing research collaborations with biotechnology start-ups and research laboratories in academia have helped diversify the pharmaceutical firm's research portfolio across a number of research areas. For example, Penan (1996) identifies 15 distinct research programs to fight Alzheimer's disease, each of which is supported by a different constellation of university departments, large

pharmaceutical firms, and in some cases, biotechnology firms (Casper and Matraves 2003). Finally, biotechnology has gained in importance as a source of innovation with 70 per cent of compounds currently in clinical development originating from biotech/academic centers.

Since the 1980s, pharmaceutical industry dynamics have become more complex, mainly due to radical changes in the nature of the innovation process, primarily in the target identification/validation as well as the development/clinical phases. These changes have caused shifts in firm strategy, especially with regard to scaling the marketing and sales functions, in order to be able to compete effectively. This leads us naturally into a discussion of how incentive systems can be used to support a strategy, and our analysis highlights the importance of incentive systems associated with creating capabilities in the drug innovation process. In other words, we analyse how the internal resources of the firm are leveraged in response to the external market dynamics, thereby determining determines R&D configurations. It is these factors that make an exploration into the pharmaceutical industry vital.

### Case Profiles

> We believe that our long term compensation program is better than the stock option program of a listed company because it is dependent on an intrinsic value, the economic value added, and not the views and speculation of the stock market. Just because someone thinks you are good, this does not mean you are really good or bad. We believe that it is closer to reality and that it minimizes volatility; that it is more solid. (PHARMACO 2, Member Management Board, 35:1)

> I believe that incentives are not leveraged sufficiently. Here in [headquarters] at least, this is partly caused by the environment. When I was in Canada, we relaunched the performance reward system. And they came with a corporate guideline, that 70 per cent needed to be individual and 30 per cent needed to be company objectives. In Canada, when I was talking to my management team, the head of marketing, the head of sales, I said, personally I think it is 100 per cent company. Because if you are not responsible for the success of this company who the hell is? When they implemented it here, making 30 per cent company performance was a big step. For North America, because it was the same in America, it was a big step back actually and to a large extent ignored. (PHARMACO 2, Senior Manager, 37:3)

## DYNAMIC CAPABILITIES AND CORPORATE GOVERNANCE

In the following sub-sections we will compare and contrast the two cases of PHARMACO 1 and PHARMACO 2 along three key routines: strategic

**Company overview and governance structure of PHARMACO 1**

Company PHARMACO 1 focuses on molecular diagnostics and nucleic acid sample handling, separation and purification in its main markets which, in 2003, comprised the United States, Germany, Japan, and Switzerland. In 2003, PHARMACO 1 with its 1500–2000 employees generated earnings before interest and tax (EBIT) of €30–60M on total net revenues of €250–300M.

PHARMACO 1 can be identified as being most strongly associated with 'American' characteristics as regards the firm-level corporate governance incentive systems, with relatively high variability in employee remuneration and a high proportion of equity components for upper levels in the hierarchy. In addition, every employee received stock options. PHARMACO 1 employees in 2003 accounted for 14 per cent of all shareholders, of which 58 per cent of employee shares were held by officers and directors with the Chief Executive Officer (CEO) alone holding 7 per cent.

**Company overview and governance structure of PHARMACO 2**

PHARMACO 2, a family-held firm, is focused on the research, development, and sales of human pharmaceuticals, with its core markets being the United States, Canada, Mexico, Japan, and Germany. In 2003, PHARMACO 2 with its 30 000–35 000 employees generated an EBIT of €500–1000M on total net revenues of €7000–8000M.

PHARMACO 2 can be identified as being most strongly associated with 'German' characteristics as regards the firm-level corporate governance incentive systems. PHARMACO 2 exhibited relatively low variability in employee remuneration and a low proportion of equity components. Since 2000, between 10 and 20 per cent of the overall compensation has been variable for the top 300 employees of the firm in the three largest countries; United States, Germany, and Japan. For management levels below the top 300 employees there was a bonus system, so that around 15 per cent of the overall compensation was variable. However, conflicting values as well as market forces seem to drive the company in their pursuit of a balanced portfolio of incentive systems.

decision making, resource allocation and organizational architecture. These include integration dynamics as well as reconfiguration and organizational routines that are hypothesized to impact on radical innovation behavior of these enterprises. According to our empirical data those three key routines seemed to be most critical for explaining the association between firm-level corporate governance systems, such as incentive systems, and innovation processes. Other routines in the areas of resource integration, release, reconfiguration, and gaining were found to be insufficiently strong enough to make a claim for either relevance or non-relevance regarding an association between corporate governance systems and innovation.

## The Case of PHARMACO 1

PHARMACO 1 exhibits a relatively strong tendency towards top-down strategic decision making, with a relatively centralized mechanism for allocating resources, together with an organizational architecture and culture that was relatively strongly oriented towards the stock market. In the following discourse, we will expand on each one of the three organizational routines.

### Strategic decision making routines

PHARMACO 1 exhibits a relatively strong tendency towards a top-down process organization as can be illustrated by the formulation and implementation of strategy, which often seems to follow a complex but linear process that reflects a key capability within the company. In a first step, the strategic goal is formulated by the CEO and selected top management. The strategic goal is then translated into a medium-term operational plan with requirements for individual units of the company. Those requirements are then translated into requirements for individual employees. Finally, attempts at measuring the degree of implementation of those requirements took place and incentives were granted accordingly. This strategy implementation process can be regarded as an integration routine, which constitutes a dynamic capability for the company. The following comments by management support the importance of this process:

> I mean, our strategy is derived from our mission, which we hung up on the walls of this building. We then have those strategy weekends to discuss where we want to go and how we are going to get there. The result is a medium-term plan with a list of to dos, dak, dak, dak, dak – and everyone knows exactly what he has to do. (PHARMACO 1, CEO, 48:21)

> The CEO sits down and reflects what his goals are. The requirements that [the CEO] gives to his direct reports are then broken down – in principle they are

> broken down to every single employee. (PHARMACO 1, Member Executive Committee, 50:3)

> Once we have defined that [strategic goal] for a specific period in time, we break it down for individual units of the company. The resulting strategic requirements then have to be implemented by business managers responsible for their units. (PHARMACO 1, Member Executive Committee, 50:1)

Highly variable, equity-based incentive systems appeared to be associated with a relatively strong tendency towards a top-down process organization as a basis for integrating resources. More specifically, interviewees seem to suggest that top-down formulation and implementation of strategy was necessary for meeting managers' targets, hence avoiding non-realization of their potential income, especially important since management were among the largest individual shareholders of the firm. For example, the CEO held approximately 2 per cent of all shares, making him the third largest individual shareholder:

> Our strategic goal is broken down into operational plans and budgets for individual units. Incentives for the responsible managers are relationshiped to those operational plans and budgets. So the strategy is really broken down from the top to every single employee. Like this we can swing the company into the defined strategic course, much like an orchestra, where the conductor shows which way to go and the musicians follow and play in harmony; or like compass needles, which adjust themselves towards the magnet. (PHARMACO 1, Member Executive Committee, 50:2)

> The CEO himself is interested that we as a whole can achieve an excellent performance for shareholders. (PHARMACO 1, Member Executive Committee, 50:2)

**Resource allocation routines**

PHARMACO 1 exhibited a relatively centralized and vertically configured structural organization as a basis for allocating resources. This can be illustrated by the structure of management institutions, which can be viewed as a vital dynamic capability for PHARMACO 1, characterized by three steps. First, the management 'institution' embodied by the CEO seemed to be relatively strong, with the CEO able to unilaterally set the requirements for heads of the individual businesses who he could dismiss or appoint by himself and was not dependent on their vote on decisions that were unrelated to their businesses. More specifically, the management board comprised only the CEO and the functional Heads of Finance, R&D, and Marketing who did not carry direct responsibility for profit and loss. One level further down, the 'executive committee' not only comprised

the members of the management board but also the heads of the firms' businesses who did carry direct responsibility for profit and loss. With PHARMACO 1's members of the management board being functional heads who did not carry direct responsibility for profit and loss, the CEO was able to act as *primus* vis-à-vis the heads of the firm's businesses:

> We do not manage the firm according to the classic corporate governance, which [German] lawmakers had in mind. Rather, we have an executive committee, which partly consists of members and non-members of the management board. In the management board there are only myself and the functional heads of Finance, R&D, and Marketing . . . While this is not what the legislature originally intended, I think it works much better. The heads of the individual businesses take their responsibility much more seriously. I believe that a consensus-oriented system of corporate governance is actually outdated. (PHARMACO 1, CEO, 48:2, 48:9)

> I can control the performance of the heads of the firm's businesses. I have this SAP dashboard on my screen and can see the key financial indicators and if they get red I can click to break them down and find out about the cause. First thing when I come into my office every morning is to check those indicators. If anyone is red, I would call the responsible head of the respective business to see what is going on. (PHARMACO 1, CEO, 48:14)

> As a result of our corporate governance, our CEO, who is also Chairman of the executive committee, is probably stronger than an average German corporation's CEO. We have mirrored the structure of American corporations. I mean, we are listed at NASDAQ and are subject to SEC regulations; therefore we have a structure that is very much American. (PHARMACO 1, Member Executive Committee, 49:3)

Management 'institutions' apart from the CEO seem to be structured to promote individual-level responsibilities. This is an organizational capability that deserves special attention. The degree to which there were overlapping responsibilities seems to be relatively small. Rather, there exists a precisely defined responsibility-scheme on an individual level:

> There are very clear responsibilities for the people sitting on the executive committee. We could vote, however, so far we have never done that. (PHARMACO 1, Member Executive Committee, 47:24)

> Actually, you won't find it a practice at [PHARMACO 1] that the responsibility for decisions is carried from one committee to another and back to the first one. There are discussions going on but only to inform someone who is responsible to make a decision. (PHARMACO 1, Senior Manager, 100:1)

> It is a short-term objective to get rid of any remaining overlaps of responsibility in the organization below the executive committee. For my division this was

> already achieved, there is no need for consensual decision making anymore. (PHARMACO 1, Member Executive Committee, 47:25)

**Organizational architecture routines**

Highly variable, equity-based incentive systems seemed to be associated with a culture at PHARMACO 1 that is strongly oriented towards the stock market. A concern for short-term optimization and shareholders was again understood to be supportive of meeting managers' targets, hence avoiding non-realization of their potential income:

> Incentive systems do play a role – I see a danger that we have too much short-term thinking. (PHARMACO 1, Senior Manager, 28:17)

> Every employee has stock options – you probably learned already that every employee who starts here is granted stock options. The main function is to remind employees who the owners of the company are. (PHARMACO 1, Member Executive Committee, 47:5)

## The Case of PHARMACO 2

In contrast, PHARMACO 2 is found to exhibit a relatively strong tendency towards consensual strategic decision making, a relatively decentralized and horizontal mechanism for allocating resources, as well as an organizational architecture with a culture that was relatively strongly oriented towards a wider group of stakeholders. Again, it will be useful to expand on each one of the three organizational routines.

**Strategic decision making routines**

Concerning strategic decision making, PHARMACO 2 exhibits a relatively strong tendency towards a consensual process organization as can be illustrated by the formulation and implementation of strategy. The implementation of strategy often seems to follow a three-step process, which can be identified as a dynamic capability to integrate resources. First, the necessity for a specific strategy was recognized by top management. Second, management created a pilot in one unit of the firm. Finally, based on the success of the pilot, management discussed with employees whether and how the strategy could be implemented in their respective units, which frequently led to a compromise:

> For example, we realized that a balanced scorecard is advantageous; however, we would never force our worldwide subsidiaries to implement it. Rather, we would implement it in headquarters and then show it to them, trying to convince them to accept it. In Anglo-American firms it would be different – there

> would be an order to implement it. There are, of course, some cases where our federal, consensual approach has disadvantages: we have a multitude of analysis methods, machines, computer systems, softwares, procurement policies, etc. (PHARMACO 2, Senior Manager, 39:2)

> We [management] rolled up our sleeves, a small team and myself, and worked on the production machines together with employees out there. And then they said: 'Oh, yes, I always saw this problem, this never really worked, this was crap from the beginning on'. And then we said: 'You may change it, you may, and we help you'. . . . And we convinced them, and slowly and gradually from the bottom-up we developed this, and finally withdrew from the manual work. (PHARMACO 2, Senior Manager, 31:3, 31:4)

> I think it is less top-down here. [. . .] Pfizer would say: 'Pfizer is active in 65 countries'. We cultivate the idea that we are many companies, which cooperate in a loosely coupled network. This sometimes leads to frictional losses. (PHARMACO 2, Senior Manager, 38:4)

**Resource allocation routines**

Concerning structure, PHARMACO 2 exhibits a relatively decentralized and flat structural organization as a basis for allocating resources. This can be illustrated by the structure of management institutions. First, the management institution of the CEO seems to be relatively weak with the CEO only able to multilaterally set the requirements for the heads of the individual businesses. This reflects the fact that the heads of the firm's businesses sit on the management board and it is only the supervisory board which can dismiss or appoint members of the management board; moreover, due to the legal principle of collegiality, the CEO is dependent on their vote in the management board as regards decisions unrelated to their businesses:

> We are a 'collegiate organ', and accordingly the members of the management board are jointly responsible vis-à-vis the shareholders for the company performance. This is so and will stay so. (PHARMACO 2, Member Management Board, 35:3)

> There is a casting vote for the CEO, however, it is not used, this is not necessary as we indeed make our decisions consensually. (PHARMACO 2, Member Management Board, 35:3)

> Well it has maybe to do with our history. The country units used to have a lot of autonomy. There was the term of 'The Seven Lawless'; of course we had committees here in headquarters at that time, the 'Central Pharmaceuticals Conference'. And after things were discussed, decided, and recorded in writing there and the minutes had been sent to the seven countries' managements and there was something that they did not like, they simply would pick up the

> phone and call the CEO to make sure this was turned around by 180 degrees. (PHARMACO 2, Senior Manager, 34:13)

> The members of the management board – we call this group the 'company leadership' – are individually responsible vis-à-vis the supervisory board. We as a team are responsible towards the shareholders. And the Speaker [CEO] is *primus-inter-pares*, he moderates the meetings, if he is not there this is done by the deputy Speaker. So basically, this is a team approach, much like the CEO according to the German corporate law. He is not an American CEO and we like it this way. (PHARMACO 2, Deputy CEO, 32:1)

Interestingly, management institutions apart from the CEO seem to be structured to promote group-level responsibilities. The degree to which there are overlapping responsibilities is high. Many responsibilities appear to be carried by committees. We argue that this routine to reconfigure resources is less linear and implies conflicting values within the company, with the outcomes of such conflicts eventually driving the decision-making process:

> We have a management team of six colleagues here in headquarters plus nine leaders of the plants, this is the operative part. We meet four times per year in the [. . .] Committee. This is an alignment platform; we are the leadership of this network, they on the operative part, and us on the strategic part. And we have a going concern, the improvement of the network. We discuss everything together, all data is reported there. We create a detailed report based on the data and send it to the country subsidiaries for comments; they then send the comments back and we discuss it in the [. . .] Committee. (PHARMACO 2, Senior Manager, 31:7)

> You know him as well, Professor Malik, he said: 'the matrix organization means death for the company'. He may be right because responsibility is torn apart. However, I cannot imagine anything else. I believe that one can get along very well with dotted lines. (PHARMACO 2, Senior Manager, 33:10)

> There is a 'Quality Management Team' (QMT) in which the different subsidiaries' heads of quality operations sit. It rejoins every month and discusses up to 30 topics. . . . I tend to call it the quality government of [PHARMACO 2]. If this team identifies a need to focus on a specific topic, they create a QET, a 'Quality Expertise Team'. This team gets a defined task and reports and delivers to the QMT. Sometimes we have to transform the QET into a permanent team, a 'Quality ad hoc Group'. (PHARMACO 2, Senior Manager, 39:4)

**Organizational architecture routines**

Low variability in equity-based incentive systems appears to be associated with a culture that exhibits no significant stock market orientation. More specifically, interviewees suggest that a concern for long-term optimization

and the presence of a wider group of stakeholders is supportive of meeting management's expectations of decision effectiveness. The following comments by management support this notion:

> Quarterly reporting is a problem if you are monitored by the stock market. If you take into consideration how sensitive the stock market has reacted toward every company news release during the past two years. If you announce nowadays a decrease in revenues and profits for 2004, your share price may fall up to 20–30 per cent. And if you add on top of this relationship the stock option programs of management to the share price, you are confronted with an association of market signals and motivations. This can keep a company from focusing on the important, long-term goals. (PHARMACO 2, Deputy-CEO, 32:16)

> Especially because of share and stock option programs you get a very strong element – the share price. You can influence it through activities or information on what you do. The result can possibly be a distortion, which, in the long run, can be better for the value of the stock option than for the company. This problem is now under discussion, I believe we do not have a solution yet. I believe it is indeed positive that things are differently for us. (PHARMACO 2, Deputy-CEO, 32:17)

## ASSOCIATION OF DYNAMIC CAPABILITY CHARACTERISTICS WITH RADICAL INNOVATION

We now turn to the association of dynamic capability characteristics with radical innovation for both cases within our research framework. Particular attention has been paid to the impact of gaining and releasing productive resources and competences as well as the impacts of strategy formulation routines on radical innovation.

### The Case of PHARMACO 1

Here we seek to establish an association between specific routines and radical innovation characteristics. We argue that top-down strategic decision making, a relatively centralized and steep mechanism for allocating resources, as well as an organizational architecture with a culture that is strongly oriented towards the stock market, is associated with a more radical approach to innovation. Within PHARMACO 1, interviewees appear to perceive a top-down process organization to be essential for a more radical approach to innovation. More specifically, interviewees seemed to suggest that top-down formulation and implementation of strategy allowed for the gaining and releasing of productive resources and competence. Gaining via the entering of business areas, e.g. through

mergers and acquisitions (M&A), in-licensing, combination of technologies and markets in a new way; releasing via the exit of business areas, e.g. through spin-offs, discontinuation, or sale. This process can be categorized as a dynamic capability, based on learning and reflection cycles:

> But you know that's our management's strategy: first of all to grow in-house organically by betting on the existing techniques and products and on the other hand growing by in-licensing and M&A – for example, we acquired [company A] in [country A] in 2001, [company B] in [country B] in 2002, and [company C] in the [country C] in 2002. (PHARMACO 1, Senior Manager, 41:20)

> The company has always been good at entering new business areas thanks also to its visionary leadership. The first idea, which led to the foundation of the company, was really radical, that was 'Columbus'. In the beginning, I did not think it would fly. I used to work for another company at that time. When we heard of [PHARMACO 1], we thought they were nuts. However, when the first numbers were published after the IPO we thought: my God, how can you earn so much money with this! That was really radical. Later on, there were radical things like the [. . .], the [. . .], or direct distribution via the internet. There were also other areas where we took a radical approach by catapulting the company into areas we did not know anything about; simply driven by the idea to create options for the future. That was quite experimental, like a board game – we made some bets. (PHARMACO 1, Member Executive Committee, 49:10)

> As I said, we have spun out this research department, this research company. But this company that spun out, they fired quite a few people because they could not afford it. (PHARMACO 1, Senior Manager, 41:24)

> Management decided to close the [business line A] site in the [country A] in 2002. Also, they sold the assets of the acquired and developed [business line B] business to [company A], an animal health company, as they were not considered core to our strategic direction any longer. (PHARMACO 1, Senior Manager, 100:3)

> The direction, for example to look into nanotechnology, is not proposed by employees but by top management. (PHARMACO 1, CEO, 48:18)

Interviewees appear to perceive a centralized and steep structural organization to create the conditions for a more radical approach to innovation. More specifically, interviewees seemed to suggest that management institutions that involved a strong CEO and individual-level responsibilities allowed for the gaining and releasing of competences and productive resources: As members of the management board suggest:

> The CEO and other members of the executive committee have substantial knowledge of the research we are doing as well. They read the relevant publications. They sometimes come up with ideas for totally new business areas and

> drive them forward – take for example molecular diagnostics or nanotechnology. (PHARMACO 1, Senior Manager, 100:4)

> Structures, which weaken an individual's responsibility, the delegation into committees – this makes it difficult to create innovations. Whenever you emphasize and reward an individual's responsibility, of course this is easier! (PHARMACO 1, Member Management Board, 30:12)

Our interviews also suggest that there is a non-direct, but stringent association between specific routines and more radical innovation characteristics, characterized by an emphasis on simple processes, e.g. in piloting, basic research, market research, production, and development:

> In a fast moving market like ours, which is dominated by radical innovations – I mean, this is only natural as it is not a mature industry like car manufacturing or so – you have to try to innovate radically. And to do so I think you need to give freedom to employees, space to be creative; you must not define every little process and write a SOP [standard operation procedure]. This is key to perform well. (PHARMACO 1 Senior Manager, 100:2)

> For the radical innovation we say: well, this is the topic, what could be in it? We gave them [external competence carriers] the topic and I have no idea what they will come up with. (PHARMACO 1, CEO, 48:19)

> We have one department called basic research. They do not have the task to develop new products but new technologies that can be leveraged into many products. Things where we don't know today how much profit we could possibly make out of it in the future. This is why we call it basic research. We have deliberately allocated resources in a way that a group of people can work on a project where we don't know what the prospects are. (PHARMACO 1, Senior Manager, 46:2)

> Those radical innovation projects, which we do – we just simply let people try things out, this is very exciting; it is a reward for people if they did well on the standard projects. (PHARMACO 1, CEO, 48:18)

> You have to make sure that you work 80 per cent incremental or project-based and the rest radical. The radical innovation is facilitated by having skunkwork structures in interesting areas. You have to create freedom and scope for development for radical innovations to take place. This is our challenge and we deal with it by having creativity teams and creativity workshops. (PHARMACO 1, CEO, 48:17)

## The Case of PHARMACO 2

We argue that consensual strategic decision making, a relatively decentralized and flat mechanism for allocating resources, as well as an

organizational architecture with a culture that was relatively strongly oriented towards a wider group of stakeholders, is associated with a less radical approach to innovation. First, interviewees perceive a consensual process organization to create the conditions for a more incremental approach to innovation. More specifically, interviewees argue that consensual formulation and implementation of strategy allowed for the integrating and reconfiguring of competences and productive resources, i.e. the continuous development of business areas, e.g. through the implementation of compliance or efficiency improvements:

> Take the computer validations compliance case – where the law demands a corporate philosophy; this led to problems with management of the large countries, like Germany, US, which said: we have our own, and they are equally good, where's the benefit for us? We found a – we tend to speak of a typical '[PHARMACO 2] solution' – we found ways to harmonize the dissonances. That's usually a compromise, very typical. (PHARMACO 2, Senior Manager, 39:3)

> And we came forward with a suggestion here and one there, small things, nothing big – but we [management] showed it to the shop floor personnel, and it worked. And slowly paths were emerging, the organization reacted to this program [worldwide efficiency improvement in production], and there was some support. And we convinced them, and slowly and gradually from the bottom-up we developed this, and finally withdrew from the manual work. (PHARMACO 2, Senior Manager, 31:4)

Second, interviewees highlighted the decentralized and flat structural organization as a major underlying support for a more incremental approach to innovation. More specifically, interviewees identified management institutions that involved a weak CEO and group-level responsibilities as allowing for the integrating and reconfiguring of competences and productive resource:

> The decision to continue or discontinue a development project is decided by the respective responsibles. I am only involved at a later stage if there is a lot of money involved. I listen to the specialists. I do this. And at the end there are different opinions, things are not black or white and we have to discuss. Of course we should hit the switch as soon as possible; however, there are usually ideas to repair it, to change objectives, to look at it again, make this or that change. One takes the bait easily. People love their projects, they believe in their projects. This makes it so hard to have the courage to hit the switch and start a new project instead. (PHARMACO 2, Senior Manager, 30:8)

Third, interviewees appear to perceive a culture that exhibits no significant stock market orientation as creating the conditions for a more

incremental approach to innovation. They suggest that long-term optimization and stakeholder focus allowed for the integrating and reconfiguring of competences and productive resources. The argument of the senior management supports this notion:

> We don't have this credo like other companies to reorganize everything every one or two years. For us there were more discrete events, after five years or after ten years. At least in the past; in the last few years this has also changed a bit. . . (PHARMACO 2, Senior Manager, 30:11)

> We have more conservative and long-term values, as a matter of fact. This 'going in and going out' is not so much our way of doing things. Rather, we try to think of something for the long-run. And if we fail this is regarded as something negative and we will not say: it was our pleasure, what's next? (PHARMACO 2, Senior Manager, 28:16)

> In terms of HR the risk is lower if someone is known in the company than if you employ someone from the outside. . . . This is a principle that is very, very widely accepted here. This makes it also easier to attract someone as this person knows that from the moment on that he is employed people will think about his further development. It is part of our culture to continuously develop people over the long run, also to give them a chance, instead of creating a high turnover. (PHARMACO 2, Senior Manager, 36:8)

Our interviews also suggest that there is a non-direct, but stringent association between specific routines and less radical innovation characteristics, characterized by an emphasis on complicated processes, e.g. in customer relationship management or production. The following comments reflect on how the production portfolio was restructured:

> I got a bunch of, two of my Canadian buddies who helped me to do it in Canada; I got them into headquarters [to reshape customer relationship management]. I got a good guy from Argentina who had worked for the guy from Mexico. So we got the people who intimately knew it and also were believers. A small team under the philosophy: 'start running, we will likely make one or two mistakes and we will clear them up afterwards'. Which I believe is very contrary to what the normal standard in this company is. You know they want to do a project; they plan it to the details. They spend years planning for 120 per cent perfection and obviously they never get there. (M1, Senior Manager, 37:1)

> Here in [headquarters], one effect of our program was that they [production management] had a look at their portfolio and thought 'I have to do something differently' and then they started to think about it. They eventually found out that they had to reorganize their machinery in order to improve efficiency, something which every entrepreneurial-thinking person would do. I mean, you also don't drive by car, then switch to a bike, then train, then bike again. (M1, Senior Manager, 31:9)

## CONCLUSION

Our comparative case analyses suggest that firm-level corporate governance institutions and concomitant incentive systems that are most strongly associated with 'American' characteristics, as illustrated at PHARMACO 1, can be understood to interlink with, if not drive, the faster development of routines, leading to radical innovation dynamics. Among these, we observe a focus on gaining and releasing productive resources and competences. These are, for example, entering of business areas, e.g. through M&A, combination of technologies and markets in a new way; or the exit of business areas, e.g. through discontinuation, outsourcing or sale. In contrast, firm-level corporate governance institutions and incentive systems that are most strongly associated with 'German' characteristics, as illustrated in PHARMACO 2, enhance the development routines that drive less radical innovation characteristics. These are a focus on integrating and reconfiguring productive resources and competences, as for example, the continuous development of business areas, e.g. through the implementation of IT, the change of the internal division of labor, or the refinement of the sales process.

An interesting question is how the concept of dynamic capabilities can contribute to explaining this phenomenon? As presented by the rich interview data of PHARMACO 1, radical innovation characteristics focus on gaining and releasing productive resources, whilst simple process routines are enforced. In contrast, PHARMACO 2 focuses on integration and reconfiguration routines, e.g. through change of the internal division of labor and the refinement of sales processes. Decision-making processes at PHARMACO 2 are rather complex and emphasize decision matrices as well as detailed decision hierarchies. It follows that there are a variety of propositions as to how a firm-level corporate governance institution most strongly associated with 'American' characteristics or with 'German' characteristics can be understood to be associated with specific routines, and hence innovation characteristics. In this respect, we highlight two contrasting routines, reflecting how companies develop and reflect upon strategic decision making. Further, we argue that resource allocation routines are vital in the companies' urge for increasing the generation and deployment of ideas. This includes techniques for the configuration of new capability clusters that strengthen the innovation process by incorporating organizational structure routines. We also argue that these techniques are persistent routines and hence can be categorized as a key dynamic capability, which in turn, supports the development of sustainable competitive advantage.

## LIMITATIONS AND FUTURE RESEARCH

Even though the results of this study have a robust methodological foundation, our study has a number of limitations. First, our sample has been intentionally biased towards companies within the pharmaceutical industry. Further, the empirical sample has a limited scope and hence the triangulation opportunities were relatively restricted, which is a common problem when conducting inductive case-based research (de Rond 2003) and the limitation involved in only two case studies does not allow for a wider generalization. Another limitation relates to our relying on interview data that encapsulates the retrospective, already digested, recollections of our informants. The bias here lies in the possibility of informants subsequently, whether consciously or unconsciously, adapting their recollections of the events that influenced their innovation behavior.

Future research might therefore be directed towards a longitudinal analysis of the governance structures of companies, which could yield further insights into the resource allocations involved in the innovation experience. Thus a longitudinal study might be undertaken using a five-year framework to track 50 firms throughout this region (and others) as they undertake their innovation activities. The use of network questionnaires based on LaBianca, Brass and Gray (1998) might also highlight areas such as trust, affection, as well as communication frequency, which could then be triangulated with interview data. This would allow deeper insights into the skills and learning needs of 'American' versus 'German' firms as they manage the 'uncertainty' concomitant with innovation actions, which in turn would help in the development of more targeted policy interventions. Further, more pluralist theories might shed additional light on the development of dynamic capabilities as well as yielding further strategic insights into the factors involved in developing a more dynamic capabilities-based view as regards the innovation behavior of enterprises.

## NOTES

1. Harvard Business School, Harvard University; Judge Business School, University of Cambridge, Trumpington Street, Cambridge, CB2 1AG, United Kingdom.
2. Queens' College and Judge Business School, University of Cambridge, Trumpington Street, Cambridge, CB2 1AG, United Kingdom.
3. See Teece and Pisano (1994) for an analysis of the potential conflicts between the market-based and the resource-based theories.
4. For the purposes of this research, the resource-based theory is understood to incorporate the dynamic capabilities-based theory as dynamic capabilities are considered to be a specific form of resources. It is acknowledged that differences exist with regard to the basis for competitive advantages and the subsequent creation of performance, as reflected by

Ricardian, Monopoly, or Schumpeterian rents. Whereas the resource-based theory in its narrowest sense focuses on *content* as the basis for competitive advantages and the subsequent creation of performance, as reflected by Ricardian or Monopoly rents, the dynamic capabilities-based theory focuses on *process* as the basis for competitive advantages and the subsequent creation of performance, as reflected by Schumpeterian rents.

5. Procedure is understood as the physiology of the firm (de Witt and Meyer 2003) and as such is an abstraction, a theory of the business, often inferred by reviewing a pattern of managerial decisions. It can be considered more fluid, i.e. more changeable over time, than the categories of structure and culture.
6. Structure is understood as the anatomy of the firm (de Witt and Meyer 2003) and as such is an artifact, a visible determinant of the practice of business, often designed to orient, limit and motivate managerial decision-making. It can be considered less fluid, i.e. changeable over time, than the category of procedure and more fluid than the category of culture.
7. Culture is understood as the psychology of the firm (de Witt and Meyer 2003) and as such is a system of shared values and norms that define appropriate attitudes and behaviors for organizational members. It can be considered to be less fluid, i.e. less changeable over time, than the categories of procedure and structure.

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# 3. Shaping the context for learning: corporate alignment initiatives, environmental munificence and firm performance

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## ABSTRACT

In this chapter, we build on organizational theory and dynamic capabilities to explore the link of corporate initiations to environmental conditions and firm performance. We especially consider concrete and manageable corporate alignment initiatives rather than learning behaviour per se. By integrating the environment market context into the analysis we are able to engage in a quantitative and longitudinal field study to extract existing empirical studies. Our findings reveal a fundamental dilemma that give firms a Hobson's choice between suboptimal alignment behaviors that could be called 'flat slopes' and 'steep slopes'. We conclude with a discussion of the results and proportions for future research.

## INTRODUCTION

Organizational learning, defined as an organization's capability to create, disseminate, and act upon generated knowledge, has been regarded as a necessary dynamic capability for firms seeking to sustain a competitive advantage (Barney 1991; Teece, Pisano, and Shuen 1997). March (1991) suggested that 'exploration' and 'exploitation' are two fundamentally different learning activities between which organizations divide their attention and resources. Whereas exploitation refers to 'learning gained via local search, experiential refinement, selection and reuse of existing routines', exploration refers to 'learning gained through processes of converted variation, planned experimentation and play' (Baum, Li, and Usher 2000, 768). While organizations' direct influence on these learning processes is limited, managers

may align the organizational context to enable exploration and exploitation (Goold, Campbell, and Alexander 1994; Lechner 2006). Both learning types, however, were found to require fundamentally different structural and strategic contexts (Ancona, Goodman, Lawrence, and Tushman 2001; He and Wong 2004). There is a fundamental trade-off between aligning the organization to exploit existing competencies and exploring new capabilities (Levinthal and March 1993; Floyd and Lane 2000).

Management research has provided three contrary recommendations on how corporate leaders should position their organization with regard to exploitation and exploration (Adler, Goldoftas, and Levine 1999, He and Wong 2004). First, some scholars argue that organizations must choose between distinct organizational configurations that provide for either exploitation or exploration. From this perspective, mixed strategies and structures are expected to lead to inconsistent configurations and poor performance (Wernerfelt and Montgomery 1988; Doty, Glick, and Huber 1993; Ghemawat and Costa 1993). Conversely, a second group of researchers argues that organizations need to be aligned to both exploitation and exploration (March 1991; Levinthal and March 1993; Burgelman 2002). Superior performance is predicted for the 'ambidextrous' firm that balances exploitation and exploration, rather than for those firms emphasizing one at the expense of the other (Tushman and O'Reilly 1996; Gibson and Birkinshaw 2004). Finally, a third group of researchers advises firms to alternate between different structures and strategies, with the objective of temporarily cycling through periods of exploitation and periods of exploration (Brown and Eisenhardt 1998; Nickerson and Zenger 2002; Siggelkow and Levinthal 2003). Empirical studies have shown mixed results for the different views, recommending either a one-sided (Dess and Davis 1984; Ebben and Johnson 2005), a more balanced (Gibson and Birkinshaw 2004; He and Wong 2004), or a temporarily shifting alignment (Nickerson and Zenger 2002).

Two shortcomings may partially explain the inconsistency of prior empirical findings. First, the validity of these studies may be harmed by their *generic* character. Prior studies have found that the effectiveness of an organization's strategic orientation or structural alignment depends on the environmental context (Burns and Stalker 1961; Lawrence and Lorsch 1967; Hambrick 1983). Levinthal and March (1993) as well as Lewin, Long, and Carroll (1999) pointed to environmental aspects as important boundary conditions for analyzing both learning types' effect on firm performance. To date, however, there is little empirical evidence of a firm's organizational alignment being effective with regard to exploitation or exploration under different environmental conditions. This chapter analyzes these effects and provides a better understanding of how organizations adapt their strategies and structures in response to multiple

contextual conditions. It suggests that different types of alignment may be related to superior performance under varying environmental contexts.

Second, the extant empirical research may be further restrained by its *static* character. Empirical evidence suggests that organizations are continuously aligning their strategies and structures over time. Previous studies have shown that success is a question of dynamic alignment rather than static fit (Zajac, Kraatz, and Bresser 2000). Given that environmental conditions often change, March (1991) suggests that returns from exploitation and exploration may also vary over time. Drawing upon these arguments, Nickerson and Zenger (2002) propose that organizations, in line with changing boundary conditions, dynamically adapt their strategies and structures to exploitation or exploration. While the dynamics in firms' alignment behaviors have been noted, much more remains to be understood about the specific change patterns and their effect on short- and long-term performance. This chapter analyzes how, depending on individual firm's initial configuration, their alignment behaviors vary in the face of the same environmental changes. We further argue that, depending on the extent of the change required, shifts in firms' organizational alignment might lead to different performance outcomes.

In summary, we build on organizational theory and strategic management studies to establish a set of hypotheses that link corporate initiatives (focused on aligning the organizational context in respect of different learning activities) to environmental conditions and firm performance. In contrast to previous studies, we consider concrete and manageable corporate alignment initiatives instead of hard-to-grasp learning behaviors. Furthermore, we integrate the environmental context into our analysis of how firm performance is affected by exploration- or exploitation-oriented corporate alignment activities. Finally, we strive for a quantitative and longitudinal field study to extend existing empirical studies' often static and narrow scope. In the next section, we present the literature review and hypotheses. After describing our research method, we summarize the empirical findings from our analysis of 2473 corporate alignment moves in 64 European insurance companies between 1995 and 2004. We conclude with a discussion of the results and derive propositions for future research.

## LITERATURE REVIEW AND HYPOTHESES

### Exploration and Exploitation in Organizational Learning

Organizational learning has been defined as the production and reproduction of organizational rules that lead to behavioral stability or change

(Levitt and March 1988). Learning provides organizations with the possibility to generate competence, either in the form of exploration or in the form of exploitation (Levinthal and March 1993). Exploration creates variety through search, discovery, novelty, innovation, and experimentation. Conversely, exploitation aims at extending existing knowledge by means of the refinement, routinization, production, and implementation of knowledge (March 1991). Research has found that organizations tend to exploit more often than they explore, leading to phenomena such as organizational inertia (Hannan and Freeman 1984; Tushman and Romanelli 1985) or competency traps (Leonard-Barton 1992; Ahuja and Lampert 2001) that may be harmful to future success. On the other hand, excessive exploration can lead to the abandonment of value-creating processes and the emergence of cost inefficiencies (Volberda and Lewin 2003; He and Wong 2004). This notion is strengthened by the fact that the expected returns from exploration usually take longer to materialize than the expected returns from exploitation. Consequently, Levinthal and March (1993, 105) argue that firms' long-term survival and success depend on their ability to 'engage in enough exploitation to ensure the organization's current viability and to engage in enough exploration to ensure future viability'.

## Corporate Alignment Activities for Exploitative and Explorative Learning

While corporate leaders have limited influence on the learning processes themselves, they can actively align the organizational context to promote organizational learning (Lechner 2006, 25). Exploitation and exploration have been related to fundamentally different organizational contexts (Levinthal and March 1993). Among the most discussed contextual factors at the corporate level are firm strategy and firm structure (Tushman and Romanelli 1985; Burgelman 1991; Brown and Eisenhardt 1998; Benner and Tushman 2003; He and Wong 2004).

**Corporate structure.** Companies use various formal and informal coordination mechanisms to link and integrate different parts of the organization (Ghoshal, Korine, and Szulanski 1994). The hierarchical structure represents the most important formal coordination mechanism. In line with prior research, we focus on a main element of a firm's hierarchical structure: centralization (Galbraith 1973; Miller and Droge 1986; Cardinal 2001). Centralization refers to the degree to which decision-making power is concentrated in an organization (Aiken and Hage 1968; Puranam, Singh, and Zollo 2006). Previous research has suggested that centralization supports exploitative learning (Sheremata 2000; Cardinal 2001; Jansen, Van den Bosch, and Volberda 2006), as it allows for higher degrees

of coordination, fosters efficient processes, and enables organizations to realize synergies across existing knowledge stocks (Miller and Droge 1986; Adler et al. 1999). In his empirical study of the pharmaceutical industry, Cardinal (2001) found that centralization facilitated the exploitation of existing products.

While centralization may support exploitation, it has also been found to limit lateral communication, reduce the quantity and quality of knowledge available across the organization, thus decreasing employees' ability and motivation to generate new and innovative ideas (Nord and Tucker 1987; Damanpour 1991; Sheremata 2000). In the context of a financial services company, Jansen et al. (2006) found evidence of a negative association between centralization and exploration. Explorative learning requires non-routine problem solving and fresh thinking that may be better supported by decentralization (Nickerson and Zenger 2002). Decentralization allows for generative learning and lateral communication, thus encouraging the exploratory search for new knowledge (Adler et al. 1999). Companies thus face conflicting structural requirements when aligning their organizations: while exploration may be better supported by decentralized structures, exploitation calls for more centralized structures.

**Corporate strategy.** An important decision in corporate strategy relates to firms' diversification behavior (Ansoff 1957; Rumelt 1974). Diversification moves are regarded as vital in corporate development to avoid inertia and revitalize the firm (Miller and Chen 1996; Teece et al. 1997). Barkema and Vermeulen (1998), for instance, argue that firms should promote new learning by entering a variety of product and geographical segments. Burgelman (2002) relates expansion into new fields to autonomous strategic processes and explorative learning. Exploratory initiatives thus emerge outside the current strategy and allow new product-market environments to be entered (Benner and Tushman 2003, 243).

Conversely, diversification moves – especially into unrelated areas – have also been related to additional costs and increasing risk (Lubatkin and Chatterjee 1994; Palich, Cardinal, and Miller 2000). Alternatively, firms may focus on existing products and market environments. The firm's existing business can be strengthened by consolidation-related acquisitions and new ventures that build on existing knowledge and capabilities (Burgelman 1991; Webb and Pettigrew 1999; Vermeulen and Barkema 2001). Burgelman (2002) describes such developments inside a firm's core business as induced strategic initiatives and relates them to exploitative learning. Exploitation builds on existing knowledge, products, and customer groups (Benner and Tushman 2003). This focus on the existing business may contribute to more efficient exploitation, but simultaneously undermines a firm's ability to explore new fields in future. Induced

and autonomous strategic initiatives thus compete for scarce resources and corporate leaders need to carefully select the most appropriate ones (Burgelman 2002).

**Corporate alignment.** As described above, firms can actively support exploitation and exploration by aligning their strategies and structures. The contrary requirements, however, make it difficult to provide for both learning processes simultaneously. While exploitation has been related to centralized structures and a narrow search with regard to corporate strategy, exploration may benefit more from decentralized structures and a broad search with regard to corporate strategy. These tradeoffs have been described as a 'central paradox of administration' (Thompson 1967).

In the literature, two contrary recommendations have been developed on how corporate leaders should align their organizations to deal with these challenges. Some scholars believe that the contradictory requirements of exploitation and exploration are impossible to be harmonized within a single firm. These scholars promote a one-sided alignment with either exploitation or exploration and link mixed approaches to poor performance (Burns and Stalker 1961; Ghemawat and Costa 1993; Porter 1980). Ebben and Johnson (2005), for example, found empirical evidence that firms aligned with either exploitation or exploration outperformed firms that tried to pursue both orientations.

Conversely, a second group of researchers points to the shortcomings of a one-sided alignment. These researchers consider a balance between exploitation and exploration as essential for firms' long-term success and survival (Tushman and O'Reilly, 1996; He and Wong 2004). Several recent studies found empirical evidence for the superior performance of balanced – or ambidextrous – firms (Gibson and Birkinshaw 2004; He and Wong 2004; Lubatkin, Simsek, Yan, and Veiga 2006).

## Environmental Munificence as Boundary Condition for Corporate Alignment

The contrary recommendations and empirical findings in respect of firms' alignment behaviors fostering different types of learning may be partly explained by the neglect of boundary conditions. According to the contingency theory, there is no one best organizational initiative (Ginsberg and Venkatraman 1985). This is explained in that these initiatives do not take place in a vacuum, but rather inside a social system. The external environment therefore influences organizational contexts strongly (Tushman and Rosenkopf 1996). In order to be successful, corporate alignment thus requires a fit with the external environments' demands (Lawrence

and Lorsch 1967; Hambrick 1983; Miller 1992). Both Lewin et al. (1999) and Levinthal and March (1993) suggested that task environments might moderate the relationship between initiatives and performance that are exploitation or exploration oriented. Consequently, corporate leaders should consider external contingency variables when deciding on exploitation-oriented or exploration-oriented organizational and strategic initiatives.

**Environmental munificence.** Organizational task environments' range of dimensions is manifold (Starbuck 1976). However, there is an established consensus among researchers regarding a few important dimensions (Aldrich, 1979; Dess and Beard 1984). In this chapter, in line with other research in the field (Zahra 1993), we use the 'environmental munificence' concept to analyze external contingencies' moderating effect on the performance impact of corporate alignment activities. Environmental munificence reflects an industry's opportunities and renewal richness. It embodies industry growth, dynamism, an abundance of technological opportunities and the environment's demand for new products (Aldrich 1979).

Industry growth refers to the industry's capacity to allow the relevant organizations to grow as well as to provide them with financial stability (Cyert and March 1963). Dynamism refers to the continuity of change in a firm's environment, which can occur through regulatory developments, competitive rivalry and other, similar forces. The definition emphasizes the persistence of change in the environment, rather than the nature or rate of change as such (Miller and Friesen 1984). Technological opportunities rely on the technological push effect, with new advances stimulating demand in existing or new markets (Scherer 1980). The lack or existence of opportunities may therefore impede or stimulate corporate entrepreneurship. The last component is the importance of new products, which relies heavily on demand's pull effect when customers ask for new ways of problem solving (Zahra 1993).

**Aligning organizations and environments.** Environments create opportunities while at the same time imposing constraints on the companies involved (Djelic and Ainamo 1999). Due to the various interrelations between environmental conditions and firm strategy and structure, companies should consider external factors' influence on corporate alignment activities (Farjoun 2002).

Dynamic and highly munificent environments quickly render current products and services obsolete and thus require new ones to be developed (Sorensen and Stuart 2000; Jansen et al. 2006). In order to minimize the threat of obsolescence, companies in these environments need to pursue exploratory initiatives such as the creation of new customer segments or market niches (Levinthal and March 1993; Lumpkin and Dess 2001).

As market demand is high and increasing, companies face considerable opportunities for new growth. Hence, we expect exploration-oriented alignment behaviors to be most promising under conditions of high environmental munificence. Conversely, firms focused on exploitation may fall behind as they miss market opportunities while competitors race ahead.

**Hypothesis 1:** *Firms with an exploration-oriented alignment behavior outperform their peers under conditions of high environmental munificence*

Conversely, environments characterized by low environmental munificence provide the stability required for the efficient exploitation of existing products and technologies (Ketchen, Thomas, and Snow 1993; Burgelman 2002). The weak market demand reinforces the competition between established players, which may further increase the pressures for higher efficiency and lower prices (Matusik and Hill 1998). In competitive environments, firms need to focus on continuous cost improvements to enhance their performance (Lumpkin and Dess 2001). Conversely, extensive risk taking and a strong focus on new products can be particularly risky in these environments (Miller and Friesen 1983, 223). This is explained by the lack of firm resources for large-scale exploratory initiatives in a hostile market environment (Zahra and Bogner 1999).

While a strong focus on exploration may be dangerous, researchers argued that some degree of exploration might be necessary. Focusing exclusively on exploitation in the context of low environmental munificence bears the risk of companies getting trapped in existing products, services, and processes (Levinthal and March 1993). Companies need to engage in some degree of risk-taking and proactive activities that require exploration to enable them to elude the downward spiral caused by consolidating markets (Zahra 1993; Zahra and Covin 1995). By engaging in new products and markets, companies may be able to free themselves from the extensive rivalry and price wars that characterize environments characterized by low munificence. These exploratory activities are considered complementary to a primary focus on efficiency. As there are no quick returns on exploration, firms need to maintain their exploitative efforts to free up scarce financial resources for further investment in exploratory initiatives. Environments marked by low environmental munificence may thus require a balanced focus on both exploitation and exploration (Auh and Menguc 2005; Jansen et al. 2006).

**Hypothesis 2**: *Firms with a balanced alignment behavior outperform their peers under conditions of low environmental munificence*

## The Dynamics of Corporate Alignment

March (1991, 71) argued that the returns from exploitation and exploration vary over time. Empirical studies have shown that success is not a question of static fit with the relevant environmental contingencies, but rather of dynamic alignment to changing environmental conditions (Zajac et al. 2000). At different times, varying emphases are required on specifically relevant learning orientations (Burgelman 1991). Along the same lines, the 'cycling' theory claims that organizations temporarily modulate between different strategies and structures, with changes occurring whenever the actual functionality is biased against the desired one (Eisenhardt and Brown 1999; Nickerson and Zenger 2002; Siggelkow and Levinthal 2003). Duncan (1976) argues for modulating between activities that are exploitation and exploration oriented over the firm's life cycle.

While firms' alignment behavior has been found to converge to some extent at the industry level, differences in individual firms' behaviors have been observed (Siggelkow and Levinthal 2003). Differences in firms' reaction to similar environmental changes may be explained by the degree of misfit between these firms' prior positioning and the new environmental exigencies (Burton, Lauridsen, and Obel 2002). Zajac et al. (2000) found that greater misfits with external conditions induced stronger changes. We thus assume that firms with a strong one-sided orientation (i.e. towards exploration) within a specific period are forced to adapt their alignment behavior (i.e. towards exploitation) more radically when environmental conditions change. Firms with a more balanced orientation in a specific period may be able to react to environmental change by making only minor adjustments to their alignment behavior. The degree of change required may thus depend on the extent of the misfit between the firm's initial alignment orientation and the new orientation required by the altered environmental conditions.

**Hypothesis 3***: When the level of environmental munificence changes, firms with greater misfits show greater changes in their alignment patterns*

Organizational change can be extremely costly (Argyris 1970; Kanter 1983). There are considerable upfront change costs in respect of the new strategy or structure's planning and implementation. Additional costs arise from a transitional loss of productivity due to employee turnover and resistance to change (Miller and Friesen 1980; Lamont, Williams, and Hoffman 1994). Due to organizational inertia, organizations are slow to adapt the informal organization after changes in the formal organization. Reorganization produces a 'liability of newness': the greater the frequency

of change and its relative intensity, the greater the likelihood of poor performance and failure (Cyert and March 1963; Hannan and Freeman 1984). We therefore assume that greater changes are related to increased cost and lower short-term performance.

**Hypothesis 4**: *Greater changes in firms' organizational alignment patterns lead to lower short-term performance*

# METHODOLOGY

We tested our hypotheses by means of a longitudinal field study of corporate initiatives in the European insurance industry between 1995 and 2004. This industry is particularly interesting, as the firms faced extreme changes in their environmental conditions due to deregulation, new technologies, customer demands and changing capital markets (Ackermann, Erdönmez, and El Hage 2005). In the first half of the observed period (1995–1999), deregulation spurred innovation and customer orientation, while the booming capital markets fueled expansion into foreign markets and new business segments (Enz 2005). Following a strong market downturn, insurance companies refocused on tighter cost control and operational efficiency during the second half of the observed period (2000–2004).

## Setting and Data Collection

A single industry study was chosen for its clearly demarked population and controllable environmental characteristics (Frederickson and Iaquinto 1989). Selecting the European insurance industry as the arena for our empirical research, we constructed an area sample defined by three dimensions (Churchill 1999). To be included, companies needed (1) a primary standard industry classification (SIC) code equal to life insurance (6311), non-life insurance (6331) or reinsurance (6371); (2) headquarters located in Austria, Germany, and Switzerland (region 1), or the United Kingdom and Ireland (region 2), and (3) premiums of at least €100 million by 2005. The full area sample included 88 insurance companies, which were contacted and asked to provide a full set of company reports for the last decade. We received full information on 64 companies or 72 per cent of the population. The results reported in this chapter are based on these data. In future, we intend to expand the sample to cover additional European regions.

We collected panel data from archival sources, including company reports and company information databases, to describe firms' alignment

activities between 1995 and 2004. The use of archival data seems appropriate, as researchers have questioned the reliability of informants' retrospective accounts (Golden 1992; Miller, Cardinal, and Glick 1997). Furthermore, previous research on firms' alignment activities has found the analysis of corporate development over a ten-year period to be adequate (Pettigrew 1985). An extension to a longer period would have been complicated by the poor data available on earlier decades.

## Constructs and Measurements

We considered two types of exploitation-oriented and exploration-oriented corporate alignment initiatives as independent variables: centralization and decentralization shifts within an organizational structure, as well as focus and diversification shifts within corporate strategy.

**Structural alignment initiatives.** Shifts towards centralization are represented by corporate initiatives that lead to a higher concentration of decision-making power. The requirements for a centralization event have been met when one of the following occurs: (1) the creation of a functional role (i.e. Head of HR, Chief Information Officer/Chief Technology Officer) on the management board; (2) the creation of a central operating role (i.e. Chief Operating Officer, Vice President Operations); (3) the merging of strategic business units; or (4) the creation of a centralized shared services center. Conversely, shifts towards decentralization are represented by corporate initiatives that lead to a lower concentration of decision-making power. The requirements for a decentralization event have been met when one of the following occurs: (1) the abolishment of a functional role on the management board; (2) the abolishment of a central operating role; (3) the division of strategic business units; or (4) the dissolution of a centralized shared services center. Tushman and Rosenkopf (1996) used similar measurements in respect of shifts in both centralization and decentralization.

**Strategic alignment initiatives.** Shifts related to a focus on strategy are represented by corporate initiatives that (a) extend the firm's existing core business and/or (b) refocus the firm on its existing core business by shutting down or selling off non-core activities. The requirements for a focus event have been met when one of the following occurs: (1) withdrawal from a primary business segment; (2) withdrawal from a country market; (3) consolidation-related acquisition or a new venture (>1 percent of sales); or (4) consolidation-related large-scale expansion (>5 percent of sales). Moves related to a diversification strategy are represented by corporate initiatives that extend the firm's activities into new product or geographical segments. The requirements for a diversification

event have been met when one of the following occurs: (1) entry into a new primary business segment; (2) entry into a new country market; (3) diversification-related acquisition or a new venture (>1 percent of sales); or (4) diversification-related large-scale expansion (>5 percent of sales). Similar measurements have been used in respect of shifts in focus as well as diversification in several previous studies (Webb and Pettigrew 1999; Vermeulen and Barkema 2001).

**Firm performance.** As the dependent variable, we use return on equity (ROE), as it is widely recognized as a reliable accounting-based measure of corporate performance (Porter 1980; Ketchen et al. 1993). We computed the ROE as the net income divided by the average equity (Tushman and Rosenkopf 1996). Unfortunately, we were unable to consider market data due to a considerable number of unlisted companies in our sample.

**Environmental munificence.** The moderating variable 'environmental munificence' was determined on a yearly basis through a combination of quantitative and qualitative approaches. In line with prior studies (Staw and Szwajkowski 1975, Dess and Beard 1984), we first computed the average industry ROE, the growth in industry sales, the growth in industry employment, and the spending on new customer marketing activities. All figures were then compared with the respective ten-year average values. Based on that data, we identified an initial period of high munificence (1995–1999) and a subsequent period of low munificence (2000–2004). The statistics reveal highly significant differences between the two periods, with p-values ranging from 0.008 (sales growth) to $p = 0.021$ (marketing spending). Next, we conducted seven semi-structured interviews with industry experts to gain a more qualitative assessment of environmental munificence. As in earlier investigations, the qualitative information was used to challenge and verify the quantitative data (Miller and Friesen 1984; Dess and Keats 1987; Fritz 1992). The results from the industry experts' assessment confirmed our quantitative findings and suggested a similar division into two periods with contrasting environmental conditions.

**Control variables.** In the empirical study, we controlled for possible contradicting effects by including a number of control variables. We considered firm size and firm age, the firm's primary SIC code, the firm's home country, and the type of alignment initiative (Tushman and Rosenkopf 1996; Carroll and Hannan 2000).

## Data Analysis

Altogether, we registered 2473 events over a ten-year period within the 64 companies (a mean of 38 events per company). We thereafter summarized the relevant data for each firm in a profile. Following Webb and Pettigrew

(1999, 605), we recorded whether an event had been achieved or not, rather than to which extent an organization conducted these shifts. This allowed the binary coding of events in the year of their implementation.

To distinguish firms' alignment patterns, we used a 'mixing ratio', which indicated the relative importance of exploitation-oriented initiatives in comparison to exploration-oriented ones. Auh and Menguc (2005) used a similar procedure. This approach assumes a continuous relationship between exploitation-oriented and exploration-oriented alignment initiatives. While some researchers share this belief (March 1991), others have argued in favor of an orthogonal relationship between exploitation and exploration (Katila and Ahuja 2002). We agree with Gupta, Smith, and Shalley (2006) that no universal argument can be made in favor of either continuity or orthogonality. It is important to consider whether or not the two activities compete for scarce resources and whether or not the analysis focuses on single or multiple domains. In our model, we suggest that there is a continuum that ranges from alignment activities that are exploration oriented to those that are exploitation oriented, as both orientations refer to the same (corporate) level and (to a large extent) compete for limited resources and managerial time.

## RESULTS

The four hypotheses presented above were tested using a student t-test, ordinary least square (OLS) regression analysis, and non-linear (quadrate) regression analysis.

*Hypothesis 1* presumes a link between firms' alignment patterns and environmental munificence. It posits that exploration-oriented alignment leads to superior performance in the context of high environmental munificence. In order to test this hypothesis, we ranked the companies according to their respective annual standardized return on equity. This allowed us to control the overall market's annual performance fluctuations. It also mitigated the problem of outliers and possible erroneous values in the data set. We then clustered the insurers in groups of high, middle and low performers within the two observed periods by calculating their mean performance for each period. The analysis of the tiers' alignment behavior in the high environmental munificence phase confirmed our research proposition. Top performers' mixing ratios were significantly biased towards exploration (mixing ratio of 0.32) in the period of high environmental munificence. The middle and low performer groups showed a clearly more balanced alignment (mixing ratio of 0.49). As indicated in Table 3.1a, the t-test confirmed the significant differences in the top performers' alignment

*Table 3.1a Descriptive statistics and t-test for H1*

| Hypothesis 1 | Environmental munificence | Mean | Standard deviation | t-value and p-value |
|---|---|---|---|---|
| Top performers | High | 0.32 | 0.21 | 2.761 |
| Middle and low performers | High | 0.49 | 0.20 | 0.008 |

*Table 3.1b Linear regression analysis for H1*

| Hypothesis 1 | Unstandardized coefficients | | Standard coefficients | t-value | p-value |
|---|---|---|---|---|---|
| | B | Standard Error | Beta | | |
| Constant | 20.066 | 3.398 | – | 5.906 | 0.000 |
| Mean mixing ratio | 21.981 | 7.246 | 0.394 | 3.034 | 0.004 |

behavior when compared to their less performing peers ($t = 2.761$; $p = 0.008$).

Next, we used linear regression analysis to show the correlation between the mean mixing ratio and the mean rank in the period of high munificence. As shown in Table 3.1b, an exploration-oriented alignment behavior was found to be positively and significantly related to firm performance in times of high environmental munificence ($t = 3.034$; $p = 0.004$). Hence, the result from both t-test and linear regression analyses supported H1.

*Hypothesis 2* suggested that in the context of low munificence, firms might reach superior performance by relying on a balanced alignment pattern. In line with our above approach, we ranked the companies according to their mean performance and divided them into tiers. While the top performers' mixing ratios indicate a balanced alignment (mean value of 0.59), the less performing peers showed almost similar mixing ratios (mean value of 0.61). The low standard deviations confirm that truly 'balanced' firms were strongly represented in both groups (see Table 3.2a). As shown in Table 3.2b, the non-linear regression analysis failed to show any significant results. H2 is thus rejected.

*Hypothesis 3* posits a more radical reaction by organizations that show greater misfits with the altered external conditions. In order to obtain the 'optimal' mixing ratio for the two periods, we used the mean market mixing ratios in times of high and in times of low environmental munificence. We

*Table 3.2a Descriptive statistics and t-test for H2*

| Hypothesis 2 | Environmental munificence | Mean | Standard deviation |
|---|---|---|---|
| Top performers | Low | 0.59 | 0.16 |
| Middle and low performers | Low | 0.61 | 0.14 |

*Table 3.2b Non-linear (quadrate) regression analysis for H2*

| Hypothesis 2 | Unstandardized coefficients | | Standard coefficients | t-value | p-value |
|---|---|---|---|---|---|
| | B | Standard Error | Beta | | |
| Constant | 12.73 | 12.39 | – | 1.038 | 0.309 |
| Mean mixing ratio | 50.07 | 43.64 | 0.759 | 1.147 | 0.256 |

*Table 3.3 Linear regression analysis for H3*

| Hypothesis 3 | Unstandardized coefficients | | Standard coefficients | t-value | p-value |
|---|---|---|---|---|---|
| | B | Standard Error | Beta | | |
| Constant | 0.020 | 0.049 | – | 0.402 | 0.689 |
| Predicted adaptation move | 0.896 | 0.144 | 0.643 | 6.232 | 0.000 |

then computed the means of the mixing ratios for every company in the period characterized by high munificence (1995–99) and subtracted it from the mean market mixing ratio in the subsequent period marked by low munificence (2000–04). This comparison allowed us to predict each company's 'need for adaptation'. Next, we calculated the 'actual adaptation realized' by each company by subtracting the company's mean in the high munificence phase from its mean in the subsequent phase of low munificence. As shown in Table 3.3, a regression with the predicted 'need for adaptation' as the independent variable and the 'actual adaptation realized' as the dependent variable presents highly significant results ($t = 6.232$; $p = 0.000$). Organizations that were strongly exploration oriented in the first phase showed more radical changes in their alignment patterns when adjusting to the altered environmental conditions in the second

*Table 3.4 Linear regression analysis for H4*

| Hypothesis 4 | Unstandardized coefficients | | Standard coefficients | t-value | p-value |
|---|---|---|---|---|---|
| | B | Standard Error | Beta | | |
| Constant | 3.446 | 1.064 | – | 3.239 | 0.001 |
| Absolute change of mixing ratio | −6.963 | 1.995 | −0.145 | −3.490 | 0.001 |

phase compared to firms that had already had a more balanced alignment in the first phase. H3 was thus supported.

*Hypothesis 4* predicts a negative short-term performance effect in respect of larger changes in firms' alignment patterns. In order to test this proposition, we computed the absolute change in a firm's mixing ratio from one year to the next. We used the mean of the market-adjusted return on equity in the year of the adaptation and in the subsequent year as the dependent variable. This approach allowed us to account for possible time-lags in the adaptation's affect on performance. As predicted, we found a negative and significant relationship between change and performance ($t = -3.490$; $p = 0.001$). Similar results were found for the respective performance effects in the same and the following years. H4 was thus supported.

## DISCUSSION

Research has presented a range of contradictory recommendations on how organizations should align their strategies and structures to exploitation and exploration. Accordingly, empirical studies in the field have produced mixed results. Only recently have studies started to reflect on the external environment's moderating role on the different alignment patterns' performance outcomes. The objective of this study was therefore to explore how environmental munificence affects the effectiveness of exploitation-oriented and exploration-oriented corporate alignment initiatives.

Prior research suggested two opposed alignment patterns to enable organizational learning: a one-sided alignment focused on either exploitation or exploration, and a more balanced alignment that intends to foster both learning types simultaneously (Adler et al. 1999; He and Wong 2004). We argued that both alignment patterns might be beneficial – albeit under varying environmental conditions. Our findings demonstrate that exploration-oriented alignment behavior is linked to superior performance

in an environment characterized by high munificence. The data also show that firms are moving towards a more balanced orientation in times of low environmental munificence. Contrary to our assumptions, however, we did not find evidence of such a balanced alignment having a superior performance effect. This may be explained by the particularly low variance and standard deviations across the entire sample: nearly all firms showed similar behavior in times of low environmental munificence. Previous studies have shown that firms' alignment behaviors converge in the face of increasing environmental hostility (Auh and Menguc 2005). This uniformity in firm behavior may make it difficult to identify performance differences. Future research should examine whether a balanced orientation in times of low munificence – while not directly leading to superior performance – reduces the firm's risk of failure. A balanced orientation may thus be a necessity rather than a distinguishing factor when markets go south.

Our findings further show that firms 'cycle' through periods of different alignment behaviors in line with changing environmental conditions (Nickerson and Zenger 2002; Siggelkow and Levinthal 2003). As predicted, we found that the switches of firms with a stronger initial alignment towards exploration are stronger towards greater exploitation when environmental munificence is declining. These results highlight that, depending on firms' initial configuration, they exhibit different organizational responses to similar environmental shifts (Zajac et al. 2000). We also found that more radical realignments negatively affect short-term performance. Prior research has related this effect to the various costs associated with the planning and implementation of organizational change (Argyris, 1970; Amburgey, Kelly, and Barnett 1993).

Altogether, our findings reveal a fundamental dilemma that gives firms a Hobson's choice between two suboptimal alignment behaviors that could be called 'flat slopes' and 'steep slopes'. Companies with alignment patterns resembling a flat slope usually take a middle position between exploitation and exploration. From a static point of view, their alignment behavior resembles that of an ambidextrous organization (Tushman and O'Reilly 1996; Gibson and Birkinshaw 2004). When environmental conditions change, however, these firms alter their alignment behavior to achieve a better external fit. These movements are relatively minor and gradual due to the balanced starting position. This way, the costs and risks related to change, such as the disruption of business, are minimized. The flip side of the coin is reflected by these firms' lower performance in times of high environmental munificence. While a prudent alignment with environmental changes may help to keep the risk down, there is the risk that opportunities may be missed that would require a more aggressive behavior.

Conversely, firms with an alignment pattern akin to a steep slope alternate between radically different alignment behaviors, much as in the switching pattern described by previous studies (Brown and Eisenhardt 1998; Siggelkow and Levinthal 2003). When environmental munificence is high, these firms are strongly focused on exploration. As soon as environmental munificence declines, these firms move completely back towards a balanced orientation. Our research shows that this behavior is rewarded by superior returns in times of high environmental munificence. At the same time, however, we also found that these firms bear the additional cost (and risk) of planning and implementing large-scale change.

Future research should directly examine the performance outcomes of both alignment patterns. An interesting finding has recently been presented in the related debate on 'strategic purity'. Strategic purity (as opposed to 'balanced' strategies) is a one-sided focus on either cost leadership or differentiation (Thornhill and White 2007). Thornhill, White, and Raynor (2006) found that the 'pure' players are associated with a higher profitability, but also with a greater risk and higher exit rates than balanced companies. Accordingly, we expect that firms showing flat slopes will exhibit less variance in performance over time and will be less prone to failure and bankruptcy. This can be explained by these firms' higher degree of stability and balance between contradictory requirements. On the other hand, we expect firms exhibiting steep slopes to outperform them in terms of financial performance. This can be related to these firms' more active and aggressive reaction to market opportunities. Firms may thus have to select between the 'race car strategy' (peak performance in the short run) and the 'luxury sedan strategy' (built to last for the long run).

## Limitations and Future Research Directions

Several limitations, which provide insightful directions for future research, deserve discussion. First, for theory-testing purposes, we conducted our study in the insurance industry. While we collected data on firms of different sizes and from different countries, the generalizability of our findings to other types of organizations is still limited. Firms exhibiting cycling behavior characterized by steep slopes may, for instance, find it more difficult to outperform industries with faster 'clockspeeds' than the relatively stable insurance industry (Fine 1998; Mendelson and Pillai 1999). Frequent changes create significant additional cost, which may render flat slope alignment patterns more promising. Hence, future research should replicate and extend this study to other sectors and compare findings across different industry settings.

Second, although our study provides new insights into strategic and structural alignments to exploitative and exploratory learning, it does not address how managers actually implement these changes within their organizations. Previous studies have shown, for example, that 'balanced' alignments can be achieved by different means, including the creation of 'parallel learning structures' (McDonough and Leifer 1983; Bushe and Shani 1991) and structural separation into exploitative and exploratory units (Tushman and O'Reilly 1997; Benner and Tushman 2003). Others found that factors such as cultural contexts (Gibson and Birkinshaw 2004) and leadership team structures (Lubatkin et al. 2006) might affect organizations' ability to successfully implement a 'balanced' alignment. It would be useful to conduct in-depth studies to better understand how these differences in corporate alignment initiatives' implementation moderate the findings in this study.

Third, while we capture 'exploitation-oriented' and 'exploration-oriented' alignment activities in our study, we do not measure the actual learning activities themselves. Based on prior findings that related different structural and strategic activities to the two learning types (Levinthal and March 1993; Ancona et al. 2001; Jansen et al. 2006), we implicitly assumed that a certain type of corporate initiative would trigger a respective learning behavior. While our focus was on alignment behaviors' performance effects, future studies may open up the 'black box' of organizational learning by measuring exploitative and exploratory learning processes. This would, however, require moving from archival data to primary data acquired through a field study based on questionnaires or interviews. While such a study design will reduce the researcher's ability to analyze longitudinal developments, it may allow for a more detailed investigation into interrelations between learning processes, organizational alignment initiatives, and performance outcomes.

In sum, this chapter presented various theoretical and practical implications by providing new insights into how environmental conditions and dynamics affect corporate alignment initiatives' effect on firm performance. We showed that different alignment patterns – one-sided, balanced, and cycling – are complementary rather than mutually exclusive. Elements of all three patterns are used over time to address changing environmental requirements. Successful firms exhibit both stability and change in their organizational alignment behaviors.

## NOTE

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# 4. Knowledge-based perspective on dynamic capabilities

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## ABSTRACT

The theory of dynamic capabilities deals with the fundamental questions of strategy in changing environments. Theoretical analysis underpinning the dynamic capabilities approach is, however, biased by some important limitations concerning the basis of how organizations actually change themselves. These limitations are due to a failure to recognize the socially constructed nature of knowledge, to focus too much on the role of top management, and to exaggerate the controllability of organizational knowledge. These limitations can be overcome, to some extent, with the help of the emerging knowledge-based view of the firm. From this perspective, the organizational change capacity can be explained from a perspective of more generic, meta-level, and higher-order capabilities that are connected with organizational knowledge. This chapter complements the existing discussion by identifying three knowledge-based higher-order capabilities: connectivity, learning culture, and knowledge management.

## INTRODUCTION

The paradigm of dynamic capabilities has been introduced in the recent strategic management literature as a theoretical answer to the problem of how firms are able to achieve sustained competitiveness in turbulent environments. Dynamic capabilities, consisting of a 'firm's ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments' (Teece et al. 1997, 516) are argued to be the key to the mastery of continuous change required in rapidly and unpredictably transforming hypercompetitive environments. More explicitly, dynamic capabilities have been defined as learned, path-dependent, and stable patterns that govern the change of organization's ordinary capabilities (Collins 1994; Eisenhardt and Martin 2000; Zollo and Winter

2002; Winter 2003). In constantly changing environments, the dynamic capabilities approach can give a more substantive picture than traditional views of how competitive advantage is gained and sustained (Levitas and Ndofor 2006).

However, dynamic capabilities are only one tool among other explanations in understanding how organizations change (Winter 2003). Indeed, in addition to utilizing stable and learned change patterns (dynamic capabilities), organizations constantly change themselves by learning, experimenting, and creating new solutions without relying on existing dynamic capabilities. This type of change sometimes leads to the formation of new dynamic and ordinary capabilities (as described in Zollo and Winter 2002), but it sometimes only happens as a single event of creative problem solving (referred as ad-hoc problem solving in Winter 2003). Either way, organizations that are more flexible in terms of learning, knowledge creation, and problem solving, are also likely to be continuously successful in changing environments. In current literature, characteristics of these kinds of organizations have been studied quite broadly (e.g. Dougherty 1992; Leonard-Barton 1995; Nonaka and Takeuchi 1995; Kianto 2008), but the linkages to the discussion on dynamic capabilities are surprisingly rare. An exception is the view of dynamic capabilities in high-velocity markets formulated by Eisenhardt and Martin (2000). However, this view of dynamic capabilities has encountered criticism (Schreyögg and Kliesch-Eberl 2007), because of its ambiguity in terms of explaining how a firm could actually possess and repeatedly utilize such capabilities.

Our aim is to formulate an alternative view of dynamic capabilities, one which takes a more profound view on organizational knowledge and change. Indeed, from the perspective of knowledge-based view of the firm (Kogut and Zander 1992; Grant 1996; Spender 1996a; Tsoukas 1996), the current dynamic capabilities approach suffers from a few restrictions that decrease its explanatory power. More specifically, we claim that the dynamic capabilities approach is affected by a static conception of knowledge, top management bias, and control illusion. This approach treats knowledge much like a commodity which can be created, transferred, and combined under the supervision of managerial control. In our view, these problems are due to the fact that the current view on dynamic capabilities does not recognize to a sufficient extent the heterogeneous and unique nature of organizational knowledge and social interactions. It should be therefore valuable to recognize how the organization's and its individuals' knowledge actually are able to provide (sustainable) change that provides value for an organization.

In this chapter, we suggest that there is a class or level of existence of change-related capabilities that can be conceptualized with the help of

the knowledge-based view of the firm (KBV). We call these 'higher-order capabilities', which are outside the current framing of dynamic capabilities. These kinds of capabilities are the ones *enabling* organizational change, not actually *executing* it. Thus, they are on a higher level of 'capability hierarchy' (Collins 1994) than dynamic capabilities. They are by nature far more generic than dynamic capabilities that can be conceptualized as 'routinized activities directed to the development and adaptation of operating routines' (Zollo and Winter 2002). Thus, such higher-order capabilities are only partially routine-based, and rather located on the meta-level of capability analysis. In particular, we formulate three higher-order capabilities which we call *connectivity, learning culture* and *knowledge management*.

By utilizing insights from the knowledge-based view and introducing a specific set of higher-order capabilities, we contribute to the existing literature of dynamic capabilities in several frontiers. First, we confront some of the criticism put forward by Schreyögg and Kliesch-Eberl (2007), who suggest that learning mechanisms (Zollo and Winter 2002) are inherently based on routines and capabilities thinking, and therefore do not provide an ultimate answer to the organizations' need to adapt to dynamic environments. We also complement the perspective presented by Eisenhardt and Martin (2000), who claim that dynamic capabilities are highly experimental and vastly unique when it comes to changing in high uncertainty. Our view, however, describes a view on knowledge-based capabilities that can be patterned and somewhat structured, and thus a more repeatable and continuous source of competitive advantage. Finally and most importantly, our view provides a more holistic picture of skills and knowledge of the whole organization, instead of focusing mainly on the role of top management, which has been characteristic to current theories on dynamic capabilities. Because the dynamic capabilities approach strives to explain superior firm performance and the functioning of the organization itself, our complementary work contributes not only to the dynamic capabilities perspective, but also to research on knowledge management and strategic management, and to organization studies in general.

## THE KNOWLEDGE-BASED PERSPECTIVE AND HIGHER-ORDER CAPABILITIES

The starting point of the knowledge-based view of the firm is that knowledge is the key explanatory factor of organizational success, and the nature of knowledge is an important determinant enhancing understanding of firm organization and behavior. The KBV addresses the issues of

the existence, the boundaries, and the internal organization of the multi-person firm (Foss 1996). According to the KBV, organizations exist to create, transfer, and transform knowledge into competitive advantage (Kogut and Zander 1992), and performance differences between firms derive from their differing stocks of knowledge and capabilities in using and developing knowledge (Nonaka and Takeuchi 1995; Grant 1996; Spender and Grant 1996).

According to the KBV, knowledge is not something objective, free-floating, abstract, and universal as portrayed by traditional western epistemology; but neither is it only subjective, residing solely in the heads of individuals as their personal experience. Instead, knowledge is something that is constructed in the social practices of actors embedded in a particular social context. Rather than residing in the minds of individuals or in databases, the most important type of knowledge is that which is located between people (Spender 1996a, 1996b; Brown and Duguid 2001). Knowledge emerges from the social interactions between various parties within and across organizational borders. In addition, it is fundamentally related with activity (Polanyi 1966; Dougherty 1992), continuously re-interpreted and modified, and continually changing and developing (Blackler 1995). In other words, knowledge is fundamentally dynamic in nature: it is subject to constant negotiations, modifications, and alterations.

From the knowledge-based perspective, the research area of dynamic capabilities can be conceptualized as examination of how organizational knowledge is augmented, developed and renewed. In the sense that the KBV views knowledge as the most important firm resource, it is similar to the resource-based view (RBV) of the firm (Penrose 1959; Wernerfelt 1984; Barney 1991) which conceptualizes the firm as a unique bundle of idiosyncratic resources and capabilities and assumes that rents flow from the internal structure of assets within the firm. The dynamic capabilities view (DCV) is largely based on the RBV and can be seen as an extension of this research approach to the conditions of rapid and unpredictable change. In addition to the RBV, the DCV mainly draws from evolutionary economics (Nelson and Winter 1982). To some extent, the approach also draws on research from fields that have been viewed as outside the traditional boundaries of strategy research, such as R&D management, new product development, organizational learning and manufacturing (Teece et al. 1997; Eisenhardt and Martin 2000). However, even though the DCV is set out to extend the RBV, its presumptions about the nature of knowledge are largely based on it.

Examined from the knowledge-based perspective, we can point out some critical issues for improvement in the dynamic capabilities approach

(Teece et al. 1997; Eisenhardt and Martin 2000; Zollo and Winter 2002). If the dynamic capabilities approach pursues to explain how organizations are able to master continuous change and renewal, and thereby also how dynamic capabilities themselves are created, developed and modified, it has to relocate itself in relation to three issues: the nature of knowledge, locus of expertise, and controllability of knowledge.

First, the KBV conceptualizes knowledge as an emergent and dynamic concept, which is continuously created and modified in the course of social interaction among various parties, whereas the DCV approaches the firm as a black box and treats knowledge uncritically as a thing or a commodity, neglecting its fundamentally socially constructed nature (Ferdinand et al. 2004; Pöyhönen 2004). This suggestion is in line with the DCV having its foundation in the traditional RBV, which also treats knowledge as an important and perhaps the most fundamental resource (Barney 1991; Cyert et al. 1993), but still only as one resource among others.

Second, the DCV tends to focus on the role of the top management in building capacities for mastering change, thereby overlooking the underlying micro-level structures and processes (Pöyhönen 2004). According to the DC perspective, to succeed in a rapidly changing marketplace, the strategic top management has a key role in adapting, integrating, and reconfiguring internal and external skills, resources, and competences (Teece et al. 1997; Teece 2007). The KBV, in contrast, is interested in interaction and interagency at the different levels of the organization. Knowledgeable activity is seen to be brought about by actors all across the organization. In other words, what the organization knows and can do is not derived solely from the skills of the top management, but is constructed of the skills and knowledge of all organizational members. To limit the perspective only to the top management would be to overlook a significant proportion of the organization's capabilities.

Finally, the DCV tends to exaggerate the extent to which the top management can exert influence and control over knowledge-based processes (Scarbrough, 1998; McGuinness and Morgan 2000). In contrast, according to the KBV, the management focuses on managing the conditions that enable the creation of knowledge, since managing knowledge *per se* is impossible due to its experiential and inherently tacit nature. Innovation and learning cannot be completely managed or forged from the outside – the only way they can be promoted is by creating enabling conditions, or 'spaces for directed imagination' (J-C Spender, direct communication).

Based on these arguments, it seems necessary that the dynamic capabilities approach would be complemented from insights developed in the KBV. The knowledge-based perspective enables understanding of the higher-order capabilities, which, in our view, are the basis for

understanding how organizations change. Winter (2003) suggests that dynamic capabilities can be perceived to exist in a hierarchical structure. According to him, there are the zero-level or the 'how we earn a living now' capabilities, which are the currently existing capabilities of the organization, used to collect revenue from existing customers. Next, there are the first-order dynamic capabilities, 'capabilities that would change the product, production process, the scale or the customers (markets) served' (p. 24), for example, new product development capability. Winter propounds that there are also higher-order dynamic capabilities, which concern the ability to develop the first-order dynamic capabilities (as well as the ordinary capabilities), and mentions organizational learning as an example of such a higher-order dynamic capability. We assert that in order to understand how firms succeed in turbulent conditions, we should not focus on so called first-order dynamic capabilities only, but dig deeper into those underlying characteristics of organizing which are the generating sources of the capabilities for modifying, extending and creating ordinary capabilities. Dynamic capabilities are ultimately based on an organization's abilities to develop what it knows and what it can do, namely, its knowledge. Therefore we argue that the most fundamental, higher-order capabilities can be explained by using the knowledge-based perspective.

The concept of higher-order capabilities used in this chapter can be seen as the organizational-level variant of individual-level meta-competencies. Nordhaug (1998) defines meta-competence as a non-firm or – industry-specific type of competence that can be used for accomplishing a variety of different tasks, and encompasses a broad spectrum of knowledge, skills and aptitudes. He further notes (p. 15) that:

> meta-competences, albeit involving low task-specificity, are not irrelevant for the accomplishment of concrete tasks. Instead, their importance lies in the fact that they represent a sort of genuinely basic or underlying infrastructural knowledge and skills that are broadly applicable and form a crucial foundation for work performance in general. The fact that they cut across different tasks and constitute a potential for the mastering of future tasks makes them especially critical for organizational performance and development. In that sense, meta-competences constitute a potential for facilitating organizational and strategic change (for example, learning ability, mastering of uncertainty, ability to tolerate change). Moreover, they are in general just as easily applicable after a change as before (for example, analytical skills, cooperative abilities, communication skills). Furthermore, meta-competences are crucial not exclusively to managers but also for subordinate employees at all levels in firms that have to accomplish organizational change.

In line with Nordhaug's (1998) account of meta-competencies of individuals, we suggest that higher-level capabilities are organizational

characteristics that enable execution of a multitude of activities and processes enabling continuous flexibility in the face of turbulent environments. We also assert that higher-order capabilities, in order to enable organization-wide renewal, pertain not only to the top management level of the firm, but to all internal work environments within an organization as a whole (Leonard-Barton 1995; Weick and Sutcliffe 2001).

Thereby the idea of higher-order capabilities bridges some of the paradox in the change management literature, where the literature has tended to emphasise either top-down or bottom-up approaches to executing organizational change. For example, commenting on the state of organizational change literature, Dunphy (1996, 551) notes that there tends to be 'an uneasy tension between executive level strategic direction and intelligent, committed and innovative action on the part of the non-executive workforce'. Concerning explanations of organizational success in turbulent environments, the dynamic capabilities literature strongly focuses on the first part of this equation by addressing the macro-level steering activities and top management behaviors. We claim that the knowledge-based view could complement this picture by helping to characterize organizational elements that need to be in place for organizations to master change in such a manner that the skills and competencies of all employees of the firm are utilized for continuous learning and innovation.

## HIGHER-ORDER CAPABILITIES

Drawing from the knowledge-based literature, there are three fundamental characteristics that function as a basis for continuous capacity for change in organizational settings: *connectivity, learning culture and knowledge management*. First, knowledge processes take place in the context of social relationships and the existing and available social constellations significantly influence the possibilities and potential for knowledge development (Cohen and Levinthal 1990; Brown and Duguid 1991; Lave and Wenger 1991; Kogut and Zander 1992; Nonaka and Takeuchi 1995). Second, learning is the essential mechanism through which organizational knowledge is renewed and developed (March 1991; Spender 1996b), and thus learning culture defines organizational capacity to function in a flexible and agile manner – as dynamic capabilities (Lei et al. 1996; Zollo and Winter 2002; Ferdinand et al. 2004). Third, even though knowledge cannot be fully managed, the possibilities of its development and exploitation can be enhanced through the provision of various and appropriate communication technologies and platforms and information repositories to support, enhance and provide a context for social knowledge development

(Sher and Lee 2004; Nielsen 2006; Cepeda and Vera 2007). Each of these three higher-order capabilities is discussed below in more detail.

It should be noted that unlike some other recent knowledge-based studies on dynamic capabilities, we do not proceed to discern discreet knowledge processes (Zollo and Winter 2002; Verona and Ravasi 2003; Nielsen 2006). This is because we believe that the higher-order capabilities of connectivity, learning culture and knowledge management are yet one more level more generic than the simple knowledge processes, and that these higher-order capabilities foster all types of specific knowledge processes from knowledge acquisition to knowledge sharing and knowledge integration.

**Connectivity as a Higher-Order Capability**

The first higher-order capability enabling continuous organizational change is social connectivity. The knowledge-based perspective demonstrates that knowledge processes are fundamentally social by nature. Leveraging and creating knowledge and competences is essentially a social activity: knowledge is typically created, enriched, shared and leveraged in social interaction among several people (Nonaka and Takeuchi 1995; Nahapiet and Ghoshal 1998; Brown and Duguid 2001). Most of the problem-solving and decision-making occurs in groups, and the social context influences the motivation and actions of individual organizational members to a significant degree (Amabile 1997).

Organizations with plenty of possibilities for social interaction, dialog and discussion tend to be more flexible than organizations with strictly controlled relationships (Prieto and Easterby-Smith 2005). The more interaction there is, the more possibilities for sharing tacit knowledge and for co-creating new knowledge exist (Nahapiet and Ghoshal 1998). Connectivity also includes the ability of organizational members to locate relevant information sources. This includes finding explicit knowledge in, for example, databases, but more crucially, the ability to find and contact the persons with task-relevant tacit knowledge (Lesser 2000).

Boundary spanning relationships have been shown to be especially important for innovation (Ancona and Caldwell 1992). It is essential that intra-firm relationships are functioning across organizational units and operations. Also, relationships with external parties are crucial for renewal. In fact, nowadays most of the innovation and development activities take place in networks that span organizational boundaries (Powell et al. 1996). Valuable sources of learning and innovation can be found among the firm's customers, suppliers, partners, and competitors (Tether 2002). In addition, inter-organizational relationships can provide the organization

with access to a wider network of business partners or customers, which furthermore enable the growth of the firm's social connections.

Social relationships in general can be classified as either strong, i.e. close and frequent, or weak, i.e. distant and infrequent. The classic work of Granovetter (1973) demonstrated that these two types of links produce different types of benefits. Strong ties tend to increase trust and diminish opportunism among actors and serve the satisfaction of expressive needs. Weak ties, on the other hand, produce information benefits, as most of the new knowledge is likely to come from actors who represent different social groupings from the actor's own immediate community. Incremental development and single-loop learning benefit the most from strong ties, while radical innovation and double-loop learning are powered by weak ties (Kianto and Kosonen 2007).

In sum, connectivity enables the mastery of change by providing instances where people can compare their own ideas, assumptions and behaviors with those of others in social interaction. Continuously renewing organizations are able to benefit from many types of social constellations: self-organizing work groups, communities of practice, virtual communities, inter-organizational networks and alliances, along with the more traditional structures. Connectivity, as a higher-order capability, can be summarized as including two important facets. First, connectedness to different ties in general makes it possible to utilize heterogeneous knowledge and capabilities inside and outside the organization. Second, connectivity includes the organization's tendency and ability to also form new ties inside and outside the organization whenever needed. By being able to utilize a broad variety of connections, and by being able to form new connections, an organization is truly capable of renewing itself, and subsequently forming new knowledge and capabilities.

### Learning Culture as a Higher-Order Capability

The second higher-order capability that leads to sustained change capacity is learning culture in an organization. Learning culture provides the supportive culture and climate that enables conscious development and questioning of the current operational methods and cognitive models. Learning culture represents the general attitudes of organizational members towards creativity and learning, and the extent to which these activities are supported and enabled by organizational structures and processes. According to Ghoshal (1987), to fully exploit its learning potential, the organization must consider learning as an explicit objective and create mechanisms and systems for learning. In an ideal situation, knowledge and its development are highly appreciated throughout the organization (Leonard-Barton

1995). Employees are seen to possess valuable knowledge and development potential, and there is no strict division into thinkers and doers. Conversely, organizational cultures emphasizing rules, control, efficiency, evaluation and faultlessness are unconducive of renewal (Cameron and Quinn 1999).

The knowledge landscape of a renewing organization is in continuous flux, and conscious efforts are made to improve understanding and the effectiveness of behavior by collecting and comparing different views on important issues. Socio-cognitive research has shown that openness to alternative viewpoints increases the quality of information processing and thereby leads to better solutions. Exposure to differing views leads individuals to search for more information, to think more unconventionally and more divergently, i.e. to consider the issue from various perspectives. That is, minority dissent improves complex thinking, problem-solving and creativity. (Nemeth 1997)

Renewing organizations are characterized by reflexivity and the perpetual challenging of existing mental models and operations (West 1996). Reflexivity stands for the thoughtful and conscious questioning of one's basic assumptions and their limiting influence. For example, an R&D group might be blinded by its previous experiences so that it always falls back on the same types of solutions and cannot create genuinely novel ideas. The ability to question the very fundamentals of the status quo and to think outside the box is an important prerequisite especially for radical renewal and double-loop learning (Argyris and Schön 1979).

Creation of new knowledge always includes an element of uncertainty and risk, and it is unavoidable that some of the innovation attempts fail to produce the desired consequences. In order to enable continuous development, it is important that failures and shortcomings are used as material for further learning, rather than culprits to warrant punishments, humiliation or refusal of future resources (Weick and Sutcliffe 2001). Renewing organizations are characterized by a special type of attitude towards ideas. On the one hand, ideas are taken seriously, namely, they are reacted upon and support and help is provided to elaborate them further; on the other hand, ideas are taken lightly; they are dealt with in a constructive manner without fear of losing face (West 1990).

Learning culture, as a higher-order capability, makes it possible for an organization to leverage on its connectivity. This means that the social connections the organization has inside and outside its borders are openly used in assessing learning opportunities and utilizing them, and in transforming those learning opportunities to concrete action whenever needed. Without sufficient capability in learning culture, an organization is not leveraging its connections in an optimum way, and falls short on renewal possibilities.

**Knowledge Management as a Higher-Order Capability**

The third higher-order capability is knowledge management. Knowledge management represents the organization's systematic practices and tools for information storage and knowledge sharing. Continuously renewing organizations are characterized by proficiency in dealing with the various knowledge assets within the borders and the reach of the organization. Knowledge management tools and systems enable the codification, dissemination, search and retrieval of the lessons learned and thereby facilitate organizational renewal.

The starting point of knowledge management is the recognition of the importance of knowledge and information for the organization, and identification of the strategically significant knowledge within the firm. In other words the organization should assess its stock of intellectual capital and recognize the developmental needs in what it knows and can do (Edvinsson and Malone 1997; Sveiby 1997). Moreover, crafting a conscious knowledge vision and strategy for the firm enables innovation and learning through knowledge management (Von Krogh et al. 2001).

An important factor in managing knowledge for renewal is the comprehension of the different types of knowledge assets. Some knowledge assets are codified and explicit, whereas others are embedded in the tacit knowledge of employees and organizational routines (Nonaka and Takeuchi 1995). Different types of knowledge require distinct management methods and knowledge integration mechanisms (Grant 1996; Pöyhönen 2004) and are related to distinct learning and memory processes (Spender 1996b).

Explicit knowledge can be efficiently disseminated and combined through various systems within and beyond the borders of an organization. In order to achieve this, it is necessary that the required tools are available and that the members of the organization are skilled and motivated to use these systems. Renewing organizations tend to provide their employees with technological tools and platforms that enable effective codification and storing of explicit knowledge in databases and manuals, as well as the search and transfer of it. In addition, explicit knowledge assets should be protected by various judicial mechanisms. Tacit knowledge is, however, embedded in human experiences and shared in social interaction. Therefore the organization should also arrange possibilities for frequent face-to-face communication and creation of shared learning experiences (Nonaka and Takeuchi 1995).

In addition to managing knowledge embedded in the organization, learning and innovating organizations also possess a proactive stance towards collecting information from the environment. For example customer feedback systems, data mining and collaboration with partners and

research institutions are characteristic of renewing organizations. Further, the acquired knowledge should be assimilated in the organization via internal communication, and transformed into improved products, services, processes and mental models throughout the organization (Cohen and Levinthal 1990).

Knowledge management, as a higher-order capability, makes it possible for an organization to efficiently and effectively manage the knowledge and capabilities that it has accumulated through its connections and learning. As a distinct capability, knowledge management can be described as organizations technology that enables transformation on inputs (social ties as sources of knowledge) to outputs (learning and new knowledge that can be utilized to create a change in organizations current capabilities or processes). Technology here is understood in its broad organization theory meaning, where it is defined as objects, artifacts, activities, processes, and knowledge which is needed to produce a particular output (Hatch, 1997, 127–129).

To summarize, the knowledge-based perspective enables the identification of three higher-order capabilities. First, connectivity, as a higher-order capability, describes the variety of sources of knowledge and webs of relationships of knowledge that flow in the organization, and thus enable the formation of dynamic capabilities. Second, learning culture, as a means of how an organization is capable of renewing itself, describe the ways in which knowledge is developed, built and created within the organization. Third, knowledge management, as a means of systematically supporting learning culture by providing enabling tools, technologies, and infrastructure, and managing the outcomes of learning, supports the continuous agility of the organization.

## DISCUSSION AND CONCLUSION

In this chapter we have presented a view of higher-order capabilities that complement the existing literature on dynamic capabilities. Departing from a knowledge-based perspective, we suggested that organizational capacity for continuous change can be seen as a process of augmenting, developing and renewing what the organization and its members know and can do. While the dynamic capabilities literature, addressing mainly the 'first-order' dynamic capabilities examines the idiosyncratic routines for renewing the substantive capabilities of the firm, we argued that to understand the capacity for building and renewing the dynamic capabilities themselves (as well as operational capabilities) a more meta-level explanation is needed, which addresses the organizational characteristics

enabling continuous renewal. We claim that the knowledge-based view could complement this picture by helping to characterize organizational elements that need to be in place for organizations to master change in such a manner that the skills and competencies of all employees of the firm are utilized for continuous learning and innovation.

Some of the recent accounts of dynamic capabilities focus only on the routine-based mechanisms for executing organizational change (Zollo and Winter 2002). While routines surely are important, it seems unlikely that a continuously agile organization could be able to build routines to account for every possible new situation that it is faced with. We claim that also experimentation, improvisation and ad-hoc problem solving are important sources of organizational capability to master continuous change. Therefore the assertion that only stable and highly patterned routines (as dynamic capabilities are often viewed) can function as a source of sustained competitiveness in turbulent environments seems too limited. In addition, the traditional dynamic capabilities perspective suffers from the same kind of tautological argumentation that the resource-based view of the firm has been criticized for (Priem and Butler 2001): as dynamic capabilities are defined as the sources of sustained competitive advantage in turbulent environments they can only be identified once they have produced competitive advantage for a particular firm (Winter 2003). However, this kind of *ex post facto* argumentation can hardly help managers aiming to proactively build organizations that can be successful in the future. The DC theory does not really say what happens after an organization has acquired or demonstrated a dynamic capability at one point in time; if the environment changes, how can we explain the firm's capacity to be continuously agile?

## Higher-Order Capabilities as a Knowledge-Based Perspective to Change Capabilities

We argue that to understand the aforementioned issues, three characteristics of organizations are especially relevant to address: the webs of relationships in which knowledge emerges (connectivity), the learning mechanisms of the organization (learning culture) and the enabling tools and technologies accessible to the organizational members (knowledge management). We call these characteristics 'higher-order capabilities'. We argue that it is the higher-order capabilities that enable sustained renewal of an organization by enabling continuous change and development of ordinary and dynamic capabilities. They differ from dynamic capabilities by their generic and meta-level nature. They are generic in the sense that they enable many kinds of developments, improvements

and modifications of the existing capabilities and knowledge base of the organization. Their outcomes can also include e.g. continuous product innovation, sensitive responsiveness to customer needs, and strategic flexibility which can be defined as dynamic capabilities. They can also foster change is much smaller issues, that are unique (see also ad-hoc problem solving in Winter 2003). They are meta-level in the sense that they enable continuous development of the capacity to form both operational and dynamic capabilities, for example learning to learn and adapt more skillfully. In other words, the higher-order capabilities endow the firm with the ability to create and modify organizational capabilities that the firm possesses at the moment and to learn how to develop them, and thereby they allow sustained flexibility and agility to cope with unpredictably changing environments. We argue that this kind of meta-flexibility (Volberda 1996) is necessary, lest the particular dynamic capabilities of an organization are in danger of turning into core rigidities as the environment changes (Leonard–Barton 1992).

Some similarities to earlier literature and the definition of higher-order capabilities presented in this chapter can be identified. The difference between higher-order capabilities and first-order dynamic capabilities is analoguous to the difference between double-loop and single-loop learning (Argyris and Schön 1978). Danneels (2002) discusses second-order competencies, which are based on exploration and 'enable a company to renew itself through building new first-order competences'. Also Kale and Singh (2007, 984) propose learning processes to 'reflect a higher-order dynamic capability through which a firm systematically generates and modifies its operating routines or skills in pursuit of improved effectiveness with the task at hand'. This distinction comes very close to the one labeled 'learning culture' in this chapter. However, our framework adds two other higher-order capabilities to their view and explicitly relates all of them to the knowledge-based perspective, thereby complementing earlier work. The higher-order capabilities are also related to the 'higher-order organizing principles' by Kogut and Zander (1992), which have been demonstrated to form the source of the renewal capability of organizations (Dougherty 1992).

## Complementary Role of Knowledge-Based Perspectives on the Current Dynamic Capabilities Discussion

In addition to the conceptual discussion on higher-order capabilities, this chapter also addresses some of the shortcomings of the current dynamic capabilities literature; the nature of knowledge, locus of expertise, and controllability of knowledge. First, we claim that the current approach to

dynamic capabilities by itself does not provide all the necessary analytical tools for constructing a comprehensive account of organizational renewal, but has to be complemented by the knowledge-based perspective to understand its social and interactional bases. Without the explicit recognition of the socially constructed nature of knowledge, the dynamic capability approach is in danger of treating knowledge uncritically as a thing or a possession, and neglecting the fundamentally distributed and intersubjective nature of knowledge. However, knowledge is best considered as a collective, socially generated resource, and it is necessary to understand the social dynamics of the knowledge processes in order to understand the reconfiguration of competencies and routines. The argument put forth in this chapter explicitly recognizes the importance of social connections and relational patterns in firms. Theories of dynamic capabilities also tend to forget the role of the employees below the level of the top management in producing change and organizational agility. The knowledge-based perspective with its organization-wide outlook on knowledge integration serves to remind that also the grassroots matter, especially as highly educated knowledge workers are the best experts of their own field and cannot be managed by conventional top-down methods. Therefore the employee level should also be included in the analysis of dynamic capabilities, as is done in the approach presented in this chapter.

Second, while dynamic capabilities view has gone through recent developments, it still includes, to our perspective, some bias with respect to the locus of expertise in organizations. For example, Schreyögg and Kliesch-Eberl (2007) criticize the existing literature on dynamic capabilities for not really addressing the issue of where the dynamism of capabilities arises. They argue that as routine-based activities, capabilities themselves are always stable by nature. Their solution to this dilemma is that it is the continuous monitoring, evaluation and updating of organizational capabilities that is the real source of dynamism and change, rather than any capabilities being dynamic themselves. This interpretation is based on the assumption that there is a party, most likely the top management of the firm, that is able to consciously build, monitor and pattern the capabilities of the firm. However, based on the knowledge-based perspective, it can be argued that organizational knowledge, as the basis of any capabilities, is always distributed by nature, and there cannot be any one overseeing mind capable of comprehending and steering all the knowledge and potential in a firm (Tsoukas 1996). Therefore, Schreyögg and Kliesch-Eberl's (2007) argument seems to adhere to the top management bias, just like many of the other works on dynamic capabilities. The interpretation put forth in this chapter, in contrast, assumes that the renewal of organizational knowledge and capabilities arises from the skills of the personnel in the

firm understood in a wide manner, and cannot be attributed solely to the top management.

Third, knowledge is an issue that cannot be completely controlled, but can best be enabled through creating suitable and fruitful contexts for its emergence. The dynamic capability approach seems to exaggerate the extent of management control and to neglect the role of internal motivation in innovation and learning, as well as the unmanageable nature of tacit and complex knowledge. The perspective on dynamic capabilities presented in this chapter is based on the exploration of the organizational conditions that facilitate, encourage and enable the renewal of organizational knowledge. Thereby it can provide more realistic and tenable guidelines for managers, as they strive to build continuously renewing organizations.

### Limitations and Future Research Directions

The main limitation of the discussion in this chapter is its purely theoretical nature. In future research, the three knowledge-based higher-order capabilities and their connection with organizational change should be illustrated with rich case study data. In addition, this chapter departs from the view that capabilities can be formulated along a hierarchy. Furthermore, there might obviously be more and different kinds of higher-order capabilities than those three outlined here. They could also be labeled or grouped differently. However, we believe that the labels are not important as such, but rather the reasoning behind them. Indeed, further understanding of organizational change and capability development is a challenge for future research, and this chapter has only touched the surface by providing complementary explanation for current theories on dynamic capabilities.

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# PART II

# Dynamic capabilities and strategic entrepreneurship

# 5. Strategic management theory and the state: insights from the dynamic capabilities view

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## ABSTRACT

With the changes brought about by the rise of new rapid-innovation-based industries and the international fragmentation of production, we lack a theory with which to conceptualize our understanding of the role of the state in industrial development. We argue, however, that exactly such a framework already exists in the management literature. The best analogy for expressing the role of the state in industrial development is in terms of a strategic manager within an unmanageable conglomerate. The state role can therefore be seen as one of creating dynamic capabilities and stimulating their usage within the 'corporation', which is in this case, the national economy. It provides signals to induce agents to utilize resources and capabilities to enable the development of long-term competitive advantage in the global market place. This chapter develops these insights for the specific case of rapid-innovation-based industrial development. It also demonstrates why we believe this framework can lead to a superior understanding of the empirical reality, thus providing a powerful tool for future policy formulation.

## INTRODUCTION

In the recent past a variety of regions and states have successfully grown their rapid-innovation-based industries. In some regions, globalization and the fragmentation of production have been the initiator and momentum to enhance this development. Though there is a variety of literature on the various success stories, we lack a theoretical framework to help structure the idiosyncrasies of the multifaceted approaches that states have taken. This is even more compelling since current government approaches are

attempting fast and precise responses to the negative effects in a downturn economy. From the perspective of the neo-classical school of economics, we would argue in favor of market mechanisms, thereby de-emphasizing the role of the state. From a revisionists or developmental-state school, which is based on Gerschenkronian theories of late development, we would favor imitation and learning perspectives. Between these polar views are various mechanisms for addressing market failures, though there seems to be an apparent paucity of theory to capture the development of, for example, capability developments of entire regions or incentivizing efforts of states to drive innovation.

In times of economic recessions these efforts are further increased. We observe that states are taking deliberate actions to develop their high technology industries. Based on these impulses, companies design or align their business models accordingly. These actions have a significant influence on the ways in which industries develop, specifically the strategic approaches firms utilize, the innovative and managerial capabilities multinational corporations develop locally, and the configurations that are formed to maximize global production networks and financial markets. In other words, states have shown themselves to have the capacity to shape the capability building processes of their high technology industries. Consequently, we cannot satisfy ourselves with theoretical attempts to deny the role of the state or merely to discuss its contribution to 'market friendly' policies.

Hence, there is a demonstrable need to refine our understanding of the role of the state in industrial development. This understanding should not only allow us to explain the empirical reality, but also to offer insights with which we can better understand the legitimization, limits, and capacities for state intervention in today's global and multifaceted business environment. A similar metaphor exists in the strategic management literature: we contend that the best analogy for expressing the role of the state in industrial development is in terms of a strategic manager within an unmanageable conglomerate. The state role can then be seen as one of creating capabilities and stimulating their usage within the 'corporation', in this case the national economy, providing signals to induce agents to utilize resources and capabilities in ways which enable them to acquire long-term competitive advantages in the global market place. The state, from this perspective, needs to think about industrial development in terms of capability building, precisely because it has: (i) very little direct control over the action of the individual agents; and (ii) only very limited understanding of the changing realities of the market. These two constraints are significantly augmented in the case of rapid-innovation-based industries, where technology itself can be regarded as the product. Arguably in such cases neither markets nor products are well defined, and hence, detailed

plans for state intervention are of limited utility, suggesting that focusing on capability creation and on the private agents to utilize them profitably within global markets, is the best, if not the only, strategy available. Thus, we do not argue that our approach is a substitute for theories of economic development, but a powerful complementary.

We argue that casting the state in the role of a strategic manager is especially appropriate in the case of rapid-innovation-based industries.[3] We then proceed to utilize the growing dynamic capabilities literature to build a theoretical framework, and in an exploratory way to demonstrate why we believe this framework may lead to a superior understanding of the empirical reality, as well as supplying a powerful tool for future policy formulation. In so doing, we aim to follow the 2000 call for action of the Academy. In particular as it appeared in the special topic forum of the Academy of Management Review issue of April 2005, where both the editors and two papers are highlighting the puzzles that this paper aims to address (Mahmood and Rufin 2005; Ring et al. 2005; Spencer et al. 2005).

We argue that from the point of view of the state, national industries can be seen as a multitude of agents, who need to constantly develop and refine their dynamic capabilities, while collaborating, complementing, or competing with foreign industries in the market place. Consequently, from the national point of view, an industry is one huge quasi-conglomerate that cannot, and should not, be directly managed. Thus, states, in trying to fulfill their direct mandate of securing economic growth and stability for their citizens, have been achieving sustainable competitive advantages by developing and implementing value-growing, non-duplicable strategies in the level of the entire industry sector.

Our theory is strongly influenced from our empirical studies. Specifically, we engaged in six longitudinal studies inquiring into the various roles of policy in the creation and development of RIB industries, within regional and national environments.[4]

## RAPID-INNOVATION-BASED INDUSTRIAL GROWTH AND THE ROLE OF THE STATE

### The Limits of the Developmental State

A prominent school of thought in comparative socio-political economy, which attempts to explain the role of the state in new industrial creation, is the developmental state. This paradigm originates in the work of Alexander Gerschenkron on the industrialization of the 'late developing' European countries (Gerschenkron 1962). In *Economic Backwardness in*

*Historical Perspective*, Gerschenkron presents an institution-based view of how a less-developed state's leadership can use the advantages of relative backwardness to attain rapid economic growth. Advancing a linear theory of economic development that sees it as a process with specific stages, Gerschenkron contends that among the advantages of backward countries is the fact that product markets are already developed and defined by the pioneering countries, which have already invested in the R&D to develop the manufacturing technologies. A backward country, unlike a pioneering country, has the double advantages of knowing the market, and accordingly being able to predict needs fairly accurately, as well as having a clean slate with regards to manufacturing infrastructure so that its industry can invest in the latest technologies. This allows backward countries to reach a scale and scope that the pioneering countries cannot match, as they have already invested in an array of smaller and older manufacturing facilities.[5]

In sum, the developmental state theories have built on Gerschenkron's theory of relative backwardness to present a model of development that emphasizes the role of the state in a national effort of creating an export-based industrial system and facilitating industries that excel in technology transfer-based catching-up. Thus, they advance an argument about the need for specific state structure that enables emerging economies to utilize a particular strategy of development. This is a strategy of state-led development based on long-term industrial planning, and the nurturing of a few large industrial conglomerates operating across a broad array of industries with some managed competition. If successfully employed the result is a system that tends toward large investment in the latest manufacturing technologies to reach scope and scale. The strategy's underlying assumptions are that industrial development is achieved by the growth of a few big vertically integrated firms that manufacture complete products and are not only competing among themselves, but are also able to directly compete with foreign companies in the world markets.[6]

Yet, none of the assumptions of this model hold in the case of R&D intensive and rapid-innovation-based industries. First, looking at the industrial landscape, the market is not already well developed. Therefore, long-term planning by the state, based on the fact that both the products and their markets are defined, is not as useful. Second, the rate of technological innovation is so fast that industrial systems based on incremental innovations in technologies and products developed elsewhere find it difficult to compete and develop comparable products quickly enough. Third, products are no longer being manufactured by vertically integrated firms. Many of the leading multinational corporations (MNCs) in all industries, American as well as European, are shedding most of their manufacturing capacities and moving to manage a global production network where

products are manufactured by stages in geographically distant locations. Finally, when the industry itself becomes the creation of, and locus for the rapid application of new technologies, a strategy that is based on catching-up and massive long-term investment in large-scale manufacturing facilities does not grant such a substantial advantage.

Furthermore, since the idea of the developmental state has now been applied to economies such as France which, while certainly competing in the world market with heavy doses of direct state intervention, are not at all less developed, new theoretical insights into the role of the state need to be injected. Hence, we need to develop a new understanding, a framework which would take us back to the Gerschenkronian moment of having not only ideas about the actions states take and their influence, but a coherent theory as to the role of the state in industrial development.

Some of these same concerns, especially the relative economic stagnation of many of the Asian newly industrialized countries (NICs) and Japan toward the end of the 1990s and their difficulties to succeed in more innovative industries, brought a new version of the development state theories to the fore. Proponents of these neo-developmental state theories, building on earlier research by critics of the strong developmental state theory, such as Richard Samuels, or on the revised theories offered by some of the developmental statists themselves, such as Peter Evans, proposed a restructured theory of state-industry interaction in industrial development (Samuels 1988; Calder 1993; Samuels 1994; Evans 1995; Ansell 2000; Chibber 2002; Amsden and Chu 2003; Chibber 2003; O'Riain 2004). The adjectives describing this newly found category of developmental state proliferated. However, be it: 'the flexible developmental state', 'the neo-developmental state', 'the networked polity', 'the developmental networked state', or 'the embedded autonomy industrial bureaucracy', the same broad model is advanced. This model suggests that for a state to initiate successful industrial development, especially in a technologically intensive industry, it must cultivate interactions and a dynamic division of labor with the local industry. To accomplish this, the state needs to have and retain an ability to make and implement decisions in the national interest; be informed about the needs, abilities, and difficulties of the industry so it can tailor its policies accordingly and refrain from policy initiatives that limit the ability of the industry to develop capabilities on which it can base long-term growth; and change its policies in tandem with the changing needs of the industry. Rather than long-term planning, the state needs a flexible structure that enables it to quickly change and implement different policies as quickly as possible when industrial conditions change.[7]

However, the neo-developmental statists do not supply us with any kind of theory on how and why a state can positively influence the long-term

growth of its industry. What is it, one starts to wonder, that the state actually does through those networks of embedded autonomy and flexibility? If the state does not pick winners and create new industries, if it does not actively manage industrial development, but instead deeply embeds itself within industry, what exactly are the mechanisms through which the state influences the strategic competitiveness building of its high technology industries? It is not enough just to describe the proper state-industry relationships structure, nor is it enough to explain how the state can play the role of supplying the semi-public good of collective action and knowledge creation and dissemination. Rather we need to have a concrete theory of what it is that the state does that positively affects the behavior of companies and organizations in particular industries.

Managerially-based literatures may provide the answer to this question, in particular that of strategic management. Here, we follow in the footsteps of Michael Porter (1990), who addressed the question on how nations advance and prosper in his ten-country study of the patterns of competitive success, applying and advancing the literatures on international economics and strategic management. His work on the 'national diamond', which centers around factor conditions, investment, innovation and wealth, has recently been criticized for lack of precision, variable incoherence and selection bias (Grant 1991). However, the logic of using concepts of strategic management to reformulate theories on national trade and economic development, is still very beneficial. We argue, though, that a more inside-out perspectives, as presented by the dynamic-capabilities view will further advance our understanding of industrial development. The modern state is widely perceived as responsible for the continued economic and financial wellbeing of its citizens. Indeed, as has been the case in many countries, when a specific government failed in this task, it was quickly and swiftly removed from power by its citizens/shareholders. As such, the state is the only actor which is responsible for the development of the industry as a whole. While we agree with the neo-classical economists that the state has only a very limited ability to take direct positive action in the market place, we do argue that it has the unique capabilities of shaping other agents actions, of taking the long-term view, and has the added tool of being able to shape the 'rules' of the game.[8]

To the reader with a management science background it should now be clear that the state, in looking at the question of developing rapid-innovation-based industries, faces many of the similar concerns of a manager of an unwieldy conglomerate. Indeed, one can argue that what the great managers of such conglomerates actually do is to successfully engage in dynamic capabilities creation. It may therefore be apposite at this point to turn to the literature on dynamic capabilities to see what kind of insights it could offer us to the questions at hand.

**Dynamic-Capabilities and the Role of the State**

We argue that there is no apparent reason why the dynamic capabilities view, which focuses on the development of routines (Teece and Pisano 1994; Teece et al. 1997; Eisenhardt and Martin 2000; Winter 2003) cannot be extended to the area of the theory of innovation and the state. Furthermore, as we explain below, we contend that the use of dynamic capabilities is especially compatible with the industrial systems of contemporary rapid-innovation-based industries. The development of routines is a process which is inherently incorporated within contemporary organizations. Accordingly, if we truly want to understand and analyze the growth and deployment of dynamic capabilities, we have to take into account the mezzo level of analysis (Herrigel 1994; Hollingsworth et al. 1994). This reflects the fact that routines are essentially behavioral capacities, which are highly influenced by external interactions (Hodgson and Knudsen 1994). Following this logic, the concept of dynamic capabilities can be as powerfully applied to the state as it can to the company level when industry development becomes the focus.

Thus, the emphasis on resource releases and renewed growth is much better explained in the context of industries than in that of individual firms, as exemplified by the renewed interest in the Schumpeterian concept of destructive creation. Hence, if the demise of a leading company, such as Digital Equipment Corporation (DEC), seems to be a complete failure when analyzed at the level of the individual company, at the level of industrial systems in many locations, such as Massachusetts, the West coast of Ireland, or Israel, the aftermath of DEC demise has been a showcase of how a well managed resource release routine can have robust reinvigorating effects.

Underlying the initial success of, and academic interest in, dynamic capabilities at the company-level of analysis, is a perceived necessity of shifting the economic policy understanding towards an 'inside-out' perspective. The focus is then on the internal capabilities of the state as a unique organization that has the ability to change the rules of the game, whose mandate is the public and not the private good, and that in many cases has the ability to mobilize resources on a scale which is beyond the compass of private industry. We argue that a capability-centric view of the state more closely aligns itself with actual state behavior by emphasizing the development of rare, inimitable and non-substitutable resources in the quest for achieving a sustainable competitive advantage.

The state has three main roles in assisting in the development of these dynamic capabilities within rapid-innovation-based industrial sectors. First and foremost, the state can stimulate private actors to continuously

engage in the creation of dynamic capabilities. There are two main mechanisms by which the state can fulfill this mission; first, directly incentivizing private agents to create dynamic capabilities which they do not possess. Secondly, by stimulating industry to continuously improve its existing dynamic capabilities through increasing corporate awareness and suggesting new ways by which to acquire them. The main avenues available to the state in seeking to achieve the above goals include the creation of policy forums and advisory committees on industrial and regulatory issues, with membership drawn extensively from industry; facilitating and supporting university-industry relations and associated exchanges of information; encouraging risk taking and entrepreneurship by forming agencies that support these activities and by supplying training and education programs. In these various ways, the state can not only allow, but actively encourage, a diversity of economic activities and business models by tailoring its regulations to encourage and support experimentation. Finally, we might note that the state performs its role as the only actor with overall responsibility for economic growth by acting as the main strategic management consulting agency, supporting the development and diffusion of various industry analyses, including resource gap analyses and predictions as to markets trends. We should affirm, however, that we envision the state acting primarily as a supplier and diffuser of information to private actors who are then better informed in devising their own strategies, rather than being itself the implementer of such strategies.

Two examples of such activities might be identified at this point. The first example is the United Kingdom's Development Agencies' efforts to initiate industry-wide internationalization strategies, involving stage-by-stage market penetration export-oriented policy approaches for 'young' British firms, as in programs such as 'Passport-to-Export'.[9] Another example from the UK involves government programs to enhance the utilization of agent or distributor networks. As part of the Export Network program, British start-ups pass through a training program, which educates them in how to approach distributors and customers and maintain relationships before and after the deal is closed.

The second role of the state in the creation of dynamic capabilities is by aiding their development. There are two main mechanisms by which the state can achieve this goal. The state can supply needed infrastructure and information, as in the case of assistance for foreign market penetration and access. The state can also improve what is widely termed as the 'social capital' of the industry by creating venues of collaboration, such as assisting in the formation of industry associations and networks (Coleman 1988; Saxenian 1994; Fligstein 1996; Jackman and Miller 1998; Portes 1998; Whitley 1999; Breshahan and Gambardella 2004; Breznitz 2005a).

An example of such activities is the role played by Enterprise Ireland in assisting Irish start-ups in their first foray into foreign markets, using its extensive global network of offices (O'Riain 2004; Breznitz 2007b). A second example is the role played by regional development agencies in France, such as the Agence pour l'Economie en Essonne, in the creation and maintenance of Optics Valley and Genopole (two industrial networks and community creation institutions in the IT and Biotechnology sectors), in an effort to develop a richer social capital environment where none existed before (Breznitz and Berger 2006).

We would argue that a third role of the state in creating dynamic capabilities applies in cases of very early technologies and severe market failures. If only for a temporary period, the state can directly attempt to create these capabilities and diffuse them to industry. There are two main ways in which the state can engage in direct development of new dynamic capabilities; first, the state can itself develop the new capabilities/technologies as in the case of two famous examples from the US, namely the Defense Advanced Research Projects Agency (DARPA) and the Internet, and the Department of Defense (DOD) and the creation of Computer Science (Langlois and Mowery 1996; Mowery 1996); second, by directly engaging in new dynamic capabilities creation by providing the routes and linkages to external resources. Widely known examples here include the role of the Taiwanese Industrial Technology Research Institute (ITRI) in technology transfer to the Taiwanese IT industry (Hong 1997; Amsden and Chu 2003; Fuller et al. 2003; Breznitz 2005b) and the Yozma program with which the Israeli government not only assisted in the creation of the local venture capital (VC) industry, but directly interlinked it with its US counterpart (Avnimelech and Teubal 2004, 2006; Breznitz 2007a, 2007b).

The literature has so far identified four main domains of dynamic capabilities as well as an additional meta-level of dynamic capability evolution, and in the following section we briefly touch upon each of them, showing how the state, in its role as a strategic manager, is crucial in enhancing the overall level of these capabilities throughout whole industrial sectors; a critical ingredient for long-term success that private industry cannot, and should not be expected to, supply.

## STATE ACTIONS IN THE FOUR DOMAINS OF DYNAMIC CAPABILITIES

Management scholars argue for the categorization of dynamic capabilities into four (Teece et al. 1997; Eisenhardt and Martin 2000), these include: (1) routines for the integration of resources as well as strategic decision

making; (2) reconfiguration routines and exploitation of resources within firms; (3) routines for gaining resources including knowledge creation routines as well as; (4) exit routines to release resources. In addition, another category of 'second-order' dynamic capabilities that enhances the understanding of the formation of dynamic capabilities by integrating parts of the literature on organizational learning and organizational architecture into the framework of dynamic capabilities, was proposed by Zollo and Winter (2002) and Eisenhardt and Martin (2000).

**Integration of Resources**

Two major integration routines are highlighted in the managerial literature: product development and strategic decision making. The deliberate decision on resource reconfigurations for fast product development processes, including idea design and implementation, functions as a major source of competitive advantage. The effective product development process includes well-researched routines such as the inclusion of cross-divisional teams as well as the setting of achievable deadlines to optimize product development processes (Dougherty 1992; Brown and Eisenhardt 1995; Eisenhardt and Tabrizi 1995). Effective innovation process development also includes strong project leaders as well as extensive external communication (Clark and Fujimoto 1991; Ancona and Caldwell 1992; Clark and Wheelwright 1993). These elements do not only apply at the company level but also at the industry level. In line with findings from the managerial literature, we see the state as crucial in the creation, stimulation, and sustaining of a variety of integration routines (Andersen 1993; Bell et al. 2004).

The best known and researched set of state policies that have been demonstrably critical in the creation of integration capabilities throughout whole industrial sectors (although never seen as such by the policy makers themselves) are states' initiatives in the creation of research consortia. A research consortia initiative by the state can be as simple as giving a legal framework that relaxes anti-trust laws and allows companies to pull together their R&D resource and accomplish tasks which they could not accomplish alone, or as sophisticated as creating a program that specifies the projects for which grant aid and resources will be approved. An example of the second, with the specific aim of creating high level industry-wide R&D capabilities, is the Israeli MAGNET, which stands for the Hebrew acronym of Generic Pre-Competitive Technologies R&D (Trajtenberg 2000; Breznitz 2006). A research consortia can also be more state-led and specific, for example the USA's SEMATECH**,** or might aim at technological catch-up instead of new technology development, such

as the Taiwanese Industrial Technology Research Institute-led research consortia (Mathews 2002).

Research consortia help in the creation of integration routines in several ways. First, they allow companies to integrate resources and tackle problems in ways unachievable alone. Second, research consortia, by enhancing intra-company collaborations allow the companies to receive external feedback on their own capabilities, resource, and routines, aiding the discovery of value in existing projects, which would otherwise have gone undiscovered. Third, by pulling in resources and enhancing them with state aid, research consortia enable companies not only to develop more extensive R&D management and product innovation capabilities and routines, but also to develop a wider view of the market, the technological roadmap, and the ways in which generic technologies can be embedded into specific products.

Our understanding of the state's role in focusing on the creation of integration routines has a variety of advantages, not least by the fact that such routines are influenced by the experience of the decision maker as well as by expectations, thereby illuminating the idiosyncrasies involved, and by enabling our analysis to incorporate the well-established integration routines already explored at corporate level.

**Gaining Resources**

The ability to gain resources is itself classified as a major knowledge routine, whether via inside knowledge development or external knowledge acquisition, at both the firm and industry level (Henderson and Cockburn 1994; Powell et al. 1996; Zollo and Singh 2004). We contend that the state needs to take explicit account of these often tacit routines and organize itself accordingly, utilizing alternative modes of innovation behavior appropriate to the particular circumstances of each company. Otherwise, state interactions with industry involving knowledge creation run the risk of being viewed as too sequential, mechanistic, and insufficiently need-oriented. Of equal importance are transfer routines and knowledge creation routines that help in gaining external resources, such as University-Industry alliances and partnerships (Owen-Smith et al. 2002; Rangan et al. 2006).

A key example of successful state policies with regards to both securing new resources and devising new technologies for securing new resources is the Israel VC industry creation initiative – Yozma. The aims of this initiative were fourfold: increasing the amount of venture capital available to Israeli firms, especially in their expansion phases; creating a professional VC industry that would possess the business skills that the IT industry

was lacking at the time; injecting the Israeli high-technology industry with systematic knowledge of the American markets, both product and finance; and expanding what the Israeli government perceived as an overly restrictive group of financiers.

The Israeli state decided that the necessary skills and knowledge did not exist in Israel and that in order to succeed the Israeli VC industry would need strong networks with foreign financial markets, rather than with the local stock exchange, and planned the program accordingly. Yozma was created as a government VC fund of $100 million that had two functions. The first was to invest sums of $8 million in each of ten private limited partnership venture funds, which comprise 40 per cent or less of the total capital – the rest to be provided by the other private limited partners. Second, the remaining $20 million was only made accessible to fund managers who were able to secure partnerships with least one established foreign financial institution and at least one local one. Moreover, the state made a deliberate decision to pick one organizational model for the future Israeli VC industry, namely the American style limited partnership fund, and to focus on early-stage financing VC (Avnimelech and Teubal 2004; 2006; Breznitz 2007a).

Yozma became highly successful and was a model for VC-directed policy worldwide. The precise construction of the program, in particular the fact that it treated the VC as an industry with specific skills to be acquired and capabilities to be nurtured, unlike similar initiatives throughout the world, had a number of positive impacts. The first involved the professionalism and education of the venture capitalists themselves. In Israel, with its relatively long history of the R&D-based IT industry, there was already a growing pool of experienced technological entrepreneurs who successfully managed their companies. This, together with the demand of Yozma to bring in a professional foreign partner, created a VC industry in which the VC typically utilizes an entrepreneur or manager of an R&D-based IT firm. This VC profile is very similar to the ideal American background, and very different from the average profile of VCs in other emerging centers of high technology industry, such as India, Ireland, or Taiwan, where most VCs do not have entrepreneurial or even IT management backgrounds. Second, the Yozma initiative itself sponsored and cultivated many avenues for collective learning within the industry, which enhanced its capabilities (Avnimelech and Teubal 2003; Breznitz 2007a).

As this example shows, the conceptualization of the role of the state as a strategic manager for the utilization of dynamics capabilities has many advantages. Reviewing resource gaining routines at the industry level, not only enlightens us to what exactly the state does, but also points the way toward specific goals and aims of future industrial development policies.

**Reconfiguration of Resources**

With regards to the reconfiguration of resources, the managerial literature includes resource allocation routines as well as resource configurations. These comprise routines for technology brokering (Hargadon and Sutton 1997), as well as resource-deepening and resource-extension routines (Karim and Mitchell 2000). To do so, state agencies need to examine how local companies identify relevant capability configurations and pursue them to enhance the generation and deployment of ideas. This includes the configuration of new capability clusters, which incorporate capabilities and resources from other organizations, and would thus strengthen the innovation process or generate synergistic resource combinations (Eisenhardt and Galunic 2000; Zimmermann et al. 2007). Moreover, resource allocation routines can be linked to improved company performance and are therefore central to an interest the state has in establishing rapid-innovation-based industries (Venkatesan and Kumar 2004).

A similar categorization can be achieved within entire industry clusters, whereby the strengthening of the innovation capabilities within rapid-innovation-based industries would be apparent. According to Eisenhardt and Martin (2000, 1112) the value of dynamic capabilities 'lies in the resource configurations they create'. These can include knowledge transfer processes used to recombine resources in the areas of innovation process or internationalization management. Subsequently, capability clusters and new capability configurations can be formed in order to incorporate major 'best practices' within the industry.

A classical example of the state acting in a strategic management for a capability configuration process of its local rapid-innovation-based industry is the role that the Taiwanese government played in the development of the semiconductors industry; especially the crystallization of the pureplay intellectual capital (IC) fabrication foundry model. This process, cumulating with establishing and spinning-off of TSMC (Taiwan Semiconductor Manufacturing Corporation), completely transformed not only the Taiwanese semiconductors industry, but also the global one (Meany 1994; Mathews and Cho 2000; Hsu and Chiang 2001; Chang and Tsai 2002; Fuller 2002; Fuller et al. 2003; Breznitz 2005b; 2007a; Ernst 2005).

The pureplay foundry model is one of the best examples of an organizational innovation that enabled new levels of fragmentation of the semiconductor industry's production network.[10] In 1986, the viability of the pureplay foundry was still unclear, as the technology for full codification of the designs was not yet developed. Nonetheless, the Taiwanese government strategically decided to advance it. The implementation of

the model was pioneered within Taiwan's largest public research institute – ITRI – and spun-off as TSMC in 1986. It developed as part of state efforts to infuse the Taiwanese industry with Very Large Scale Integration (VLSI) capabilities. A decision was made to commercialize and privatize the VLSI project by creating a joint public-private company, to be called TSMC. However, the Taiwanese state faced a very unwelcoming investment landscape, with the private market unwilling to commit to a leading investment. This ironically proved to be a boon for TSMC as Phillips, the Dutch MNC, agreed to invest 27.5 per cent of TSMC's initial investment and became its leading private shareholder, with another 48.3 per cent of the investment coming from the China Development Corporation, an investment arm of the ruling KMT party (Fuller 2002; Fuller et al. 2003).

Within a few years TSMCs effect on the Taiwanese semiconductor industry became immense. Its services enabled a growing number of companies to profitably commence operations. This unleashed the commercial potential of the Taiwanese industry's application-specific integrated circuit (ASIC) specialization and skills. By 1997 the pureplay foundries have been fabricating the lion-share of chips in Taiwan with many of the older companies converting to the foundry model or being bought by pureplay foundries in need of more fabrication facilities; with the same transformation quickly occurring worldwide. Furthermore, the two Taiwanese Pureplay foundries (TSMC and UMC), both of which official spin-offs of ITRI, are the global market leaders.

Putting on a resource reconfiguration lens, with which to analyze the role of the state helps in exploring some of the dynamics within policy making. As our example highlights, the painstaking analysis of existing resources, as well as the conscious effort aimed at solving issues of resource needs, can foster the development of new industrial segments. The emphasis is, however, on the capability to reshuffle resource units in order to form new industrial activities, generating sustainable competitive advantages to the national industry.

**Releasing Resources**

Eisenhardt and Martin, highlight the importance of releasing resource routines thereby counterweighing the gaining of resources (Eisenhardt and Martin 2000). In particular, the ability to find exit routines is proposed, which on a company level includes exit routines for products and markets on a broader level, offshoring, outsourcing (Adelakun and Jennex 2003) as well as exit routines as regards idea implementation or collaborations on a more innovation-specific level. Exit routines highlight the conscious abandoning of markets, products and even entire technologies

(Burgelman 1994, 1996). The logic behind this is that the planned exiting of a product that is either not profitable or has limited future impact, can unleash the necessary resources to be used for more specialized or future-oriented constructions of value chains.[11]

A revealing example for the role of the state in developing and maintaining industry wide resource releasing routines is the case of the development agencies in the UK. Initially, the East of England Development Agency (EEDA) focused on development and national distribution of resources. However, EEDA realized the perceived 'diffusion' caused too many companies to attempt to approach too many markets for their relatively wide product portfolio, with little apparent success. To resolve this problem, EEDA developed a routine for exiting markets that was then shared and further developed in conjunction with private companies. Consequently, the focus of the EEDA internationalization expertise changed to operate side-by-side with assisted companies to internationalize and develop resource creation and integration dynamic capabilities, EEDA is now offering extensive aid in developing exit routines, to allow companies to recognize when should they exit a market as well as when they should enter.

Understanding the critical role of the state in enhancing and enabling the successful implementation of exit routines is also highly instructive for other reasons. It has long been argued that one of the major inhibitors of sustained economic growth and the inability of specific industrial systems to dynamically and flexibly react to radical technological changes has been the active opposition of losers. Thus, in its role as the guardian and supplier of the public good, it is critical that the state vigorously interacts with industry in dealing with both resource exit and resource reconfiguration routines.

## CONCLUSIONS

How does the dynamic capabilities literature advance our current understanding of the role of the state? By taking a first step towards a coherent theoretical understanding, this chapter offers a way out of the current impasse, whereby on the one hand we have theories which tend to the polar extremes, which have very little resemblance to the current reality; and on the other hand, we have a multitude of explanations of specific cases with very little generalized theoretical conceptualization.

We have therefore called for the conceptualization of state industrial development efforts in terms of management theory. Specifically, we argue that the state should be seen as a strategic manager, whose main role is the

creation and diffusion of dynamic capabilities throughout the 'industrial-conglomerate' under its responsibility. This chapter has emphasized the interconnections between the integration, formation, reconfiguration and release routines within a policy environment. We have highlighted the importance of the literature in the emerging field of dynamic capabilities and argued that this perspective provides useful insights into understanding some of the 'black boxes' hitherto encountered within our understanding of the role of the state. Among these are resource integration and reconfiguration dilemmas, which any nation needs to consciously and explicitly address to enhance its innovation capability. Analyzing the state role in terms of strategic management also answers the need for an anchoring principal, around which policy makers frame, understand, and explain to themselves and others what is the 'it' that they do and what are their aims.

We aimed to show the usefulness of the view of the state as a strategic manager by indicating the benefits of moving towards such a perspective. Among these benefits are a better opportunity to articulate the underlying principles of policy interventions in terms of actions that include the integration, reconfiguration and exiting of resource routines. Such an approach yields important insights into policy experience, and contributes to a better reflection upon efficient policy making. Using the principles outlined in the dynamic capabilities literature, we hope to install a 'macroscope' in front of policy making, enabling reflections on policy actions by using a dynamic capabilities lens. In this respect, our empirical examples highlight how the level and quality of assistance provided need to be oriented towards building dynamic capabilities that involve knowledge codification, knowledge articulation and a reflection upon past experience.

Thus, programs adapted to resource constraints, and paying attention to the construction of dynamic capabilities, may enable policy making to better understand and engage in the development of research and industry clusters. In addition, policy interventions may better be directed to harmonize and categorize resource needs to reconfigure entire industry value chains. A dynamic capabilities framework may even function as a roadmap for resource deployment in less developed regions, as well as help identifying opportunities for resource integration.

As to the way research is conducted, we argue that state policies should by analyzed by their influence on capability formation and development. Doing so, we contend, would also allow for a more coherent multidisciplinary research effort, bringing forward different streams of research to focus on understanding the ways in which state policies influence the development and retainment of dynamic capabilities across industries. We also systematically show that each of the five key domains of dynamic

capabilities helps in understanding various aspects for the deployment of policy making. Our examples highlight the importance of routines and codification in combining resources in the dynamic process of managing the unmanageable. This bridges the gap in our understanding of the role of policy making in building, developing, and maintaining rapid-innovation-based industries. We have highlighted examples of how the state can identify relevant capability configurations to increase the generation and deployment of ideas. Further, we have exemplified the configuration of new capability clusters that eventually strengthen the overall innovation process of a region or state.

In a call for future research, we encourage the further development of an applicable framework within dynamic capabilities that is differentiated towards the role and needs of the state. Possible approaches could be matrices, scorecards or sets of guiding principles to help foster the debate and provide further application. A longitudinal analysis could also shed light on the dynamics within the change process of intensified state interventions as well as the actual development of dynamic capabilities towards an industry and state level. This would be particularly beneficial to help understand the changing behavior of companies and states in and around times of economic recessions. Moreover, a discourse of the individual segments of dynamic capabilities could help to provide a solid theoretical grounding for further research in this area.

Generally, we argue that our research provides a first step in helping to integrate some of the recent developments in comparative political economy theory and strategic management theory. This truly dual-disciplinary approach to a common phenomenon might be an effective advance in disentangling the specific developments of growth in high technology and other industries. The mutual transfer of knowledge may also be a fruitful and promising approach to further enrich the application of a dynamic capability oriented view and thus may help us gain further insights into the multi-faceted actions and developments of enterprises and states in a globalized environment.

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## NOTES

1. Georgia Institute of Technology and Stanford University, The Sam Nunn School of International Affairs & The School of Public Policy, Atlanta, USA.
2. Queens' College and Judge Business School, University of Cambridge, United Kingdom.
3. Rapid innovation-based industries are defined as industries populated by New Technology Based Firms (NTBFs), where NTBF are defined as companies whose products are new technologies, based on their own and others' R&D effort to commercialize applications of new technology, or companies whose main revenue stream is based on R&D efforts to develop new technologies. For more on rapid-innovation-based industrialization, see (Breznitz 2007a).
4. It is important to note, that these five studies were *not* conducted in order to build and test the framework we present in this chapter. Nor did they construct one holistic body of research. Thus, each was chosen for different context specific reasons, which significantly influenced the sampling technique and location However, we feel that full disclosure urge for sharing with the readers at least some basic descriptions of the five studies. Overall in these five studies a total of 610 interviews were conducted in Taiwan, Ireland, Israel, USA, the Greater Paris area (Ile-de-France), and East of England (UK) in an attempt to extensively map these industrial systems. The use of published, governmental, and archival data helped to achieve a degree of external validity.
5. Some of the same insights have been the basis for Paul Krugman's early model of global innovation and income distribution, as well as the basis for the flying geese and product cycle models of the geographical development of industrial production, see (Akamatsu 1962; Krugman 1979; Vernon 1966).
6. Parts of this version of this economic growth theory have been sanctified by the World Bank (WB 1993).
7. There are some differences among the neo-developmental state theorists, in particular between those who argue that the state should continue to advance national champions, and those who argue for a strategy based around SMEs. It is unclear whether these differences arise because of the different context of location, timing, and industries that the different writers researched. However, in the critical part of theorizing about the optimal role and behavior of the state in its attempt to spur the growth of high-technology industries and in their treatment of the state for all practical purposes as a unitary actor, the authors are similar enough to be treated as advancing one model.
8. There are of course major differences as to what is the legitimate role of the state in doing so, and as to the priority that the state should give industrial development versus ensuring social welfare and economic equality. Each of these dilemmas is solved differently in different countries, for example the Scandinavian countries are given a much higher priority to welfare and social network providence then the US or the UK. Nonetheless, we argue that all modern states see industrial development as one of their key economic roles.

9. Passport-to-Export is a package offering by UK Trade and Invest with the aim of nurturing companies through the formative planning stages of exporting (Mughan et al. 2004).
10. Originally, the leading semiconductor firms were all Integrated Device Manufacturers (IDMs), which built their own dedicated fabrication plants. The industry also consisted of design houses that were smaller and marginal and needed to secure their fabrication capacity from IDMs with no standards for information transfer, and with the added risk of sharing their intellectual property (IP) with potential competitors. Moreover, the process was lengthy and cumbersome, putting the design houses in distinct disadvantage. In contrast, the pureplay foundry model calls for the creation of companies whose sole business is fabrication. Pureplay foundries receive codified designs from the design houses and fabricate their chips for them. Thus, they enable stage specialization in both design and fabrication.
11. The literature on exit routines for products and markets is multi-faceted, for two recent summaries, see (Burgelman 1996; Sull 1999).

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# 6. Resource acquisition and venture survival in the telecommunications industry

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## ABSTRACT

Using resource-based theory and upper echelon theory, this study identifies factors influencing new venture survival and failure. The resources firms control and the characteristics and composition of their top management teams (TMTs) play a major role in firms' likelihood of failure. The results indicate that TMT characteristics do not significantly differ among survivors and non-survivors and TMT composition does not impact firm failure. Consistent with earlier literature, firms entering the market earlier, patenting their innovations, and those with a scale advantage have a higher likelihood of survival.

## INTRODUCTION

In the last decade, triggered by technological breakthroughs and government deregulation, the number of new firms in Internet-based and telecommunications industries increased dramatically. While some of these ventures created successful public firms and jobs in the short run, many failed within a few years. The number of new issues was dramatically lower in 2001–2005 after the dotcom era than in any other period in the last two decades. It is important for researchers to identify and understand how and why these boom and bust cycles occur. This chapter examines such survival and failure patterns.

Failure of new ventures is an area that has not been systematically explored in the strategic management or the entrepreneurship literature. This chapter proposes that past research attempting to investigate this topic has serious limitations in that it has relied solely on data collected from successful companies. The study is designed to overcome the survivor

bias inherent in previous work by examining data on *both* surviving *and* failed companies.

## THEORETICAL BACKGROUND

Researchers agree the entrepreneurship literature clearly needs to address some of the explanatory variables typically examined in strategic management for *how* business opportunities are exploited, as well as a framework broader than firm creation (Shane and Venkatraman 2000). This study attempts to provide such a framework. The asymmetric nature of information about emerging markets, products/services, or processes allows entrepreneurs to seek out those resources that can be recombined in new ways and sold at a profit (Schumpeter 1934). The duration between the emergence of an opportunity and its diffusion is influenced by many different factors (Shane and Venkatraman 2000). This study investigates such factors influencing firm performance, and subsequent survival/failure are identified using resource- and knowledge-based views of the firm, and upper echelon theory.

The primary research questions are: 1. W*hen and why do new ventures fail?* and 2. *How do top management team characteristics contribute to new venture performance?* Almost by definition, some variables that have been found in strategy research to be important predictors of firm performance, such as top management characteristics, become even more highly relevant in the entrepreneurial context, because they drive (access to) other resources for the new firm. This study develops a multi-level theoretical framework to investigate such predictors and then empirically test the framework to determine whether these variables also predict performance outcomes for startups as well as they predict outcomes for established companies. In particular, the primary emphasis is on the impact of top management team characteristics on firm performance, an area that has received considerable attention as well as accumulated strong support in the strategic management literature. Much of the evidence has focused on samples of established firms. This study investigates whether TMT characteristics are as critical for new ventures as they are for more established firms.

## HYPOTHESES

The following hypotheses examine the impact of group, organizational, and industry factors on firm failure. According to the resource-based view

of the firm, entrepreneurs construct opportunity with the resources they control, so if they do not possess or have access to the right resources, or they misuse what they do have, they might not be able to succeed. Hence, entrepreneurs can fail even if they have valuable opportunities. There are critical factors in the internal (i.e. organizational level) and the external (i.e. industry level) environment of the firm that contribute to how opportunities are exploited. Factors this study investigates include TMT characteristics and composition (i.e. group level), as well as timing of market entry, firm size and age, proprietary organizational knowledge, venture capital involvement, and intensity of competition. The impact of these factors on firm performance is examined.

If firms and their managers do not possess or have access to the necessary resources and capabilities, they may remain unaware of opportunities. The characteristics of top managers, in this case, entrepreneurs, are particularly relevant to opportunities and particularly critical for young firms because they have not had the time to establish firm-level networks that can alternately provide them access to opportunities (Eisenhardt and Schoonhoven 1996).

There is an established literature stream in strategic management that provides strong evidence for the contribution of managerial deficiencies to organizational decline and subsequent failure (Hambrick and D'Aveni 1992). According to upper-echelon theory (Boeker 1997; Knight et al. 1999; Pegels, Song, and Yang 2000), TMT characteristics significantly affect firm behavior and outcomes because top executives are the primary strategic decision-makers in the firm. Upper-echelon theorists have utilized demographic characteristics of the TMT (such as age, education, tenure, functional background) to serve as indicators for the intangibles in the TMT's decision-making process (Goll, Sambharya and Tucci 2001).

According to upper-echelon theory, decision making in the TMT is influenced by the executives' values, beliefs, and cognitions, all intangible constructs that are difficult to measure. The upper-echelon theory suggests that researchers can utilize demographic characteristics of the executives on the TMT as observable proxies for the individuals' input and their group decision making (Finkelstein and Hambrick 1990; Thomas, Litschert, and Ramaswamy 1991; Michel and Hambrick 1992; Hambrick and D'Aveni 1992; Boeker 1997). Studies in this area have predominantly found associations between TMT social and demographic characteristics and organizational outcomes (Pegels, Song, and Yang 2000). The demographic characteristics of the TMT are said to inform the shared vision that inspires the team's decision making (Hambrick and Mason 1984; Miller 1993). Effective information processing by the TMT improves firm performance (Henderson and Fredrickson 1996).

Among TMT demographic characteristics that have been found to affect firm performance in established firms, age is expected to be positively associated with risk aversion (Goll, Sambharya and Tucci 2001). Better education and up-to-date technical knowledge are argued to characterize younger managers (Bantel and Jackson 1989) Younger age should therefore contribute to superior performance (Norburn and Birley 1988). Previous research corroborates this perspective (Zenger and Lawrence 1989; Knight et al. 1999) although when TMT members are too young, it may be difficult for a startup firm to attract a valuable network of people (e.g. investors, customers, suppliers, etc.) who will help them with various aspects of the business. The demographic characteristics of the TMT may also act as signals to the public for the performance potential and risk of the company, especially with the lack of historical data for a startup (Cohen and Dean 2005). Older TMT members, in that case, could be perceived as more experienced, and in turn, help the company gain access to valuable resources and networks (Goll, Sambharya and Tucci 2001). Combining the two arguments, the benefits of age would be expected to bring diminishing returns to firm performance at higher levels.

***Hypothesis 1:*** *TMT age will have a U-shaped relationship to the likelihood of failure for the firm.*

Past research has found the level of education in the TMT to be associated with changes in corporate strategy (Wiersema and Bantel 1992) and innovation (Bantel and Jackson 1989), and as such, with firm performance (Norburn and Birley 1988). TMTs with higher levels of education are expected to generate a wider range of creative solutions when faced with complex problems and therefore are much better equipped to handle the problems that could arise from being a new venture. Moreover, the telecommunications industry is driven by innovation. Having a TMT that includes executives with advanced degrees in engineering, for example, is a very valuable asset for a young company.

***Hypothesis 2:*** *Higher educational levels for the TMT will be negatively related to the likelihood of failure for the firm.*

Outsiders on the TMT extend the expertise of the board of directors (Pfeffer and Salancik 1978; Hambrick and D'Aveni 1992). They can contribute different viewpoints to the group's decision-making process while expanding the firm's network through their own access to people, firms, and resources (Goodstein and Boeker 1991). Rosenstein, Bruno, Bygrave, and Taylor (1993) found that outside board members added value to the

organization primarily by acting as a 'sounding board'. Other areas they found outside board members were helpful in interfacing with the investor group, monitoring operating and financial performance, assistance on short-term crises and problems, providing contacts with customers, obtaining sources of financing, and development and modification of strategy. Outside board members also act as constraints on the activities of management (Mizruchi 1983; Daily, McDougall, Covin, and Dalton 2002), more so than insiders (i.e. board members who are also executives of the firm).

***Hypothesis 3:*** *The influence of outside members on the board of directors will be negatively related to the likelihood of failure for the firm.*

Heterogeneous (diverse) TMTs are those that display a greater diversity along certain dimensions/characteristics. There are strong theoretical reasons to believe that heterogeneous TMTs will be more successful because they will seek out a variety of numerous strategic alternatives and ideas and will arrive at solutions from different cognitive perspectives (Eisenhardt and Schoonhoven 1990; Wiersema and Bantel 1992; Pitcher and Smith 2001). Heterogeneous teams will thus exhibit greater creativity. Hambrick and Mason (1984) and Priem (1990) argued that heterogeneous TMTs would be best able to manage complex environments. Heterogeneity is especially important in new ventures because of the complex and ambiguous nature of the TMT's task in a startup. In prior research in this area, evidence has shown stronger relationships between heterogeneity and strategic outcome variables in turbulent environments (Murray 1989; Eisenhardt and Schoonhoven 1990; Boeker 1997; Pitcher and Smith 2001).

Heterogeneous TMTs can exhibit diversity in various dimensions. For instance, primary activities of the firm, such as research and design, operations, finance, as well as marketing and sales should be represented on the TMT (Hambrick and D'Aveni 1992). The functional perspectives represented on a TMT are indications of the firm's capabilities in these aspects of running the business. Daily, McDougall, Covin, and Dalton (2002) note that functionally balanced startup teams have been empirically linked to firm growth in new ventures.

***Hypothesis 4:*** *Heterogeneity in the functional backgrounds of the TMT members will be negatively related to the likelihood of failure for the firm.*

A form of diversity that has not been very well researched in the past is heterogeneity in prior industry experience among the members of the TMT.

TMT members who have been active in that particular industry before they got involved with the current startup have a lot to contribute to the team in terms of industry knowledge. Cohen and Dean (2005) have found that past industry experience of the TMT serves as an important signal of value to investors in IPOs. Vesper (1980) reviewed a number of studies that examine factors associated with survival and found that success was more likely to be achieved by those who undertook entrepreneurial efforts in a business they knew well. If such knowledge is also coupled with the different viewpoints of members who have experience in other industries, then the true value of it can emerge in an environment where alternatives are discussed and more innovative decisions and solutions are reached. Kor (2003) has found that managers' past industry experience does contribute to new venture growth but only with diminished returns.

***Hypothesis 5:*** *The TMT's heterogeneity in past industry experience will be negatively related to the likelihood of failure for the firm.*

The above-mentioned argument about the knowledge benefits of having past industry experience can also be developed for past startup experience. Those TMTs with members who have experience in starting companies or members who have worked with other startups previously will not only derive direct learning benefits from their past, but also will be perceived by other stakeholders as more reliable and competent, and will be connected to a network of individuals who might be valuable to the new firm. 'Prior experience provides knowledge about resources that help to start new firms, entrepreneurial skills, and reputations that help to influence the reallocation of resources to the new venture' (Shane 2001, 211). The net result is higher productivity and fewer mistakes.

***Hypothesis 6:*** *The TMT's past startup experience will be negatively related to the likelihood of failure for the firm.*

Cognitive diversity may sometimes make teams *less* successful because heterogeneity along certain lines may produce conflict and therefore reduce strategic consensus (Smith et al. 1994). Hambrick, Cho, and Chen (1996) found that heterogeneous teams were slower in their actions and responses and were less likely than homogeneous teams to respond to the initiatives of their competitors. Carpenter (2002) also found support along these lines and concluded that at high levels of complexity, the negative behavioral consequences of diversity may begin to undermine the positive sociocognitive ones. The benefits of heterogeneity might be outweighed by a lack of coherence and behavioral integration within the team (Finkelstein

and Hambrick 1996; Carpenter 2002). And homogeneity provides certain benefits, too. For instance, diverse teams might not have shared worldviews and common decision-making routines. Coordination among TMT members in highly heterogeneous teams could thus be slower (Williams and O'Reilly 1998), thereby rendering decision-making less efficient.

Research has also shown that teams that perform well under uncertain and ambiguous conditions have high coordination and flexibility, conditions cultivated more easily by team homogeneity rather than heterogeneity (Eisenhardt and Bourgeois 1988; Eisenhardt 1989). Along the same lines, Simons, Pelled, and Smith (1999) examined four kinds of demographic diversity that tend to exist in TMTs. Of these, they classified functional, educational, and tenure diversity as more job related and age diversity less so. Following Williams and O'Reilly (1998), they argued and found support for more job-related forms of diversity having a greater potential impact on organizational performance. Job-related forms of heterogeneity, by definition, give the TMT the ability to bring in diverse information and viewpoints, which, in turn, affect organizational outcomes. On the other hand, if the TMT process is characterized by less job-related forms of diversity, such as age, then even though TMT members still exhibit diversity, this may have very little to do with accomplishing their tasks. In this case, the TMT process would not be expected to impact organizational performance very significantly (Simons et al. 1999).

Neither of the positions for or against TMT heterogeneity has received convincing empirical support in extant research in the area (Pitcher and Smith 2001). Considering the fast-paced, complex, and uncertain environment of the firms in this sample, this study advances competing hypotheses on age and tenure heterogeneity of the management team:

***Hypothesis 7a:*** *TMT age and tenure heterogeneity will be negatively related to the likelihood of failure for the firm.*
***Hypothesis 7b:*** *TMT age and tenure heterogeneity will be positively related to the likelihood of failure for the firm.*

Among the organizational level variables this study examines, order of entry into the market has been researched primarily in marketing even though it started in economics (Kalyanaram, Robinson, and Urban 1995). In the extant literature, there are two broad streams of thought: a number of authors have stressed the importance of being the first to a market, while others have developed contingency models where followers can create more advantageous positions for themselves (Teece 1986). For the startups in this sample, being early to market is a more advantageous position.

Relative to later entrants, market pioneers (i.e. first movers) can gain and sustain competitive advantage at different levels.

> At the consumer level, theoretical research predicts that consumer risk aversion, pioneer prototypicality, and consumer learning can aid the market pioneer. In distribution channels, it can be easier for pioneers to gain intensive distribution and to dominate scarce retail shelf space. At the firm level, scale economy or experience advantages can lead to higher quality and lower costs. Market pioneering firms also have the opportunity to develop a broad product line, while later entrants are often forced to enter a market niche with a narrow line (Kalyanaram, Robinson, Urban 1995, G215).

Pan, Li, and Tse (1999) suggest that economic, preemptive, technological, and behavioral factors may allow pioneers to obtain and sustain a competitive advantage.

Kalyanaram, Robinson, and Urban (1995, G218) summarize findings in the literature on the association of order of entry with firm survival:

> Across 36 categories of consumer brands, Golder and Tellis (1993) report a long term survival rate for market pioneers of only 53 per cent. While they do not have data on later entrants, other studies directly compare long-term survival rates for market pioneers and later entrants. No difference in survival rates is reported across 18 markets for Iowa newspapers, 39 markets for chemical products, and 11 markets for consumer nondurables. In contrast, Mitchell (1991) finds lower pioneer survival rates in five subfields of the medical diagnostic imaging industry.

The empirical evidence in this area, however, is at best not robust and the confusing results indicate that the rewards of pioneering should be estimated after controlling for survival bias by studying successful and unsuccessful pioneers.

***Hypothesis 8:*** *First movers and early followers will have a lower likelihood of failure than late entrants.*

For the most part, strategic management research has empirically supported the notions of the 'liability of newness' and the 'liability of smallness' (Stinchcombe 1965; Aldrich and Auster 1986). There is considerable evidence in the extant literature that points to how firms are more likely to survive as they age and increase in size (Venkatraman and Low 1991). Small business accounts for about two thirds of all firm failures and the majority of those occur in the first 2–5 years of a new venture (Timmons 1999). Pan, Li, and Tse (1999) suggest that since large firms have more resources to invest in innovation and to pursue more

aggressive expansion strategies, they can perform better. Large firms enjoy economies of scale and scope (Kobrin 1991), have more financial resources, greater legitimacy, and more slack within the organization (Aldrich and Auster 1986; Venkatraman and Low 1991). Compared to smaller firms, large firms are more likely to perform better (Pan, Li, and Tse 1999) since the above-mentioned factors allow them to have a greater depth and breadth in products and services (Venkatraman and Low 1991). Smaller firms are more likely to fail since they have fewer contacts with external creditors, management with shorter tenure, and less substantial resources to survive unfavorable environmental conditions (Bruderl and Schussler 1990; Mascarenhas 1997). Previous work has mostly shown that large-scale entry improves firm performance (Evans 1987; Dunne, Roberts, and Samuelson 1989; Lieberman 1990; Duchesnau and Gartner 1990). Timmons (1999) concludes that new ventures that cannot reach a critical mass of 10–20 employees and $2–3 million in revenues are more likely to fail than larger organizations. Size is at least as important in the case of startups as in older and more established companies since it can be thought of as partially a function of the viability of the firm's business model as well. Firms that have reached a certain size even before the time of the initial public offering (IPO) probably have higher capitalizations and a business model that is working at least to an extent.

***Hypothesis 9:*** *Firm size will be negatively related to the likelihood of failure for the firm.*

Stinchcombe (1965) talks about two important factors at the time of the founding of firms. The first one is the external network the firm has developed. Young firms face more difficulties than older ones, which have established suppliers, customers, and other stakeholders and therefore legitimacy and power. New organizations are based on relationships that are less stable and more tenuous. For example, it takes time to learn about what customers want and need and to develop the organizational skills required to meet those needs (Venkatraman and Low 1991). The second factor is internal to the organization. The management team in a young organization has less experience working together and this can cause delays, errors, and inefficiencies in critical decision making. Besides, the management team has to follow a learning curve with respect to their roles and tasks in the new organization – rules and routines can only be learned over time (Venkatraman and Low 1991). Stinchcombe (1965) concludes that a higher proportion of new organizations fail compared to older firms.

Firm age is thus a proxy for risk since newer firms do not have historical data on which investors can assess the value of the firm. This is especially important during the IPO process when the firm needs to attract capital from prospective investors. Ritter (1991) and Hensler, Rutherford, and Springer (1997) found that older firms performed better in the aftermarket of IPOs than younger ones. This interpretation of the 'liability of newness' has been empirically tested and supported in numerous studies (Carroll and Delacroix 1982; Freeman, Carroll, and Hannan 1983; Hannan and Freeman 1989; Bruderl and Schussler 1990).

***Hypothesis 10:*** *Firm age will be negatively related to the likelihood of failure for the firm.*

According to the resource-based view of the firm, resources that are unique, rare (i.e. not widely held), and valuable (i.e. contributing to firm efficiency or effectiveness) can generate competitive advantage for firms (Barney 2001). The knowledge-based view of the firm is an extension of the focus on intangible resources in the resource-based view of the firm. According to researchers who apply the knowledge-based view, knowledge is the most significant firm resource (Grant 1996; Hill and Deeds 1996; DeCarolis and Deeds 1999). In this perspective, firm know-how is a firm-specific asset which is a potential source of competitive advantage for the firm because it cannot be imitated or traded (i.e. bought and sold in factor markets), and is differentially distributed within a population of firms (Dierickx and Cool 1989; DeCarolis and Deeds 1999). In industries populated by entrepreneurial high technology firms, such as telecommunications, the rapid development of new products is a key determinant of success (Deeds, DeCarolis, and Coombs 1999). For firms whose competitive advantage stems from their knowledge base, it is crucial to safeguard this asset. One way of ensuring such protection is obtaining patents for the firm's products, services, methods, processes, and tools. When entrepreneurs who have invented a new technology decide to start their own firms, they normally do not yet possess all the complementary assets that are necessary to gain competitive advantage (Teece 1986; Shane 2001). 'The patents held by a small, technologically oriented firm may be its most marketable asset' (Levin, Klevorick, Nelson, and Winter 1987, 797).[2] If new technology is safeguarded by patents, the firm can then develop its complementary assets, skills, and value chain before its new technology spills over to competitors (Teece 1986; Shane 2001).

***Hypothesis 11:*** *The number of patents controlled by the firm will be negatively related to the likelihood of failure for the firm.*

Venture capitalists (VCs) provide not only capital for their investment firms but also guidance for developing a business concept, helping managers integrate related innovations, and selecting and accessing the right people to include on the management team (Kambil, Eselius, and Monteiro 2000). Venture capitalists repeatedly interact and have interlocking arrangements with investment bankers and analysts, important actors for a pre-IPO firm. They have the ability, skills, and reputation to provide complementary assets to the new firm. As a result, they can support the IPO firm by not only providing funding, but also assisting in the optimal allocation of it (Jain and Kini 2000). VC involvement also acts as a 'powerful signal to potential investors at the time of the IPO' (Daily, McDougall, Covin, and Dalton 2002, 401).

Prior research has found that VC-backed firms differ significantly from non-VC backed firms on critical outcomes such as survival (Zacharakis, Meyer, DeCastro 1999; Jain and Kini 2000), performance (Sapienza 1992; Rosenstein, Bruno, Bygrave, and Taylor 1993), and managerial performance (Timmons and Bygrave 1986; Sapienza and Timmons 1989).

***Hypothesis 12:*** *The level of VC involvement will be negatively related to the likelihood of failure for the firm.*

In strategic management research, while the empirical evidence has given much more support to the proposition that firm factors account for much of the difference in performance across firms in a particular industry, industry variables have been associated with firm performance as well. Mason (1939) and Bain (1959) proposed that industry structural variables are key determinants of economic performance in the structure-conduct-performance model of the industrial organization (I/O) economics literature. And industry concentration is accepted to be the most important construct related to industry structure in the I/O field (Porter 1980; Robinson 1998). However, some authors have pointed out that empirical I/O research has produced conflicting evidence in studies of the association between industry concentration and performance (McGee 1988). According to Robinson (1998), there have been relatively few entrepreneurship studies examining the influence of industry concentration on new venture performance.

Competitive intensity is generally high in an industry where there are numerous competitors (i.e. a fragmented industry), since everyone would have a smaller share of the market (Pan, Li, and Tse 1999). Past studies have found industry effects to account for roughly 10–20 per cent of the variance in performance among firms (Hill and Deeds 1996). Moreover, Robinson (1998) has found that over 90 per cent of the new ventures he

investigated entered industries characterized by low degrees of industry concentration, which is consistent with the findings of Dean and Meyer (1996). Sectors attracting many participants are likely to be characterized by more intense rivalry than those with a small number of participants. Also, when there is an unfilled niche in a particular market and many startups identify this as an opportunity, decide to pursue it, and enter this sector at the same time, each of them will have access to fewer resources, because there is more intense competition for these resources.

***Hypothesis 13:*** *The density of entrants into a product sector will be positively related to the likelihood of failure for the firm.*

# METHODS

## Data and Sample

The sample used in this study consists of 145 startup firms in the telecommunications equipment and services industries, 60 of which have failed, and 85 have survived through the study period (i.e. to 31 December 2004). All the firms have gone through IPOs in 1996–2000. The starting year is 1996 since the Telecommunications Act deregulated the industry at that time, triggering technological advances and entry into telecom and related industries. It is also the first year of full coverage of IPO registration filings in the SEC EDGAR Database, our primary data source, and the most comprehensive source available. The ending year is 2000 after which the 'dotcom bubble' burst and the macroenvironmental conditions changed drastically. The list of firms in the population was drawn from the Global New Issues Database, which is part of the SDC (Securities Data Corporation) Database. Data was collected on the history of each firm using IPO prospectuses, annual reports, Hoover's, Centre for Research in Security Prices (CRSP), and US Patent and Trademark Office (USPTO) Patent databases. For measures of the TMT, data for each individual member of the TMT was collected, resulting in 1795 observations for the sample of 145 firms. The individual-level scores were then aggregated for each firm to calculate group level TMT demographic variables, resulting in 145 observations at the firm level for the independent variables.

## Analytical Approach

The hypothesized relationships were empirically tested using survival analysis. Survivors in this sample are defined as firms that continue to

operate independently as public corporations at the end of the study period. Cox hazard methodology, specified by a proportional hazards model with partial likelihood estimates, was used to test the hypotheses. This specification allowed for right censoring of the data. Using survival analysis, the study investigated whether individual companies survived or exited *and* the time of exit for those that did.

**Dependent Variable**

The main variable of interest here *(DURATION)* is failure (survival) of the firms. However, this is not a simple binary variable where firms change state from 'survivor' to 'nonsurvivor' at some point. In past research using methodologies such as logistic regression, survival is depicted as a binary variable (Hambrick and D'Aveni 1992). In this study, survival (failure) is an event with an accompanying history that is relevant to understanding the event. The survival of the sample firms was tracked until 31 December 2004 and the firms were classified as survivors or nonsurvivors.

The IPO date was obtained from the firm's IPO prospectus. Firms that were delisted from their stock exchange by their 15-12B or 15-12G filing in the SEC EDGAR Database were identified and distinguished as non-survivors. The dependent variable for the non-survivors was measured as the time interval (in months) from the IPO date to the date of delistment. For the survivors that had not failed by 2004, the dependent variable was measured as the time interval (in months) from the IPO date to December 2004.

**Independent Variables**

All the independent variables were measured at the time of the firm's IPO. Consistent with prior research (Wiersema and Bantel 1992), TMT members were defined as the two highest levels of management, including the chairman, CEO, Chief Operating Officer (COO), other chief officers, president, and the second tier of management. The measures for the independent variables are as follows:

*TMT age (TMT_AGE).* This was measured as the average age of the firm's TMT members. Data was collected on each individual's age in years and the mean was calculated for the TMT. TMT members ranged from 26 to 80 in age, with the mean around 46.[3]

*The education level of TMT (TMT_EDU).* This was assessed by a categorical variable, depending on the highest degree attained by the individual executive. The education level of the TMT member was categorized as a 1 for Bachelor's level, 2 for Master's level, and 3 for Doctoral level.

More than half of the TMT members had Master's degrees. Eighteen per cent had their PhD.[4] The education level of each TMT was calculated as the proportion of executives within the TMT who had double Master's and/or Doctoral degrees.

*The influence of outside board membership (OUTSIDE_DIR).* The influence of the outside board members was measured by the ratio of outside board members to insiders. The number of outside board members is defined as the total number of board members who are not officers of the firm (Hambrick and D'Aveni 1992). Even though this measure may leave some noise in the data since it does not address the problem of power differentials among the non-board members of the TMT, it still has been used very commonly in the literature as a fair proxy (Finkelstein and Hambrick 1988).

*Functional heterogeneity of TMT (FUNCTION_HTR).* The functional background of each executive was identified as one of the following fields: (1) Sciences and engineering; (2) Business and economics; (3) A combination of sciences/engineering and business/economics, (4) Law; and (5) Other (such as art, design, architecture, etc.). If an individual could be categorized in two different ways, the most recent degree was used, following Wiersema and Bantel (1992). Individuals usually specialize in the field they study most recently. Then, a functional heterogeneity score was calculated for the TMT using Blau's index, computed by $1-\sum pi^2$, where pi is the proportion of individuals in the ith category. If the index was close to 1, then the team had high heterogeneity; if it was close to 0, it indicated low heterogeneity. At the individual level, 28 per cent of the valid cases had science and/or engineering degrees, 41 per cent had business and/or economics degrees, and 15.5 per cent had both engineering and business degrees.

*TMT heterogeneity in past industry experience (EXP_HTR).* Past industry experience was measured for each member of the TMT in terms of the number of years they have spent working in the telecommunications industry. A TMT heterogeneity score was calculated for each firm using the coefficient of variation (standard deviation divided by the mean). Higher values indicated greater heterogeneity in terms of TMT members' past industry experience.

*TMT's startup experience (STARTUP_EXP).* For TMT members, information was gathered on whether they founded any other startups in the past or worked for other startups. Twenty-five per cent of the individuals had founded one or more startups in the past. Only 16 per cent had not had any startup experience.[5] The past startup experience of each TMT member was then categorized as a 0 (never been involved with startups in the past), a 1 (worked in at least one startup before but never (co)founded

one), or a 2 ((co)founded at least one startup in the past). Sapienza (1992) used this operationalization to measure the startup experience of CEOs in his sample. To aggregate the individual scores, a TMT score was calculated for each firm as the total proportion of categories 1 and 2 in the TMT.

*Age heterogeneity of TMT (AGE_HTR).* To determine the age heterogeneity of the TMT, the coefficient of variation was calculated as well. The larger the coefficient, the greater the heterogeneity of the age of the TMT was.

*Tenure heterogeneity of TMT (TENURE_HTR).* For each TMT member, data was collected on when the individual joined the company. Tenure of each TMT member was measured as the time in years between joining the company and the IPO. TMT tenure was measured as the mean tenure of the members of the TMT. Tenure heterogeneity of the TMT was then computed as the coefficient of variation of company tenure among TMT members. High coefficients indicated greater diversity.

*Order of entry.* For each firm, the four-digit SIC code was identified for the firm's primary industry sector, and the date of market entry for the firm into this sector. The market entry date was defined as the date of first product shipment or the date of the first sale. All the firms in each four-digit SIC code were then ranked according to their market entry date as first movers, early followers, or late entrants. Dummies were used to measure order of entry as FIRST_MOVER (first position), EARLY_FOLLOWER (from second to fifth position), and LATE_ENTRANT (sixth or later). Even though this operationalization brings about a loss in variance, the scale is consistent with earlier literature and allows the comparison of results with prior empirical work (Durand and Coeurderoy 2001).

*Firm size (FIRM_SIZE).* In prior research, firm size has been measured by firm sales and assets (Venkatraman and Low 1991; Mascarenhas 1997; Robinson 1998). While these are appropriate to use for samples of established firms, number of employees is a more meaningful measure for startups and that was the measure used in this study.

*Firm age (FIRM_AGE).* Firm age was measured as the number of years from the founding/incorporation of the business until the IPO date.

*Patents controlled (PATENTS).* To measure proprietary knowledge of the firm, a count of the total number of patents held by the firm at the time of the IPO was obtained (i.e. patents granted directly to the firm). Studies suggest that simple patent counts are an indicator of a firm's commitment to innovation which is indicative of long run success (Deeds, De Carolis and Coombs 1999).

*Venture capital involvement (VC_OWN).* Consistent with past research

(Rosenstein et al. 1993), VC involvement was measured as the total ownership percentage of VCs who had board representation in the venture. This measure differentiates between the involvement of VCs who were actively directing the company versus those who had more of an investor role.

*Density of Entrants (DENSITY).* Intensity of competition at the time of the IPO was captured by measuring the density of entrants into the sector. This variable identified the number of concurrent entry into a product sector at the same time as the firm. It was operationalized as the number of firms going through IPOs in the same four-digit SIC code in the same quarter.

**Control Variables**

Characteristics other than the independent variables discussed above may affect a firm's survival. The following controls were used to account for these influences.

*TMT size (TMT_SIZE).* A larger team, by definition, is more diverse. More people on the team means more resources to handle the different aspects of the business and a variety of perspectives in decision making. There is empirical evidence in small group research for a positive relationship between TMT size and performance (Certo, Lester, Dalton, and Dalton 2006). For these reasons, team size was controlled for in this study, as measured by the number of TMT members.

*Size of the IPO (PROCEEDS).* Larger IPOs have enough resources to ride out a decline in value or to modify their launch strategies (Ritter 1991; Hensler et al. 1997). For this reason, the size of the IPO was controlled for and measured as the proceeds from the IPO (in millions of dollars). This variable was calculated as the offer price at IPO times the number of shares outstanding.

*Industry Sector (INDUSTRY).* The sample in this study consists of a single industry; however, there might be performance differences between the equipment and the service sectors of the telecommunications industry. Dummy variables were included in the study to account for such differences, with 0 as EQUIPMENT and 1 as SERVICE sectors.

## RESULTS

Top management teams in this sample ranged from 5 members to 23, with the mean around 12 people. Twenty-nine of the 145 firms did not have VC involvement. Forty-four of them were first movers and early followers. Fifty-two firms were in the telecommunications equipment sectors. The

*Table 6.1 Descriptive statistics for subsamples and difference-between-means tests*

| Variable | Survivors | | Failures | | Difference | |
|---|---|---|---|---|---|---|
| | Mean | Standard Deviation | Mean | Standard Deviation | S-F | t-stat |
| DURATION | 69.578 | 23.929 | 40.497 | 17.648 | 29.080 | 8.420*** |
| TMT_AGE | 46.570 | 3.953 | 45.393 | 3.520 | 1.177 | 1.847* |
| TMT_AGE$^2$ | 15.679 | 29.720 | 12.658 | 18.138 | 3.021 | 0.700 |
| TMT_EDU | 0.191 | 0.119 | 0.167 | 0.092 | 0.024 | 1.292 |
| OUTSIDE_DIR | 3.294 | 2.213 | 2.908 | 2.157 | 0.385 | 1.043 |
| FUNCTION_HTR | 0.727 | 0.129 | 0.749 | 0.125 | −0.022 | −1.031 |
| EXP_HTR | 0.716 | 0.246 | 0.785 | 0.386 | −0.069 | −1.225 |
| STARTUP_EXP | 0.811 | 0.172 | 0.780 | 0.176 | 0.031 | 1.058 |
| AGE_HTR | 0.187 | 0.048 | 0.181 | 0.052 | 0.006 | 0.774 |
| TENURE_HTR | 0.758 | 0.364 | 0.761 | 0.372 | −0.003 | −0.046 |
| FIRST_MOVER | 0.129 | 0.338 | 0.083 | 0.279 | 0.046 | 0.868 |
| EARLY_ FOLLOWER | 0.282 | 0.453 | 0.150 | 0.360 | 0.132 | 1.957** |
| LATE_ENTRANT | 0.588 | 0.495 | 0.767 | 0.427 | −0.178 | −2.320** |
| FIRM_SIZE | 5.510 | 1.291 | 5.051 | 1.228 | 0.459 | 2.152** |
| FIRM_AGE | 1.618 | 0.752 | 1.419 | 0.764 | 0.199 | 1.555 |
| PATENTS | 4.906 | 12.314 | 0.917 | 2.919 | 3.989 | 2.875*** |
| VC_OWN | 29.436 | 28.408 | 26.613 | 27.475 | 2.823 | 0.597 |
| DENSITY | 3.106 | 2.310 | 3.631 | 2.240 | −0.525 | −1.366 |
| TMT_SIZE | 12.224 | 3.392 | 12.483 | 4.390 | −0.260 | −0.402 |
| PROCEEDS | 4.139 | 1.041 | 3.987 | 1.021 | 0.152 | 0.873 |
| INDUSTRY | 0.550 | 0.500 | 0.770 | 0.427 | −0.214 | −2.765*** |

*Notes:*
* significant at the 10 per cent level
** significant at the 5 per cent level
*** significant at the 1 per cent level

firms ranged in size from seven employees to 3500, with 25 per cent of them having less than 100 employees and 50 per cent less than 228 employees.

The dependent variable is 'duration', censored by a binary variable which takes on the value of 0 if the firm survived through the study period, and 1 if the firm was delisted during the study period. The firms in the sample have durations ranging from about nine months to nine years, with the mean at 57.544 months, or a little less than five years. For the firms that survived, the average 'duration' is about 70 months, whereas for the delisted firms, it is about 40 months. The longer the 'duration' of the firm, the lower its hazard rate.

Table 6.2 contains the bivariate correlations.

Table 6.3 presents the results of the regression models. The hypotheses

are tested by regressing the dependent variable on the control variables and the TMT and firm-level measures.

In Table 6.3, the first model presents the baseline model with the control variables. Model 2 adds the TMT age variable, and Model 3 its squared term. These test Hypothesis 1. Model 4 tests the TMT demographics variables and Hypotheses 2, 3, and 6. Model 5 adds the firm-level variables and tests Hypotheses 8, 9, 10, 11, 12, 13. Model 6 is the full model, testing the TMT heterogeneity variables and Hypotheses 4, 5, 7a, and 7b. Model 7 is the adjusted model with only the significant variables. This approach will allow a comparison of the relative effects of each group of variables.

Positive coefficients indicate an increase in the failure probability (i.e. hazard risk) while negative coefficients decrease the failure probability. $e^{\beta}$, which is the Risk Ratio, can be calculated. For categorical variables, this is interpreted as the ratio of the estimated hazard for one category to another. For quantitative variables, the Risk Ratio can be used to calculate the predicted change in the hazard risk for one unit increase in the covariate (Allison 1995).

The Chi-square statistic and the log-likelihood statistic are reported at the bottom of Table 6.3. The test statistic presents whether the addition of variables to the model improves the fit significantly over the previous model for Models 1-6, and the significance of the full model for Model 7. In Model 1, regressing 'firm failure' on the control variables ('size of the IPO', 'TMT size', and 'industry') indicates that two of the control variables have no significant effect on 'firm failure' ($\beta = -0.171$ for 'size of the IPO' and $\beta = 0.031$ for 'TMT size', both $p>0.10$). The 'industry' variable is a dummy variable that controls for the effects of the industry sector the firm belongs; it takes the value of 0 for firms that are in the equipment sector and 1 for the service sector. According to the results, the 'industry' sector the firm belongs to has a significant impact on its failure rate. In Model 1, the $\beta$ for 'industry' is $-0.959$ and it is significant at $p<0.01$. The coefficient retains its significance through Models 2–6, and in the full model, Model 6, its $\beta$ is $-0.616$ at $p<0.10$. For the 'industry' variable, $e^{\beta}$ is 0.540 in the full Model 6, which indicates that firms in the equipment sector have a lower failure hazard than the firms in the service sector. Specifically, the probability of failure in the equipment sector is 54 per cent of the probability of failure in the service sector for the telecommunications industry.

Hypothesis 1 proposed a U-shaped relationship between 'TMT age' and 'firm failure'. Model 2 introduces 'TMT age' and Model 3 introduces its square term into the equation to test this relationship. Even though Model 2 indicates that the effect of 'TMT age' is negative as predicted, it is not significant ($\beta = 0.033$, $p>0.10$). Furthermore, the square term in Model 3

*Table 6.2 Correlations (N = 145)*

| Variable | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| 1. DURATION | 1.000 | | | | | | | |
| 2. TMT_AGE | 0.199 | 1.000 | | | | | | |
| 3. TMT_AGE² | 0.134 | 0.401 | 1.000 | | | | | |
| 4. TMT_EDU | 0.058 | −0.042 | 0.008 | 1.000 | | | | |
| 5. OUTSIDE_DIR | −0.105 | 0.234 | 0.068 | −0.041 | 1.000 | | | |
| 6. FUNCTION_HTR | −0.069 | −0.043 | 0.088 | −0.165 | 0.086 | 1.000 | | |
| 7. EXP_HTR | −0.107 | −0.013 | 0.050 | 0.005 | −0.045 | 0.077 | 1.000 | |
| 8. STARTUP_EXP | 0.035 | 0.033 | 0.125 | 0.002 | −0.248 | 0.199 | 0.072 | 1.000 |
| 9. AGE_HTR | 0.029 | 0.057 | −0.116 | 0.118 | 0.018 | −0.003 | 0.110 | −0.037 |
| 10. TENURE_HTR | −0.076 | 0.107 | 0.082 | −0.032 | 0.065 | 0.018 | 0.065 | 0.097 |
| 11. FIRST_MOVER | 0.091 | 0.154 | 0.014 | −0.109 | −0.080 | −0.082 | −0.086 | −0.029 |
| 12. EARLY_FOLLOWER | 0.151 | 0.113 | 0.053 | 0.061 | 0.079 | −0.077 | 0.042 | 0.018 |
| 13. LATE_ENTRANT | −0.194 | -0.202 | −0.057 | 0.018 | −0.017 | 0.123 | 0.020 | 0.003 |
| 14. FIRM_SIZE | −0.001 | −0.061 | −0.004 | 0.034 | 0.130 | 0.093 | −0.101 | −0.021 |
| 15. FIRM_AGE | 0.065 | 0.245 | 0.032 | −0.009 | 0.075 | −0.144 | −0.158 | −0.021 |
| 16. PATENTS | 0.006 | 0.230 | 0.023 | 0.061 | 0.209 | −0.014 | −0.013 | −0.187 |
| 17. VC_OWN | −0.188 | −0.096 | −0.104 | −0.120 | 0.445 | 0.111 | 0.016 | −0.257 |
| 18. DENSITY | −0.228 | −0.164 | −0.063 | −0.069 | −0.135 | 0.106 | 0.081 | 0.040 |
| 19. TMT_SIZE | −0.124 | −0.070 | −0.072 | −0.121 | 0.416 | 0.198 | 0.039 | −0.039 |
| 20. PROCEEDS | −0.226 | −0.088 | −0.068 | −0.077 | 0.185 | 0.155 | 0.028 | −0.010 |
| 21. INDUSTRY | −0.266 | −0.340 | −0.104 | −0.193 | −0.082 | 0.260 | 0.076 | 0.045 |

is also negative but not significant ($\beta = -0.004$, $p>0.10$). Hypothesis 1 is not supported.

Model 4, in which 'firm failure' is regressed on the control and TMT demographic variables indicates that the 'education level of TMT', the 'influence of outside board members', and the 'TMT's startup experience' have no significant effect on 'firm failure'. The coefficients for the TMT demographic variables are all in the predicted direction ($\beta = -1.425$ for the 'education level of TMT', $\beta = -0.004$ for 'influence of outside board members', and $\beta = -0.474$ for 'TMT's startup experience'); however, none of these relationships are significant (all $p>0.10$). Therefore, Hypotheses 2, 3, and 6 are not supported.

Model 5, including the control, TMT demographics, and firm-level variables, provides support for the hypothesis that larger firms ($\beta = -0.372$, $p<0.05$) have a lower likelihood of failure. Hypothesis 9 is thus supported. The effect of 'firm size' was the largest significant effect found for this data. $e^{\beta}$, the Risk Ratio, gives the predicted change in the dependent variable for one unit change in the independent variable. $e^{\beta}$ is 0.702 for 'firm size' in the full model. However, 'firm size' is measured by the logarithm[6] of the number of employees in the firm. For log-transformed variables, $e^{\beta}$ presents the percentage change in the hazard rate for a 1 per cent change

| 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.000 | | | | | | | | | | | | |
| 0.045 | 1.000 | | | | | | | | | | | |
| 0.080 | 0.117 | 1.000 | | | | | | | | | | |
| 0.027 | 0.278 | −0.191 | 1.000 | | | | | | | | | |
| −0.076 | −0.324 | −0.493 | −0.760 | 1.000 | | | | | | | | |
| −0.153 | −0.069 | −0.064 | −0.013 | 0.054 | 1.000 | | | | | | | |
| 0.150 | 0.329 | 0.472 | 0.239 | −0.525 | 0.128 | 1.000 | | | | | | |
| 0.106 | 0.063 | 0.144 | 0.013 | −0.107 | 0.090 | 0.392 | 1.000 | | | | | |
| −0.207 | −0.090 | −0.092 | −0.144 | 0.189 | 0.205 | −0.232 | 0.098 | 1.000 | | | | |
| −0.011 | 0.015 | −0.002 | −0.186 | 0.166 | 0.064 | −0.094 | −0.081 | −0.034 | 1.000 | | | |
| −0.043 | −0.005 | −0.111 | −0.121 | 0.181 | 0.427 | −0.086 | 0.026 | 0.377 | 0.057 | 1.000 | | |
| −0.156 | −0.012 | −0.049 | −0.065 | 0.090 | 0.697 | −0.016 | 0.036 | 0.323 | 0.065 | 0.469 | 1.000 | |
| −0.025 | −0.004 | −0.104 | −0.143 | 0.195 | 0.214 | −0.180 | −0.129 | 0.112 | 0.353 | 0.159 | 0.278 | 1.000 |

in the independent variable. Thus, if the firm increases the number of its employees by 1 per cent, its failure rate will decrease by 0.298 per cent.

Hypothesis 11 posited that the number of patents a firm holds is negatively associated with its failure rate. Even though the sign of the coefficient for 'patents' is in the expected direction, it is not significant (Model 5, $\beta = -0.088$, $p>0.10$). Therefore, Hypothesis 11 is not supported. However, since the significance level of its coefficient was very close to 0.10, 'patents' were included in the adjusted model. In Model 7, 'patents' have a significant impact on the failure rate. In this case, the $\beta$ for patents is $-0.096$ ($p<0.10$), therefore $e^{\beta}$ is 0.909. If the firm acquires an additional patent, its failure hazard goes down by 9.1 per cent ($1-0.909 = 0.091$). If 3 of its patent applications are approved, then its failure rate will decrease by $(1 - 0.909^3) = 24.9$ per cent.

Hypothesis 10 predicts the relationship between 'firm age' and 'firm failure' to be negative. It is positive and significant in Model 5 ($\beta = -0.428$, $p<0.10$), and in the full Model 6 ($\beta = 0.440$, $p<0.10$) and therefore Hypothesis 10 is not supported. This result will be further examined in the next section. Hypothesis 8 proposes that first movers and early followers have a lower failure rate than late entrants. In the regression, these two groups are compared to late entrants, which is the reference category

*Table 6.3 Proportional hazards regression*

| Variable | Model 1 | Model 2 | Model 3 | Model 4 | Model 5 | Model 6 | Model 7 |
|---|---|---|---|---|---|---|---|
| TMT_AGE | | −0.033 | −0.033 | −0.039 | −0.023 | −0.024 | |
| | | (0.037) | (0.039) | (0.040) | (0.043) | (0.044) | |
| TMT_AGE² | | | −0.004 | −0.004 | −0.006 | −0.008 | |
| | | | (0.007) | (0.007) | (0.008) | (0.008) | |
| TMT_EDU | | | | −1.425 | −0.337 | −0.208 | |
| | | | | (1.234) | (1.301) | (1.357) | |
| OUTSIDE_DIR | | | | −0.004 | 0.015 | 0.016 | |
| | | | | (0.070) | (0.080) | (0.080) | |
| STARTUP_EXP | | | | −0.474 | −0.216 | −0.218 | |
| | | | | (0.765) | (0.800) | (0.818) | |
| FIRST_MOVER | | | | | −0.819 | −0.825 | −0.837 |
| | | | | | (0.537) | (0.539) | (0.526) |
| EARLY_FOLLOWER | | | | | −0.884** | −0.952** | −0.912** |
| | | | | | (0.432) | (0.438) | (0.417) |
| FIRM_SIZE | | | | | −0.372** | −0.354** | −0.363** |
| | | | | | (0.147) | (0.153) | (0.143) |
| FIRM_AGE | | | | | 0.428* | 0.440* | 0.440* |
| | | | | | (0.248) | (0.268) | (0.239) |
| PATENTS | | | | | −0.088 | −0.089 | −0.096* |
| | | | | | (0.058) | (0.058) | (0.057) |
| VC_OWN | | | | | −0.001 | −0.002 | |
| | | | | | (0.006) | (0.006) | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| DENSITY | | | | | 0.038 | 0.033 | |
| | | | | | (0.064) | (0.065) | |
| FUNCTION_HTR | | | | | | 0.130 | |
| | | | | | | (1.137) | |
| EXP_HTR | | | | | | 0.435 | |
| | | | | | | (0.386) | |
| AGE_HTR | | | | | | −2.800 | |
| | | | | | | (2.850) | |
| TENURE_HTR | | | | | | 0.219 | |
| | | | | | | (0.401) | |
| TMT_SIZE | 0.031 | 0.030 | 0.029 | 0.021 | 0.035 | 0.036 | 0.038 |
| | (0.039) | (0.039) | (0.039) | (0.042) | (0.044) | (0.046) | (0.039) |
| PROCEEDS | −0.171 | −0.161 | −0.161 | −0.176 | 0.166 | 0.131 | 0.157 |
| | (0.146) | (0.146) | (0.145) | (0.144) | (0.181) | (0.186) | (0.179) |
| INDUSTRY | −0.959*** | −0.849** | −0.838** | −0.794** | −0.629* | −0.616* | −0.787** |
| | (0.323) | (0.343) | (0.339) | (0.348) | (0.380) | (0.380) | (0.342) |
| Degrees of freedom | 3 | 4 | 5 | 8 | 15 | 19 | 8 |
| Log likelihood | −267.975 | −267.573 | −267.379 | −266.550 | −258.617 | −257.374 | −259.512 |
| $Chi^2$ | 10.552** | 10.760** | 10.817* | 12.153 | 26.095** | 28.703* | 23.708*** |

*Notes:*
* significant at the 10 per cent level
** significant at the 5 per cent level
*** significant at the 1 per cent level
Standard errors in parentheses

(all dummy coded, with 'late entrant' = 0). Results in Model 5 demonstrate that both groups of early movers are in fact less likely to fail than late entrants ($\beta = -0.819$, $p>0.10$, and $\beta = -0.884$, $p<0.05$, respectively); however, only the coefficient for early followers is significant. The coefficients retain their significance levels in the fully specified model as well ($\beta = -0.825$, $p>0.10$, and $\beta = -0.952$, $p<0.05$, respectively) and therefore, there is partial support for Hypothesis 8: It does matter when you enter the market. In the full Model 6, the coefficients indicate that the failure rate for first movers is 0.438 times the rate for late entrants while for early followers it is 0.386 times that of the late entrants. Moving early into an industry sector increases the likelihood of survival for a firm by more than half.

Hypothesis 12 predicts that 'VC involvement' negatively affects 'firm failure' while Hypothesis 13 predicts a positive association between 'density of entrants' and 'firm failure'. The coefficients for these variables are in the expected direction; however, they are not significant ($\beta = -0.001$ and $\beta = 0.038$ in Model 5, and $\beta = -0.002$ and $\beta = 0.033$ respectively in the full model, all $p>0.10$). Hence, Hypotheses 12 and 13 do not receive support.

Model 6 is the fully specified model that includes the control, TMT demographic, firm-level, and TMT heterogeneity variables. This model tests the heterogeneity variables. 'Functional heterogeneity' and 'TMT heterogeneity in past industry experience' are proposed to have a negative effect on firm failure in Hypotheses 4 and 5, while competing hypotheses (7a and 7b) were developed for 'age heterogeneity' and 'tenure heterogeneity' of the TMT. The signs for 'functional heterogeneity' and 'TMT heterogeneity in past industry experience' are positive and in the opposite of the predicted direction. The heterogeneity variables are not found to have a significant effect on firm failure and thus, Hypotheses 4, 5, 7a and 7b are not supported.

The Chi-square indicates that Model 1 and Model 5 are significant. For comparison purposes, Model 7 is included, which is the adjusted model with only the significant variables. Model 7 fits at the $p<0.01$ level. Overall, only firm-level variables find support in the hypothesized directions.[7]

## DISCUSSION

The statistical analyses demonstrate quite surprisingly that TMT characteristics have no significant effect on firm survival. The findings also indicate that failure is affected by firm-specific factors relating to the resource endowment and/or management capabilities of the firm. Past studies

on TMTs have primarily included comprehensive process models with empirical work testing various pieces of them. In management literature, these past efforts have resulted in an established set of predictor variables in TMT demographics while TMT heterogeneity is an area where there is still considerable controversy regarding the salience of different predictors. This study aimed at providing a test of the established TMT variables in the different context of new ventures. The findings suggest the need for additional research in this area.

The pattern of results observed with TMT demographic variables is not consistent with prior research. The results indicate that there is no 'recipe' that founders of a startup can use to construct their top management teams in order to achieve a higher likelihood of survival. Prior empirical work has indicated that age (Boeker 1997; Knight et al. 1999), level of education (Norburn and Birley 1988), and influence of outside board members (Rosenstein et al. 1993) impact organizational outcomes. This study did not find these variables to be significantly affecting firm failure.

The results for the heterogeneity variables are somewhat parallel to the extant work in the field; at the very least, they add to the inconclusive state of evidence. Significant associations were not found between firm failure and functional, age, tenure, and past industry experience heterogeneity in this study. Many other researchers have also failed to find conclusive evidence linking age and tenure heterogeneity to firm performance, and those who did had conflicting results (Pitcher and Smith 2001). Educational heterogeneity is one variable that has been found to significantly affect organizational outcomes in Wiersema and Bantel's study (1992) as well as others, and the findings of this study did not point to such an effect. Heterogeneity in past industry experience is not an area that has been well researched and there are studies with findings that support the idea of diverse TMTs, as well as findings that support homogeneous TMTs. The results of this study do not indicate significance for the past industry heterogeneity variable in either direction.

These findings for TMT variables could of course be idiosyncratic to the telecommunications industry: Examining the descriptive statistics, it can be concluded that the observations for demographics, and even more so the heterogeneity measures have very narrow ranges. Therefore, the data for the characteristics of the teams seem to be quite similar. This could be a factor unique to the telecommunications industry or it is possible it could be a condition ubiquitous to multiple industries. One way to determine the answer to this would be to construct future studies using data across multiple industries. It would also be worthwhile to investigate different measures for the continuous heterogeneity variables, and to even develop

new proxies to measure the underlying constructs of the cognitive and decision-making processes, creativity, and innovativeness in the TMT.

In spite of the limitations of this study, it is worth noting that among the TMT variables, none were found to significantly affect firm failure. Prior studies with large, established firms have found evidence for associations between TMT demographics and heterogeneity and firm performance. The contrast of the findings of this study with past research points to a need to expand the research on TMT constructs with samples of new ventures.

Among the firm-level variables, 'order of entry', and 'firm size' significantly and negatively influence firm failure. Firms that entered the market early and on a larger scale had a lower failure rate. These results add to and build upon previous findings in the area (Mascarenhas 1992).

'Firm size' was found to be significantly and negatively associated with 'firm failure' as well. This result was similar to the previous findings in the field. The literature on firm size has converged to a large extent on the conclusion that smaller firms have higher exit probabilities (Mascarenhas 1997; Pan et al. 1999; Timmons 1999).

Past research on patents has also been consistent and patents have been associated with innovation and firm performance (DeCarolis and Deeds 1999). Whether and how the firm protects its proprietary knowledge greatly impacts organizational outcomes. Even though patenting activity is not found to be significant in the full model and the associated hypothesis is not supported, in the adjusted model it appears that the variable 'patents' significantly affects the failure rate of firms in this sample. Telecommunications firms that hold patents do have a lower likelihood of failure than those firms with no patenting activity.

Another interesting finding among firm-level covariates was the positive and significant association of 'firm age' with 'firm failure'. According to the regression results in Table 6.3, a younger firm's failure hazard will be 55.3 per cent lower than a firm twice as old as it is ($e^{\beta} = 1.553$). This is contradictory to both the literature and the proposed hypothesis. Two different explanations come to mind. From an inertia perspective, older firms could be more established in their ways, and therefore have a more difficult time changing with the demands of the market. This might be due to the TMT having worked together for a while and thus lacking enough diversity to facilitate innovation or creative problem solving, or simply due to a lack of flexibility, an inability of the firm to change, or perhaps products that are not useful or timely anymore. In telecommunications, an industry that was shifting so fast at the time, this could be fatal.

In a high-technology market characterized by short product lifecycles, innovation is very important. Since products become obsolete very fast,

their market longevity may become a liability for the firm rather than an asset (Khessina 2003). It is possible that incoming startups with the fresh products may have a survival advantage over the older incumbents, in spite of their lack of resources and established networks of relations. In this sample, the 'firm age' variable is also somewhat correlated with some of the other duration- and rank-based covariates such as 'order of entry' and 'TMT age'. These associations are not high enough to raise concern; furthermore, the finding that older firms have a higher probability of failure becomes an even more conservative test of the associated hypothesis if it is taken into account that older firms are also more likely to be earlier entrants.[8]

The control variables, 'TMT size' and 'size of the IPO', were not found to be significant. The findings for 'proceeds' were discussed in the Results section. The general lack of support for the TMT variables could help explain the lack of significance for TMT size. The two findings are consistent and that could be attributable to larger teams having an inbuilt tendency to be more diverse. 'Industry', another control variable, significantly affected firm failure in all the models. Firms in the equipment sector had a lower failure rate than those in the service sector.

## CONCLUSION

This chapter contributes to theory and practice in important ways. Most importantly, the lack of support for all the TMT constructs that have been previously tested and corroborated in the strategic management literature with established firms demonstrates the need for more research in this area using new constructs on samples of startup firms. By examining data on both surviving and failed companies, this study attempts to overcome the survivor bias in prior studies. The study uses survival methodology, rather than the commonly used logistic regression, to model firm failure not as an outcome but as a process by incorporating the element of duration in the time to failure. This adds to both entrepreneurship and strategic management literature by creating a richer understanding of the phenomenon being examined. The multilevel design of the study helps construct this multidimensional description of firm performance on both theoretical and operational grounds. The findings also enhance our insights on new venture performance and failure, pointing to patenting activity and protection of proprietary knowledge, market entry timing, and scale considerations as crucial decisions for entrepreneurs starting new firms, as well as venture capitalists and investors.

The telecommunications industry appears to be an appropriate setting

for testing the arguments regarding the effects of TMT characteristics and firm resources on survival since the particular period under study has witnessed high rates of IPOs *and* failure in a short period of time. The underlying macroeconomic conditions were assumed to have remained more or less similar *during* the period of study while the before and after conditions might be quite different. This alleviated the need to control for unobserved effects in the analytical model. Patenting and venture capital, two of the independent variables, are two phenomena that regularly characterize this industry. Moreover, the developments in the telecommunications industry that have been occurring in the last decade are worldwide, making the results of this study widely applicable.

On the other hand, as with any other single-industry study, choosing to investigate this particular industry has limitations. The telecommunications industry is characterized by a high rate of change and format battles are still being fought in some sectors. The deregulation sought to bring down the entry barriers into the industry for smaller players by requiring the large firms to lease their networks to competitors at cost (Economides 1998). This lifted some of the huge infrastructure startup cost requirements for new ventures; however, real competition for the business market and the consumer market is still very much capital intensive. Subsequently, the generalization of the results of this study can be directed only to industries with characteristics and dynamics similar to those of the telecommunications industry.

Our findings add to the understanding of new venture performance and failure, aiding strategy practitioners and entrepreneurs starting new firms. Job creation and economic growth in the US is primarily generated by the creation of independent new ventures (Kirchoff 1991). These new ventures, however, also have a high failure rate. Research that identifies factors that influence new venture performance is important to successful entrepreneurial investments, and the fields of entrepreneurship and management, and it would also contribute to the US economy (Robinson 1998).

## NOTES

1. St Mary's College, Graduate Business Department, Moraga, CA.
2. Quoted from Shane (2001, 209).
3. The percentage totals reflect proportions of valid observations.
4. The percentage totals reflect proportions of valid observations.
5. The percentage totals reflect proportions of valid observations.
6. Three variables demonstrated high values of skewness and kurtosis – 'IPO size', 'firm age', and 'firm size', so we transformed them using the logarithm function. This is a common procedure used for right-skewed data which may also have outliers on the high end. All the tables present results of analyses using the log-transformed values for these three variables.

7. This shows whether the change from the previous model was significant or not for Models 1–6, and the significance of the model for Model 7.
8. As discussed in the Results section, the findings indicate that compared to late entrants, firms that move in to an industry early have a lower likelihood to fail.

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# 7. Growth paths and economic success

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## ABSTRACT

This chapter examines the relationship between performance and continuity of the development of companies as well as the relationship between performance and signals leading to discontinuity. Using annual data of 387 companies over a ten-year period, we show that not growth but continuity of development has a positive influence on performance. Positive signals from good financial results can lead to inertia or hubris which can have a negative influence on performance. Whilst good financial results per se in one period are a source for success in later periods, an increase of financial results in one period is negatively related to the financial performance in a later period. Moreover, companies reacting moderately to negative signals retain continuity and tend to be more successful in the future than their overreacting counterparts.

## INTRODUCTION

Both management research and business life show a strong interest in company growth and development. Numerous scholars have analyzed the phenomenon of company growth and development (Penrose 1959; Mansfield 1962; Dunne & Hughes 1994; Sutton 1997). Managers often name growth as a goal for their companies (Hall 1967; Whetten 1987; Brush, Bromiley and Hendrickx 2000; Mishina, Pollock & Porac 2004). Understanding factors influencing performance differences between firms is one, if not the most important topic of strategic management research (Bowman 1974; Barnett, Greve, and Park 1994; McGrath, MacMillan, and Venkataraman 1995). Strategic management scholars have analyzed performance differences from different angles, for example from the perspective of industry effects and of resource heterogeneity (Schmalensee 1985; Eisenhardt & Schoonhoven 1990; Barney 1991, 2001; Rumelt 1991; Amit & Schoemaker 1993; Peteraf

1993; Wiersema & Liebeskind 1995; Chang 1996; McGahan & Porter 1997, 2002; Roquebert, Phillips, & Westfall 1996; McGahan 1999; Helfat & Peteraf 2003; Peteraf & Barney 2003; Peteraf & Bergen 2003).

In this chapter we focus on the *paths* of growth and development of companies. Although it has long been recognized that companies face constraints with respect to their growth and development path (Penrose 1959; Cyert & March 1963; Mahoney & Pandian 1992) and these constraints affect firm performance, 'little research has directly examined how different rates and patterns of expansion may result in performance differences between firms' (Vermeulen and Barkema 2002). Therefore, we want to shed light on the relationship between a company's growth and development path, characterized by growth and development continuity, and the companies' success. As discussed by Teece, Pisano, and Shuen (1997), success is not only dependent on development paths but also on positions reached in certain points in time and processes following in later periods. The reached positions constitute signals that can either be positive or negative (Harvey, Lusch & Richey 2002). These signals can be the basis for decision making and action taking which consequently influences the periodic performance over a later period of time of corporate development (Dutton, Fahey & Narayan 1983; Dutton & Duncan 1987a, 1987b; Barr, Stimpert, & Huff 1992; Hough & White 2004). Thus, we have analyzed the performance that companies that have reached a certain position in a certain point in time will achieve in later periods.

The goal of our study is to examine the relationship between performance and continuity of development of companies as well as the relationship between performance and signals leading to discontinuity. To achieve this goal, we analyzed annual data of 387 German companies over a ten-year period (1990–99). This chapter is structured in the following manner: In the subsequent section, we develop the research framework. Based on this framework we derive the hypotheses. In the third section, the methods used to test these hypotheses are specified. In the fourth section, we display the results of this study. On this basis, we close with a discussion of limitations and draw conclusions and subsequent implications from the results of the study.

## RESEARCH FRAMEWORK AND HYPOTHESES

### Growth and Development

Research on growth and development has a longstanding history. Based on different methodological approaches, many scholars have discussed the

global phenomenon of how companies develop over time (Robinson 1934; Chamberlain 1956; Penrose 1959; Leibenstein 1960; Baumol 1962; Packer 1964; Starbuck 1965, 1971; Marris 1971; Greiner 1972; Bensoussan, Hurst and Näslund 1974; Jovanovic 1982; Tushman & Romanelli 1985; Arrow 1958; Churchill & Lewis 1983). Based on these fundamental works, scholars have analyzed different factors influencing the dependent variable growth. Gibrat's law postulates that companies of a different size show equal growth rates (Gibrat 1931; Hart 1962; Sutton 1997). Whilst some older studies support this hypothesis (Hart and Prais 1956; Simon and Bonini 1958; Mayer and Goldstein 1961; Hymer and Pashigian 1962; Aislabie 1971), other papers show both a positive (Pagano and Schivardi 2003; Samuels and Smyth 1968) as well as a negative influence of size (Meyer & Kuh 1957; Mansfield 1962; Evans 1987; Dunne and Hughes 1994). Evans (1987) finds that age has a negative influence on company growth. Reichstein and Dahl (2004) point out that company growth is highly dependent on industry and geographical location. The study by Eisenhardt and Schoonhoven (1990) indicates significant effects on company growth for the founding top-management team and market stage. Feeser and Willard (1990) analyzed the differences between high and low growth companies regarding different patterns of their founding strategy. Wiersema and Liebeskind (1995) show that growth is significantly lower in leveraged buyout (LBO) firms than in control firms that remained public. Harhoff, Stahl, and Woywode (1998) demonstrate that companies under limited liability have higher growth rates than comparable companies under full liability. Autio, Sapienza, and Almeida (2000) found that earlier initiation of internationalization and greater knowledge intensity foster faster international growth. A study by Shane (1996) shows that the degree to which a company emphasizes franchising as its expansion strategy has a significant positive effect on corporate growth. Wiklund and Shepherd (2003) found that small business managers' aspirations to expand their business activities are positively related to actual company growth. Buckley, Dunning, and Pearce (1984) analyzed the influence of several factors on both growth and profitability. They show that nationality of ownership and industry related factors have a strong influence on growth and profitability.

Only a few empirical studies examine the influence of the independent variable growth on the dependent variable performance (Vermeulen & Barkema 2002). Markman and Gartner (2002) find that extraordinary high growth is not related to company performance. Vermeulen and Barkema (2002) show that the speed of internationalization, the spread of markets entered, and the irregularity of the expansion pattern negatively affect the performance from international growth.

Theoretical literature on the relationship in question provides different answers. Whereas neo-classical models of corporate development propose the existence of an optimal company size (Baumol 1962; Bensoussan 1973) and profitable growth until that optimum, Penrose neglects the existence of such an optimal company size:

> . . . there may be an 'optimum' output for each of the firm's product-lines, but not an 'optimum' output for the firm as a whole. In general we have found nothing to prevent the indefinite expansion of firms as time passes, and clearly if some of the economies of size are economies of expansion, there is no reason to assume that a firm would ever reach a size in which it has taken full advantage of all these economies (1959, 98).

**Continuity of Growth and Development and Success**

Penrose proposes the existence of 'economies of growth [that] are the internal economies available to an individual firm which make expansion profitable in particular directions' (1959, 99) and therefore a relationship between a company's growth path and its performance. Due to limited resources required for initiating and conducting growth, the growth path is relative and should be chosen depending on the availability of sufficient resources. If sufficient resources are not available, high growth directs to a strain of resources which can lead to diminishing performance and failure. Hence, the ratio between growth rate and available resources should not exceed a certain limit. Since the installation of resources is subject to limitations (Penrose 1959), the growth rate is also bounded.

> The maximum amount of expansion will be determined by the relevant managerial services available for expansion in relation to the amount of these services required per dollar of expansion. The factors determining the availability of managerial services and the need for them in expansion will therefore determine the maximum rate of growth of the firm (Penrose, 1959: 200).

If growth opportunities are not realized although sufficient resources are available, this leads to organizational slack (Meyer 1982; Milliken and Lant 1991). High volatility of the company's growth rate is therefore an indicator for exaggerated growth rates or unrealized growth opportunities. Thus, high volatility is an expression of inadequate management and should be avoided. The total volatility consists of the volatility inherent to growth (Schoonhoven, Eisenhardt and Lyman 1990) and the extraordinary volatility stemming for example from management inadequately addressing challenges from internal and external contextual factors. As different types of company development (persistent growth, persistent decline, alternating development) require different management

approaches, the relationship between the company's growth volatility and its success should not only be analyzed in general but also conditioned by the type of development.

These arguments lead to the first hypothesis that will be tested for the whole data set as well as separately for the three types of company development:

***Hypothesis 1:*** *The lower the volatility of growth, the higher the success of companies.*

**Success and Signals Resulting from Positions**

Recently, scholars have intensively discussed the influence of strategy process factors on success. Research streams within this field are the dynamic-capability approach (Teece et al. 1997; Eisenhardt and Martin 2000; Zollo and Winter 2002; Helfat and Peteraf 2003; Winter 203) and research on organizational routines (Nelson and Winter 1982; Cohen 1991; Lipman 1991; Cohen and Bacdayan 1994; Pentland and Rueter 1994; Rumelt, 1995; Cohen et al. 1996; Feldman and Rafaeli 2002; Feldman and Pentland 2003). Applying these approaches, a decision making process can be described which influences corporate development. A company's development starts with a certain position. This position can constitute a signal initiating organizational change. However, the signal must be perceived and processed before actions are taken (Wooldridge and Floyd 1990; Eisenhardt and Zbaracki 1992; Noda and Bower 1996; Dutton et al. 1997; Ocasio 1997). The influence of the starting position and the existence of signals are therefore crucial to the variation and adaptation of corporate development. Two kinds of starting positions and hence signals exist that are relevant for the explanation of success in this chapter: supposedly positive and supposedly negative starting positions.

Scholars have discussed the impact of supposedly positive starting positions by using several theories. The interest for this research is founded by the phenomenon that companies often experience a negative development after a phase of steady success (Day 1990; Eisenhardt 2000). Often successful companies face a downturn caused by inertia and adherence to established behaviour (Tushman and Romanelli 1985; Romanelli and Tushman 1986; Miller 1990; Lant, Milliken and Batra 1992; Barnett et al. 1994; Miller and Chen 1994; Boeker 1997; Greve 1999; Audia, Locke and Smith 2000). This behaviour is specifically risky when changed positions require action (Smith and Grimm 1987; Haveman 1992). Reasons for this can be manifold. Frequently however, there is a lack of perception towards the necessity of change or a lack of motivation for decision making and action

taking. Experience and routines can be valuable when the future does not deviate much from past events. In dynamic environments however, routines can lead to an experience gap where required perception of signals is hampered. Further obstacles that hamper perception are dominant logic and complacency or apparent security. Dominant logic evolves via socialisation in companies and leads to assimilation of interpretation of decision makers (Daft and Weick 1984; Tushman and Romanelli 1985; Bettis and Prahalad 1995). Complacency (Miller and Chen 1994) and apparent security (Dutton & Duncan 1987a) misguide companies to rest on its laurels. Formerly accurate assumptions and routines are not questioned anymore (Audia et al. 2000). Established search routines are not adapted to new challenges and hamper the necessity to perceive changes. The reasons behind the lack of motivation for decision making and action taking are also complex. Some companies are afraid of friction if they were to change structures, systems and processes that fit together in former times (Tushman, Newman, and Romanelli 1991; Lant et al. 1992). Furthermore, when standing in a healthy position, companies avoid the initiation of changes and are reluctant to abandon previously successful behaviour as the effectiveness of change seems uncertain.

Another theory which covers the same phenomenon and provides similar results is the mean reversion research common in the field of accounting and finance (Bajaj, Denis, and Sarin 2004). Changes in profitability and earnings are attributed to standard economic arguments (Fama and French 2000). Companies with extraordinarily high levels of profitability soon face competitors copying their strategies. This will reduce competitive advantage and profitability. On the other hand, due to possible takeover or outright failure, ineffective companies have an incentive to increase their profits (Bajaj et al. 2004). Hence, good performance leads to inertia, whereas poor performance acts as a catalyst leading to organizational change (March and Simon 1958, Cyert and March 1963; Kiesler and Sprouli 1982; Boeker 1997).

The outlined discussion proposes the consequence that poor performing companies will turn into more effective ones and highly profitable companies will face a downturn. However, reality draws another picture. There are also well performing companies that stay successful and poor performing companies that do not turn profitable. Therefore, we propose a specification. The performance in a future period is not primarily dependent on the display of a good past performance but is rather dependent on the development of this past performance. In the case of increasing success there is a higher probability of resting on one's laurels which can lead to failure. Top management is less perceptive of negative signals and does not see the necessity to initiate change. However, continuous past success

may be a sign for good management performance. If the management is not subject to inertia or hubris, good management performance can lead to future corporate success. Thus, the extent of the past success may be an indicator for good management performance und hence a predictor for future success. Following these arguments we propose the following hypothesis:

> ***Hypothesis 2:*** *Under the condition that the company has experienced a positive signal of past success, the higher the extent of positive signals and the lower the increase of positive signals, the higher the company's performance in a later period.*

In the case of negative starting positions signalled by unsatisfactory results, management potentially has an incentive to improve the company's performance (Cyert and March 1963; Kiesler and Sprouli 1982; Huff, Huff and Thomas 1992). This process starts with the perception of the negative signal. The perception of the signal is dependent on the managements' awareness as well as the strength of the signal. While weak signals are unlikely to be perceived and therefore the probability of reaction is low, strong negative signals will lead to a higher probability of reaction. One common reaction to a negative signal of declining or even of negative performance is a negative change in human capital. Although such a reaction can reduce costs in the short run, it may lead to an abandonment of valuable resources in the long run. Therefore, strong negative change in human capital gives more indication of an over-reaction of top-management than of anticipatory, long-term oriented management. This leads us to the following hypothesis:

> ***Hypothesis 3:*** *The stronger the signal itself and the lower the reduction of human capital, the higher the success after a reaction to a negative signal.*

Figure 7.1 summarizes our proposed research framework and the hypotheses derived thereof.

## METHODS

### Data and Sample

For the testing of our hypotheses we used annual financial statement information of 387 companies in the German manufacturing industry over

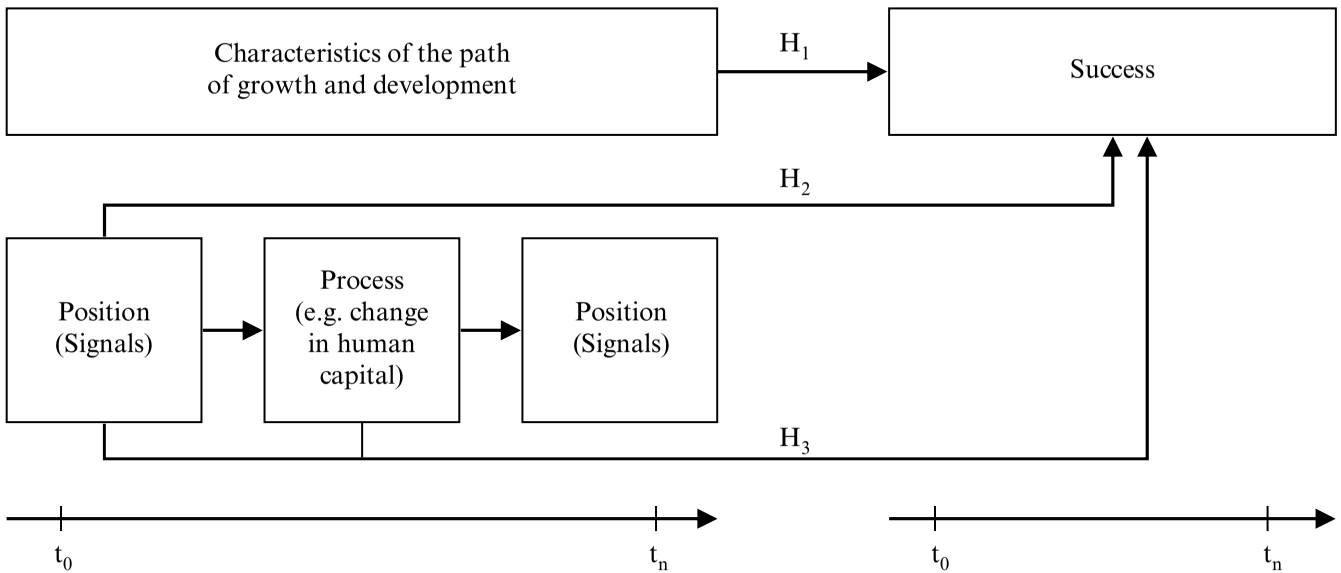


*Figure 7.1 Research framework and hypotheses*

the period from 1990 to 1999, enabling the use of 3780 observations. We focused our analysis on the manufacturing sector to have a sample of relatively comparable companies. For the purpose of our longitudinal study, we needed data over a considerably long period. In the first step of the sample selection process, we used a database containing only basic information on approximately 900 000 German and Austrian companies of all industries.[4] Out of this population, we identified 138 362 German companies in the manufacturing industry by using industry codes. Selecting only companies with sales in 1990 between 10m DM (Deutsche Mark, approximately US $6.2m) and 4bn DM (approximately US $2.5bn), we received 24 866 companies. We restricted the size to this range of sales in order to select a sample of companies that have reached at least a medium size and are not too large to be able to grow further. For these 24 866 companies we tried to compile financial statement information. For this purpose we used a database containing financial statements of approximately 30 000 German and Austrian companies in all industries. For 4773 companies we found at least one entry (one financial statement) in this database. Since, due to the characteristics of the corporate disclosure system in Germany, financial statement data for non-traded German companies is difficult to obtain, the database contains many companies with financial statement information of only a single year or with sporadic entries. We therefore checked for data availability over the whole period from 1990 to 1999 and received 1844 companies with financial statement information for every year in this period. Trying to maximize the sample size, we also checked for data availability in alternative periods, but no substantial enlargement of the sample could be reached without a significant shortening of the period of analysis. In a last step, we eliminated 1436 affiliates using shareholder information, because the unit of analysis is the whole company rather than a legal entity. We also eliminated 21 companies with obviously incorrect entries in the databases. Thus, we ended up with our final sample of 387 companies.

## Measures

### Independent variables

The variable *sales growth rate* was computed for alternative periods. Here and in all following cases we computed the growth rates using logarithms (*Sales growth rate = [LN (sales last year) – LN (sales first year)]/(last year – first year)*).

The variable *type of growth path* was operationalized as a nominal variable with the possible values 'persistently growing', 'persistently declining' and 'alternatingly developing'. We computed the one-year growth rates

of the sales for every year between 1990 and 1999 and defined the type of growth path of companies with growth rates always greater than or equal to zero as persistently growing. The type of growth path of companies with only negative growth rates was defined as persistently declining; the type of growth path of companies with at least one change in sign of sales growth rate was defined as alternatingly developing.

Whilst the variable *type of growth path* is nominal, we took the variable *volatility of growth* as a metric variable for the characteristics of the growth path. *Volatility of growth* over a given period was measured as the logarithm of the ration of standard deviation of the annual growth rates of the sales in this period and the mean of the annual growth rates in the period (*Volatility of growth = LN (standard deviation of the annual growth rates of the sales in the period/mean of the annual growth rates in the period*). Growth companies normally face a higher volatility per se. Therefore, we standardized the volatility by dividing by the mean. This separates the extraordinary volatility stemming for example from inadequate management which is the volatility relevant for our analysis from the volatility inherent to growth.

For the analysis concerning positive signals we first used a dummy variable to differentiate between firms having received positive signals and those having not. The criteria for positive signals were a return on equity above a certain threshold in one year and not declining earnings in a period of a defined length after this year. We constructed this variable alternatively using different period lengths and different thresholds for the first year of the period. For companies experiencing positive signals, we computed the variables *extent of positive signals* and *increase of positive signals* over the length of the defined period. We defined the *extent of positive signals* as the sum of the earnings before taxes in the period divided by the book value of equity in the first year of the period. We measured the *increase of positive signals* as the growth rate of the earnings before taxes over the defined period.

Similar to the procedure for positive signals, we used a dummy variable for the analysis of negative signals. We classified companies as having faced negative signals if the return on equity in any year was below a defined (negative) threshold. We alternatively constructed this variable using the operating profit on net assets instead of the return on equity. If a company had received negative signals, we computed the *strength of the negative signal* as the return on equity or the operating profit on net assets respectively. For those companies we took the *change in human capital* as a reaction to this signal. The *change in human capital* was measured as growth rate of the number of employees between one year prior to the signal and one year after the signal.

**Dependent variables**

In our study, we used firm performance as a dependent variable. Relying on a sample of mostly non-traded companies, the study was bound to accounting based performance measures. The use of accounting based data for performance measurement entails several problems (Fisher and McGowan 1983; Salomon 1985). Nevertheless, several studies showed that accounting based performance measures and market based performance measures are correlated (Kothari 2001; Penman 1991). This was also shown for the German market (Booth, Broussard, and Loistl 1997; Harris and Lang 1994). Moreover, using data over a ten year period we can to a certain extent exclude effects from creative accounting.

We used *economic profit on equity (EPoE)* as an ex post performance measure. We computed the economic profit by subtracting capital costs from the earnings before taxes and calculated the economic profit on equity for a firm $i$ as follows:

$$EPoE_{i;T;\tau} = \frac{\sum_{t=(\tau+1)}^{T} \left( (EBT_{i;t} - EQ_{i;t}(rf_t + \beta(rm_t - rf_t))) \prod_{t=(\tau+2)}^{T} (1 + rf_t) \right)}{\frac{\sum_{t=\tau}^{T} EQ_{i;t}}{(T - \tau)}} \tag{7.1}$$

Where:

$T$ = end of the period of analysis in years
$\tau$ = beginning of the period of analysis in years
$t$ = year
$EBT_{i;t}$ = earnings before taxes of company $i$ in year $t$
$rf_t$ = risk free interest rate in year $t$
$rm_t$ = market return in year $t$
$\beta$ = industry beta factor
$EQ_{i;t}$ = book value of equity of company $i$ in year $t$.

For the risk free interest rate we took a historical one-year FIBOR (Frankfurt Interbank Offered Rate) for each year in the period of analysis. Following previous research, we used a market index as the market portfolio (Biddle, Bowen and Wallace 1997; Fama and French 2002) and derived the historical market return for every year from the return of all stocks traded at the Frankfurt Stock Exchange. For the years this return was negative, we used the corresponding FIBOR instead, as this constitutes the opportunity cost of capital in this case. The industry beta is an average beta factor for the manufacturing industry, as it is not possible

to construct a peer group of listed companies for every company or for sub-groups of companies in our sample. Especially for the smaller and focused companies in the sample, there are no German traded companies with similar characteristics. Although this *economic profit on equity* also relies on accounting data and is only able to reflect the industry operating risk due to the use of an industry beta, it incorporates effects from capital structure and the cost of equity.

In addition to the *economic profit on equity*, we used alternative performance measures in our study to link up with other literature in strategic management and to check for validity of our measure. We used *Return on Equity*, *Return on Assets* and *Operating Profit on Net Assets* as further performance measures since they are widely used measures in strategy research (Barber & Lyon 1996, Fryxell & Barton 1990, Venkatraman & Ramanujam 1987). However, all these measures do not reflect capital costs properly. Neither the opportunity costs of capital which change over time nor the differences in capital costs due to differences in capital structure are covered.

*Return on Equity (RoE)* was computed for different periods dividing the sum of the earnings before taxes in each year of the period by the average of the book value of equity in this period.

*Return on Assets (RoA)* was calculated for different periods by dividing the sum of the earnings before interest and taxes in each year of the period by the average of the total assets in this period. By taking the earnings before interest, this measure is not affected by financing decisions.

*Operating Profit on Net Assets (OPoNA)* was incorporated into the study to have a better view of the actual operating performance of the companies. We computed this measure using the sum of the operating profit in the given period and the average of the net assets. Operating profit excludes special items and taxes and therefore is a cleaner measure for the operating result than earnings. Moreover, *Operating Profit on Net Assets* is not affected by financing decisions as it excludes interest expenses (Barber & Lyon 1996).

**Control variables**

The study employed several sets of control variables. To control for size effects, we used sales in the first year of our period of analysis (*sales, 1990*) as well as the number of employees in this year (*employees, 1990*). We also worked with logarithms of these measures. Moreover, we introduced the variable *industry* to control for industry effects. For this purpose we used the WZ-code, an industry code provided by the Federal Statistical Office of Germany. The more common SIC-, NAICS- or NACE-codes were not available for the companies within our sample and/or the period of our

analysis. We ran the analysis with a two-digit industry code as well as with a three-digit code. Age effects were controlled using the *year of foundation* of the companies.

## RESULTS

Table 7.1 displays means and standard deviations of all variables as well as the correlations among them. To test our hypothesis, we conducted ordinary least squares regression analyses. We also ran stepwise regression analyses, which showed no substantial differences in results. Therefore, we did not display these results.[5] For all regressions we used the four alternative performance measures. Changes in sample sizes are caused by missing data in the sample. In the regression analyses, we incorporated the *sales in 1990* as a control variable. We also ran the analyses using the alternative control variables *logarithm of sales in 1990*, *employees in 1990*, *logarithm of employees in 1990*, and *year of foundation*. As the results did not change remarkably, we dispensed with displaying the results. To control for industry effects, we ran *t*-tests comparing all metric variables for two-digit and three-digit industry code groups in our sample and could not detect any significant industry effect. Moreover, we ran the regression analyses for the two-digit industry groups separately. As for some analyses the number of companies would have been to small, we were not able to conduct every analysis for the industry groups. Where the analyses were possible, the relationships found for the whole dataset could also be shown for the different industry groups. Examination of the residuals of the regressions did not indicate any heteroscedasticity. The compliance with the normality assumption was ensured by conducting Kolmogorov-Smirnov Tests.

We could not find any relationship between sales growth rate and performance by running regression analyses with performance over different periods on the growth rates over different periods. Moreover, a *t*-test comparing the companies with different types of growth paths did not show any significant differences in performance between the groups.

For the test of hypothesis 1, we incorporated the variables *volatility of growth* and *sales growth rate* as well as *sales in 1990* as a control variable and ran the analysis with all performance measures. All variables were computed for the whole period from 1990 to 1999. We could not find any significant evidence for a relationship between *volatility of growth* and performance. Additionally, we tested hypothesis 1 for companies with different growth paths separately. We used the variable *type of growth path* to select the persistently growing, persistently declining and the alternatingly developing companies. We again incorporated the variables *volatility of*

*Table 7.1 Descriptive statistics and correlations*

| Variables | Mean | S.D. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Sales 1990[a] | 489 044.02 | 776 849.45 | 1.00 | | | | | | | | | | | |
| 2. Employees 1990 | 1725.21 | 2471.23 | 0.75*** | 1.00 | | | | | | | | | | |
| 3. Year of foundation | 1941.92 | 44.15 | −0.05 | −0.12* | 1.00 | | | | | | | | | |
| 4. Sales growth rate | 0.02 | 0.07 | −0.01 | −0.04 | 0.08 | 1.00 | | | | | | | | |
| 5. Volatility of growth | 1.44 | 1.14 | 0.07 | 0.16** | −0.08 | −0.21 | 1.00 | | | | | | | |
| 6. Extent of positive signals[b] | 3.06 | 5.47 | 0.66*** | −0.01 | 0.10 | −0.01 | −0.10 | 1.00 | | | | | | |
| 7. Increase of positive signals[b] | 0.32 | 0.40 | −0.22 | −0.16 | 0.17 | 0.43** | −0.09 | −0.06 | 1.00 | | | | | |
| 8. Strength of the negative signal[c] | −0.53 | 1.39 | 0.07 | 0.05 | −0.08 | −0.13 | 0.07 | 0.17 | 0.28 | 1.00 | | | | |
| 9. Change in human capital[c] | −0.06 | 0.10 | 0.00 | −0.05 | 0.07 | 0.18 | −0.07 | −0.14 | −0.52 | −0.11 | 1.00 | | | |
| 10. Economic profit on equity | −2.75 | 6.08 | 0.08 | 0.00 | −0.03 | 0.00 | −0.08 | 0.40* | −0.19 | −0.15 | 0.00 | 1.00 | | |
| 11. Return on equity | 0.18 | 0.37 | 0.11* | −0.07 | −0.05 | 0.26*** | −0.11* | 0.54** | 0.18 | −0.11 | 0.08 | 0.26*** | 1.00 | |
| 12. Return on assets | 0.10 | 0.11 | 0.04 | −0.13* | −0.04 | 0.25 | −0.21*** | 0.07 | 0.05 | −0.29** | −0.01 | 0.42*** | 0.54*** | 1.00 |
| 13. Operating profit on net assets | 0.12 | 0.28 | 0.08 | −0.05 | −0.01 | 0.14 | −0.02 | 0.07 | 0.06 | −0.02 | 0.09 | 0.16** | 0.20*** | 0.32*** |

*Notes:*

[a] in thousands.

[b] Only for companies having experienced positive signals. Here definition with threshold RoE > 0.25.

[c] Only for companies having experienced negative signals. Here definition with threshold RoE < 0.1.

* $p<0.05$

** $p<0.01$

*** $p<0.001$

*Table 7.2 Results of regression analysis of firm performance on growth for persistently and alternatingly growing companies 1990–99*[a]

| Independent variables | Persistently growing companies | | | | Alternatingly developing companies | | | |
|---|---|---|---|---|---|---|---|---|
| | EPoE | RoE | RoA | OPoNA | EPoE | RoE | RoA | OPoNA |
| 1. Constant | 1.13 | −0.11 | 0.17 | 0.17 | −2.47 | −0.20 | −0.12 | 0.08 |
| 2. Volatility of growth 1990–99 | −0.54*** | 0.22 | −0.46** | −0.48** | −0.04 | −0.06 | −0.10 | 0.08 |
| 3. Sales growth rate 1990–99 | −0.17 | 0.23 | 0.01 | −0.04 | −0.01 | 0.23 | 0.20 | 0.12 |
| 4. Sales 1990 | 0.38** | 0.45* | 0.39* | 0.26 | 0.09 | 0.30 | 0.22 | 0.48 |
| Adjusted $R^2$ | 0.34*** | 0.10 | 0.29** | 0.23*** | 0.01 | 0.08 | 0.08 | 0.07 |
| N | 40 | 39 | 38 | 40 | 297 | 299 | 297 | 299 |

*Notes:*

[a] Standardized regression coefficients are shown.

* $p<0.05$

** $p<0.01$

*** $p<0.001$

*growth* and *sales growth rate* as well as *sales in 1990* as a control variable. Due to the small number of persistently declining companies, we were only able to test the hypothesis for the other two groups. The results of the regression analysis are shown in Table 7.2.

We could find strong evidence for hypothesis 1 in the case of persistently growing companies. Persistently growing companies seem to perform better, the more stable the growth is. This can be shown significantly for all performance measures except *return on equity*. For the group of alternatingly developing companies, the results do not show a significant relationship between *volatility of growth* and performance. In all cases we could not detect a significant relationship between *sales growth rate* and performance.

To make sure that the detected effects are not caused by unobserved events outside our period of analysis, we conducted a lagged analysis. Therefore, we measured only the performance at the end of the period of analysis (1996–99) and used growth rates for three three-year sub-periods. The results are shown in Table 7.3 and are consistent with the results of the non-lagged analysis.

For the test of hypothesis 2, we only analyzed companies that received positive signals. We incorporated the variables *extent of positive signals* and *increase of positive signals* and controlled for *sales in 1990*. To identify the companies that have received positive signals, we used different thresholds. We measured the performance over a period of three years and with time lags of alternative lengths between the end of the signal period and the beginning of the performance measurement. Table 7.4 shows the results of these analyses with time lags of one and two years and with different thresholds for the return on equity as the trigger for the positive signal. For the length of the period of positive signals we took three years. We also conducted the analyses with shorter and longer periods of positive signals and with additional alternative thresholds. The results support the analyses displayed here.

These results strongly indicate a positive relationship between *extent of positive signals* and performance and a negative relationship between *increase of positive signals* and performance. This supports our hypothesis 2.

For the test of hypothesis 3, we only analyzed companies that received negative signals. We conducted the analyses including the variables *strength of the negative signal* and *change in human capital* and controlled for *sales in 1990*. For the definition of the negative signal as well as for the *strength of the negative signal* we used return on equity and operating profit on net assets respectively. We measured the performance over a period of three years with a time lag of three years. Table 7.5 presents the results of these analyses. The threshold used for the analyses displayed

*Table 7.3 Results of regression analysis of lagged firm performance on growth for persistently and alternatingly growing companies 1990–99*[a]

| Independent variables | Persistently growing companies | | | | Alternatingly developing companies | | | |
|---|---|---|---|---|---|---|---|---|
| | EPoE | RoE | RoA | OPoNA | EPoE | RoE | RoA | OPoNA |
| 1. Constant | 0.16 | 2.38 | 0.24 | 0.05 | 0.13 | 2.22 | 0.17 | 0.15 |
| 2. Volatility of growth 1990–1999 | −0.33** | −0.27 | −0.34** | −0.54*** | −0.07 | −0.06 | −0.06 | −0.03 |
| 3. Sales growth rate 1990–1993 | 0.21 | −0.08 | 0.38*** | 0.09 | 0.70 | −0.02 | 0.13 | −0.07 |
| 4. Sales growth rate 1993–1996 | 0.10 | −0.02 | 0.14 | 0.08 | −0.01 | 0.07 | 0.11 | 0.08 |
| 5. Sales growth rate 1996–1999 | 0.12 | −0.09 | 0.11 | 0.34 | 0.18 | 0.07 | 0.09 | 0.22 |
| 6. Sales 1990 | 0.49*** | −0.02 | −0.02 | 0.17 | 0.23 | −0.05 | 0.01 | 0.05 |
| Adjusted $R^2$ | 0.37*** | 0.01 | 0.24*** | 0.27*** | 0.03 | 0.01 | 0.02 | 0.05 |
| N | 43 | 42 | 42 | 43 | 322 | 320 | 323 | 311 |

*Notes:*
[a] Standardized regression coefficients are shown.
* $p<0.05$
** $p<0.01$
*** $p<0.001$

*Table 7.4 Results of regression analysis of lagged firm performance on positive signals*[a]

| Independent variables | Threshold RoE > 0.25 | | | | Threshold RoE > 0.20 | | | |
|---|---|---|---|---|---|---|---|---|
| | EPoE | RoE | RoA | OPoNA | EpoE | RoE | RoA | OPoNA |
| Time Lag 2 Years | | | | | | | | |
| 1. Constant | 0.44 | 1.48 | 0.51 | 0.57 | 0.49 | 1.46 | 0.50 | 0.55 |
| 2. Increase of positive signals | −0.71*** | −0.40* | −0.35* | −0.39* | −0.71*** | −0.40** | −0.36** | −0.40** |
| 3. Extent of positive signals | 0.30$^{+}$ | 0.75*** | 0.33 | 0.31 | 0.31* | 0.74*** | 0.34$^{+}$ | 0.33$^{+}$ |
| 4. Sales 1990 | −0.12 | −0.33$^{+}$ | −0.32 | −0.19 | −0.14 | −0.32* | −0.34 | −0.21 |
| Adjusted $R^2$ | 0.52*** | 0.44*** | 0.09 | 0.12 | 0.52*** | 0.46*** | 0.12* | 0.15* |
| N | 38 | 38 | 36 | 37 | 42 | 42 | 40 | 41 |
| Time Lag 1 Year | | | | | | | | |
| 1. Constant | 0.15 | 0.50** | 0.40*** | 0.58*** | 0.13 | 0.48** | 0.38*** | 0.54*** |
| 2. Increase of positive signals | −0.35*** | −0.08 | −0.16 | −0.30 | −0.36*** | −0.08 | −0.18 | −0.32** |
| 3. Extent of positive signals | 0.66*** | 0.74*** | 0.03 | 0.09 | 0.66*** | 0.74*** | 0.06 | 0.11 |
| 4. Sales 1990 | 0.29 | 0.34* | 0.38 | 0.31* | 0.29 | 0.34$^{+}$ | 0.37 | 0.30* |
| Adjusted $R^2$ | 0.72*** | 0.76*** | 0.13* | 0.16** | 0.73*** | 0.76*** | 0.14** | 0.18** |
| N | 49 | 49 | 49 | 47 | 57 | 57 | 57 | 55 |

*Table 7.4* (continued)

| Independent variables | Threshold RoE > 0.15 | | | | Threshold RoE > 0.10 | | | |
|---|---|---|---|---|---|---|---|---|
| | EPoE | RoE | RoA | OPoNA | EPoE | RoE | RoA | OPoNA |
| Time Lag 2 Years | | | | | | | | |
| 1. Constant | 0.11 | 0.99 | 0.40 | 0.49 | 0.16 | 1.03 | 0.41 | 0.51 |
| 2. Increase of positive signals | −0.61*** | −0.31** | −0.30* | −0.33* | −0.57*** | −0.28** | −0.31** | −0.36** |
| 3. Extent of positive signals | 0.23* | 0.59*** | 0.20 | 0.24+ | 0.24* | 0.58*** | 0.21+ | 0.24+ |
| 4. Sales 1990 | −0.26 | −0.13 | −0.16 | −0.15 | −0.06 | −0.14 | −0.19 | −0.18 |
| Adjusted $R^2$ | 0.39*** | 0.39*** | 0.08+ | 0.11* | 0.36*** | 0.39*** | 0.11* | 0.15** |
| N | 54 | 54 | 53 | 51 | 64 | 64 | 63 | 61 |
| Time Lag 1 Year | | | | | | | | |
| 1. Constant | 0.06 | 0.39 | 0.35 | 0.52 | 0.50 | 0.38 | 0.33 | 0.50 |
| 2. Increase of positive signals | −0.39*** | −0.06 | −0.17 | −0.30** | −0.31*** | −0.51 | −0.18+ | −0.31** |
| 3. Extent of positive signals | 0.67*** | 0.76*** | 0.10 | 0.11 | 0.70*** | 0.77*** | 0.13 | 0.15 |
| 4. Sales 1990 | 0.25 | 0.29 | 0.31+ | 0.28* | 0.21 | 0.27 | 0.29* | 0.23* |
| Adjusted $R^2$ | 0.70*** | 0.74*** | 0.12** | 0.16** | 0.69*** | 0.73*** | 0.10** | 0.16*** |
| N | 71 | 71 | 71 | 68 | 81 | 81 | 81 | 78 |

*Notes:*
[a] Standardized regression coefficients are shown.
+ $p<0.1$
* $p<0.05$
** $p<0.01$
*** $p<0.001$

*Table 7.5 Results of regression analysis of lagged firm performance on negative signals*[a]

| Independent variables | Negative signal based on RoE | | | | Negative signal based on OPoNA | | | |
|---|---|---|---|---|---|---|---|---|
| | EPoE | RoE | RoA | OPoNA | EPoE | RoE | RoA | OPoNA |
| 1. Constant | 0.22 | 0.37 | 0.11 | 0.11 | −1.91 | 0.11 | 0.01 | 0.03 |
| 2. Strength of the negative signal | −0.11 | −0.01 | −0.06 | −0.18 | 0.06 | 0.12 | −0.12 | −0.11 |
| 3. Change in human capital | 0.30** | 0.21 | 0.21 | −0.03 | 0.59** | 0.64*** | 0.39$^{+}$ | −0.14 |
| 4. Sales 1990 | 0.05 | 0.06 | 0.04 | −0.05 | 0.11 | 0.11 | 0.15 | −0.08 |
| Adjusted $R^2$ | 0.08* | 0.01 | 0.01 | −0.01 | 0.27** | 0.33** | 0.11 | −0.10 |
| N | 114 | 114 | 112 | 110 | 90 | 89 | 87 | 87 |

*Notes:*

[a] Standardized regression coefficients are shown.

$^{+}$ $p<0.1$

* $p<0.05$

** $p<0.01$

*** $p<0.001$

here was –0.1. We also conducted the analyses with alternative values for the threshold which lead to similar results.

The results do not show a significant impact of the *strength of the negative signal* on the performance. Nevertheless, the results give a weak indication for a positive relationship between the *change in human capital* and the performance after the negative signal. The reaction to the signal was mostly a reduction of the human capital (for the definition of the signal using the return on equity, the maximum of the *change in human capital* was 5.8 per cent the minimum of the change was −39.7 per cent and the mean was −6.2 per cent). This partly supports hypothesis 3 but the evidence is weak and the results are sensitive to the used performance measure as well as to the definition used for a negative signal.

# DISCUSSION

## Limitations

Our study is not without limitations. The most fundamental limitation is the use of financial statements, i.e. accounting based data which can be influenced by the management. Hence, the data used in our analyses might not reflect the true non-monetary or financial situation or development of the studied companies. This is true for both independent variables and dependent variables. Performance measures based on accounting data might not be an indicator for the actual company value (Fisher and McGowan 1983; Salomon 1985; Penman 1991; Rappaport 1998; Kothari 2001). We attempted to diminish this problem by analyzing a relatively long period of time. Furthermore, varying the sub-periods within the ten years for most of the analyses helped to overcome the problem of the accounting based data. We also used alternative performance measures based on different balance sheet and income statement items, whereby in most cases the analyses were not sensitive to the performance measure used. The richness of results could be improved by the use of additional primary data, which will be a task of further research.

Another limitation is the assumption that the performance measures used within our research framework are also the target figures for the managers of the studied companies. This assumption might not be true for some managers. Managers and also shareholders might for example pursue altruistic goals and follow other target figures, such as the number of employees. This might especially be the case in family-owned or family-run businesses (Schulze, Lubatkin, Dino and Buchholtz 2001) which play an important role in the German economy as well as for the German

society. In contrast, managers might pursue personal goals as income maximization or empire building (Fama 1980; Jensen and Meckling 1976; Mueller 1969). While the first case may be revealed with primary data, the latter is more problematic and can hardly be detected.

We also acted on the assumption that the items we used for the definition of signals represent the true situation of the company and can therefore be possible causes for reaction by the management. Consequently, we assume that these items are not the result of creative accounting. We tried to support this assumption by relying on alternative items and by using alternative thresholds for the definition of signals. None of these variations had substantial influence on the results of the analyses.

For the analysis of performance following a positive signal, we were not able to identify the reasons for a decline in performance. This decline may be caused by inaction due to inertia or by wrong action due to hubris, e.g. by non value enhancing acquisitions. This limitation could be overcome in future research by the use of additional and more detailed data on strategy and development. Another limitation is the choice and restriction of our period of analysis, which was necessary due to data availability. There might be effects stemming from the time before 1990 which are not covered by our analysis and which could have an impact on our results. We tried to diminish this problem by varying the sub-periods of analysis within our time frame as well as varying time lags. Nonetheless, it would be reasonable to repeat the analyses with a second ten-year time frame to preclude this problem. Unfortunately, the data is not available.

We did not only restrict the time frame but also the object of analysis by focusing our study on the manufacturing industry. This was necessary with regard to the homogeneity within our sample and for practical reasons. It would however be promising to broaden the focus and to explore whether the relationships found in this study are true for other industries.

## Conclusion and Implications

The aim of our study was to examine the relationship between performance and the continuity of development of companies as well as the relationship between performance and signals leading to discontinuity. Our research was mainly triggered by the seminal work of Penrose (1959) and more recent theoretical work on dynamic capabilities and routines (Nelson and Winter 1982; Teece et al. 1997; Helfat and Peteraf 2003; Feldman and Pentland 2003; Winter 2003).

In our study, we could not find any general relationship between growth and success. However, for persistently growing companies we were able to give empirical evidence for Penrose's thesis that performance depends on

the path of development. We could show that the lower the extraordinary volatility, the higher the company's performance. However, our results also show that this explanation does not apply for every path of development. Presumably, the theory of growth which was significantly influenced by Penrose needs to be expanded and detailed to develop a more comprehensive theory of corporate development. We tried to contribute to the development of such a theory by analyzing the influence of heterogeneity of development caused by signals on the success of the development of companies. Thereby, it was necessary to look at the impact of positive and negative signals separately.

Concerning the impact of positive signals, we had to separate positive and negative effects. A positive effect could be that good financial results are a source for success in later periods. Negative effects caused by positive signals could be inertia or hubris (Romanelli and Tushman 1986; Barr, Stimpert and Huff 1992; Miller 1994; Audia et al. 2000; Seth, Song and Pettit 2000). Our results give evidence for this duality of effects. We showed that good financial results in one period are positively related to success in a later period. However, not all companies that are successful in one period are successful later on. The increase of financial results in one period is negatively related to the financial performance in a later period. Also in this case, continuity has a positive influence on future success.

The results of the analysis regarding companies with negative signals lead to a similar conclusion. We showed that a strong reduction of human resources as a reaction to the negative signal lead to inferior performance in later periods. The negative change in human resources was negatively related to the success in later periods. Our results indicate that companies reacting to negative signals with a significant reduction of human resources are either abandoning important resources needed for the future or are simply overreacting. Companies reacting moderately retain continuity and tend to be more successful in the future than their overreacting counterparts. This study shows that a relationship between corporate development and success is not provable in general. In fact, it can only be detected for certain paths of development. Although the development paths are heterogeneous, it is possible to identify certain patterns and to educe success factors.

In regard to our results, an inclusion of aspects from evolutionary and managerial economics into the theory of growth and development seems to be promising. This would be an attempt to substantiate interrelations on the macro level with elements on the micro level, which could generate interesting results in future studies. Similar approaches have already been very successful in other areas, for example in monetary macroeconomics (Barro 1981; Lucas 1981, 1987).

## NOTES

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2. Faban Güenther, Otto Beisheim Graduate School of Management, Vallendar, Germany.
3. Johannes Voll, Otto Beisheim Graduate School of Management, Vallendar, Germany.
4. The databases used for our study were provided by Creditreform, one of the most important business information services in Germany.
5. All results not displayed here are available upon request.

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# 8. Deploying strategic initiatives: further consideration of the flexibility–stability balance

**Ronald Klingebiel**

## ABSTRACT

When drafting the plans for the rollout of strategic initiatives, firms consistently make decisions about the balance of flexibility and stability. Which elements of the project design should be defined in the planning phase (stable); when should commitment to a particular element be delayed until later during the rollout (flexible)? Central to this decision is the value of flexibility. This chapter reviews the current state of project planning concepts and real options theory to identify where they respectively succeed or fail to explain effective managerial decision-making.

I use a simple illustration of a planning decision problem to explore the boundary conditions of flexibility value, i.e. under which conditions is it beneficial to create and maintain flexibility in the rollout of the strategic initiative. These conditions include (a) external and internal parameters such as uncertainty and complexity, and (b) a firm's skills and routines for dealing with flexibility once it is created. Through a synthesis of these 'general' and 'organisation-specific' conditions, I point towards an extended conceptual framework for the managerial assessment of flexibility value. Using this, I argue that the project planning literature insufficiently and only indirectly considers flexibility value and its conditions. On the other hand, using real options concepts to describe managerial decision-making heuristics focuses too heavily upon general parameters, and too little upon organisation-specific conditions that influence flexibility value. I advocate a combination of project risk management with elements of real options theory, which may be better suited to explain managerial decision-making under uncertainty and provides promising avenues for further enquiry.

# INTRODUCTION

In dynamic markets, successful firms are those that adapt relatively better to changing competitive circumstances (Schumpeter 1950). Adaptation is not only a result of serendipitous managerial responsiveness, but also of a flexibility that has been deliberately preserved (Brown and Eisenhardt 1997). However, as flexibility comes at a cost, including a lack of focus and critical mass (Ghemawat 1991), a fundamental strategic question is: when should flexibility be preserved and when should it be avoided? Schumpetrian adaptation thus assumes that successful managers know how to arrive at an answer to this question, either at an intuitive or rational level, with their decision hinging on the perceived value of flexibility.

This chapter takes further the process of identifying the major boundary conditions which influence the optimum balance of flexibility and stability in the rollout of strategic initiatives, such as product developments or market entries. The assumption is that a manager competent in controlling the level of flexibility is likely to be one who is able to assess how circumstances shift the flexibility cost–benefit ratio.

Research to date has concentrated on the impact of external and internal parameters on flexibility value, which can guide these balancing decisions. Market uncertainty and project complexity have, for example, been identified as moderators of flexibility value (Krishnan and Bhattacharya 2002; Pich et al. 2002). Firm-specific factors that may increase or decrease flexibility value have, however, received less research attention (Volberda 2003). Consider the following example: an opt-out clause in a critical supplier contract may be seen as valuable flexibility for the rollout of a strategic initiative because the reliability of supply may be an uncertain variable and the delivery may be an essential component of the rollout of a strategic initiative. This flexibility is usually expressed in terms of value, however it may even be a factor in determining the circumstances which might render the supplier contract disadvantageous and inform the management to terminate the contract. In practice, decision-makers often stray from optimal rules (Kahneman and Tversky 2000) and several psychological and sociological factors, as well as organisational constraints, may render a potentially valuable flexibility worthless. These constraints differ across firms, and thus the ability to realise flexibility, even when deliberately preserved, may also vary substantially.

Motivated by the limited understanding of organisation-specific factors effecting flexibility value, the chapter seeks to synthesise the conditions influencing the value that flexibility offers for the deployment of strategic initiatives. In doing so, the intention is to add structure to an area of study that has so far remained on the fringes of scholarly work, and

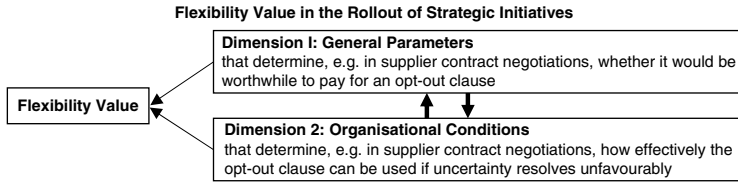


*Figure 8.1 Duality of general and organisation-specific conditions that influence flexibility value*

which has tended to focus upon generic strategic planning and project management practices that provide flexibility, rather than upon flexibility value itself. Combining both the general and organisation-specific sets of conditions in a simple theoretical framework (see Figure 8.1), the chapter explores how conventional interpretations of effective managerial decision-making derived from project planning and risk management theory, and from recently developed real options concepts, might embrace this dual conditionality.

The analysis reinforces the conclusions of Chapter 8 that, separately, neither conventional planning approaches nor real options concepts can satisfactorily predict managerial decision-making behaviour as regards an effective flexibility–stability balance. However, insights from each theory can enrich the other. Together they may better explain managerial assessments of flexibility value as a function of general and idiosyncratic organisational conditions. This not only suggests ways in which project planning theory can benefit from a more explicit and direct consideration of flexibility value propagated by real options theory, but it also marries real options concepts, which have so far tended to ignore the realities of organisational behaviour (Adner and Levinthal 2004), with an existing approach to the management of uncertainty in strategic initiatives. It suggests an answer to Tong and Reuer (2007), who asked whether real options theory can make 'greater contributions to strategy research, as a standalone theory or as a theory integrated with others?' (p. 21).

We first detail the importance of an organisational competence for flexibility assessment that allows firms to arrive at appropriate decisions as regards the balance of flexibility and stability in the rollout of strategic initiatives. The chapter continues by elaborating the notions of flexibility costs and flexibility benefits that inform the balancing act. Subsequently, the sets of general and organisation-specific boundary conditions for flexibility value are collated and reviewed. On the basis of the theoretical framework identified we review the extent to which prominent approaches to project risk management, as well as real options concepts, consider

these conditions when assessing flexibility value. The chapter concludes with a discussion of the conceptual advantages of a combined approach, the implications for theory, and suggestions for future research on flexibility in the rollout of strategic initiatives.

## FLEXIBILITY ASSESSMENT COMPETENCE

Management can create various forms of flexibility, broadly defined in Chapter 8 as the capacity to respond to changes in the environment (Sanchez 1993). For example, flexibility in the form of modular product and process architectures has been linked with more effective firm responsiveness and performance (Worren et al. 2002). Beyond the quest for operational responsiveness, flexibility has also been studied in the context of strategic decision-making. Here, flexibility is necessary because dynamic factor markets prevent the sustainability of organisational rents if firms fail to adapt their portfolio of activities intermittently. Managers thus continually strive to develop and implement new strategic initiatives, which change the firms' activities in ways that are expected to generate new streams of rent for a period of time in the future (Amit and Schoemaker 1993). Due to the time required for strategies to come to fruition, the execution of strategic initiatives needs to begin *before* market uncertainty is reducible and when only inconclusive information about future market circumstances is available.

To reduce the risk of unsuccessful strategic initiatives, decision-makers can preserve flexibility in two ways: in the initial choice of initiatives, and in the eventual deployment of a chosen initiative. By delaying choice and initially committing only a limited amount of resource investment to several strategic options, the former allows management to take advantage of information that reduces uncertainty over time before finally, at a later point in time, identifying a single option for full investment (Bowman and Hurry 1993; Dixit and Pindyck 1994). Nevertheless, not all uncertainty can be reduced in this way, and the flexible deployment of a chosen initiative, the second possibility, provides managers with further means to respond to market changes. Such flexible deployment can encompass changes of scope (De Weck et al. 2004; De Neufville et al. 2006), and changes to the planned configuration of resources used to rollout the initiative (Krishnan and Bhattacharya 2002; Terwiesch et al. 2002). This chapter focuses on the latter.

In its extreme form, a very stable rollout of strategic initiatives would be based on a pre-defined project design with a short time frame and would focus on straightforward execution, and thus not allow for the adoption

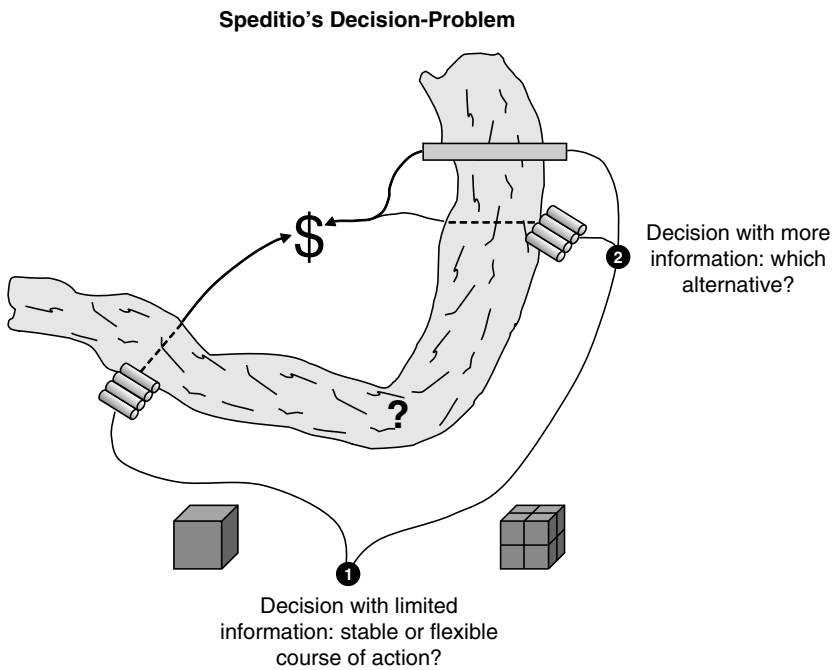


*Figure 8.2 Simplified example of the choice between flexible and stable deployment plans*

of alternative courses of action in response to changing environmental factors. By way of contrast, a very flexible rollout would require a significantly longer time frame, which would provide space for substantial experimentation. In addition, for each possible resource configuration there would be a number of alternatives, which means that, for example, instead of using a single supplier or technology, other options would be pursued in parallel (Pich et al. 2002). As the benefits and costs of flexibility vary, decision-makers have to strike an appropriate middle course between these two extreme approaches to the deployment of strategic initiatives.

Figure 8.2 illustrates a basic decision-problem in the rollout of a strategic initiative, henceforth referred to as *Speditio*. The initiative aims to deliver goods to a new market. All routes to the market require the project team to cross a river, the current in which can occasionally be very strong. If the current is moderate, the river can be conveniently navigated by raft; if the current is strong, a narrow bridge is the only way across. Without knowing ex-ante the force of the current at the time of arrival at the river,

management can either choose to rely on a single method of crossing the river. For example using the raft and thereby accepting the possibility that they will have to turn around in the event of a strong current (stable rollout), or delaying the river transportation decision by choosing the raft-or-bridge route until more information is available (flexible rollout). The latter comes at the expense of a longer journey to the market place, and of having to alter the product packaging to make it compatible with a potential journey over the narrow bridge.[1]

At Point 1 in Figure 8.2, management's choice between a stable or flexible rollout is informed by weighing up the costs and benefits of extra flexibility. These costs and benefits are likely to vary with general conditions, such as the level of market uncertainty, and with organisation-specific conditions, such as the ability to use the flexibility. The *general* conditions broadly determine how much value the flexibility could *potentially* contribute, here the potential time-saving through bridge-crossing, whilst the *organisation-specific* conditions tend to have an influence on how much value could *actually* be reaped, Speditio's ability to handle multiple future scenarios efficiently (raft or bridge). The basic tenet of this chapter is that if Speditio has the competence to understand and review these sets of conditions for the analysis of flexibility value, it can make a more informed choice between flexibility and stability at Point 1.

In the resource-based view, an organisational competence can create competitive advantage (Wernerfelt 1984; Barney 1991). In imperfect factor markets with firms holding heterogeneous resources, an acquired competence, such as being able to assess the stability–flexibility trade-offs, can then become a source of rent generation (Amit and Schoemaker 1993; Peteraf 1993). In effect, the skills and routines involved in the assessment of flexibility would resemble a higher-order competence, which causes related activities, such as project planning and management, to emphasise the pursuit of singular or multiple courses of action for the deployment of strategic initiatives in different circumstances. A flexibility assessment competence would determine the degree of managerial responsiveness to environmental changes. If such a managerial competence anticipates the average flexibility value more effectively than is typical of competitors, then organisational rents will be comparatively higher.

Using this understanding of a competence for flexibility value assessment and its impact on overall firm performance, the following section explicates the notion of flexibility benefit and flexibility costs. This then serves as the basis for collating the conditions that influence the flexibility cost–benefit relationship.

## THE VALUE OF FLEXIBILITY: COSTS AND BENEFITS

*Strategic flexibility* is a term often used to denote a firm's ability to respond to the various demands of dynamic environments (Sanchez 1993). Here, the capacity to respond is inherent in the flexibility of the available resources and the managerial flexibility with which these resources can be applied to alternative courses of action. In this chapter, the emphasis is on deliberately preserving the latter – with the competence to devise resource combinations that allow managers to choose from and follow a number of courses of action to reach the pre-defined goal of a strategic initiative. By way of illustration, in the case of Speditio, this means that the focus is neither on; (a) the flexibility to stop the strategic initiative and to start deploying an initiative with different goals in reaction to the arrival of new market information, nor on; (b) the flexibility to change the goals and scope of the plan, such as focusing on local markets on the same side of the river, but on; (c) the flexibility to change the means of reaching the defined goal of delivering the product to the market on the other side of the river. Here, the raft-or-bridge route provides Speditio with two alternatives for crossing the river. Generally, supplier arrangements, technology adoption, and material and human resource all provide potential delivery elements around which flexibility could be preserved.

The major benefit of flexibility is typically seen in greater levels of choice and/or learning opportunity. Case studies provided by Loch et al. (2006) show that an electronic-component manufacturer had to experiment in order to learn from emerging results about key component functionalities and thus to refine a dominant rollout plan alternative. As an alternative to single alternative experimentation, a pharmaceutical start-up firm, in its effort to grow, is shown to have engaged in the costly screening of numerous development opportunities to finally select the most appropriate alternative. Both approaches promise the basic conceptual benefits that flexibility offers to organisations engaged in deploying strategic initiatives: flexibility reduces the exposure to risks, and increases opportunities.

Few studies, however, have empirically observed a direct link between flexibility and performance. Notable exceptions are studies in the area of manufacturing, with works such as that by Worren et al. (2002) directly linking flexibility in the form of modularisation with performance. As a result of the limited research on this relationship, understanding the conditions that moderate flexibility also remains limited. More importantly, while research that directly and indirectly investigates flexibility often advocates the benefits of flexibility, others have contradicted the proposition and argued that stability is of higher importance to organisations.

For example, Scott (1965) observed that delaying the decision to commit to a single uncertain alternative can also adversely affect organisations: flexibility can lead to either excessive plan alterations without sufficient consideration of associated costs, or overly hesitant decision-making that incur costs through delays and excessive information search. In the example of Speditio, a premature decision made on the basis of early weather forecasts could entail unnecessary costs, such as slowly crossing the bridge, if it turns out that the raft could have easily crossed a moderate current. Equally, hesitating at Decision Point 2, hoping for a more moderate current instead of swiftly using the bridge, foregoes valuable time-to-market. Arguing for more control over the resources used to reach a defined goal, Pasmore's (1998) study of Jazz ensembles stresses that 'flexibility is always possible without control, but that random activity does not produce Jazz, it produces noise' (p. 563).

This goes to show that flexibility does not necessarily add value to the rollout of strategic initiatives when there is uncertainty, but instead, seems to require particular organisational conditions. Emphasising this point, Weick (1982) concluded that inappropriate flexibility can display a lack of commitment to internal and external stakeholders, making it difficult for organisations to retain a sense of identity and continuity and sometimes leading to chaotic situations (in Speditio: the person hired to steer the raft may not know if or when his/her services will be required and this may decrease his/her motivation and, ultimately, team harmony). In addition, excessive flexibility in the deployment of strategic initiatives can, for example as a consequence of modularisation, mean a lack of strategic focus and critical mass (Zirger and Maidique 1990; Ghemawat 1991; Tatikonda and Rosenthal 2000). Some authors consider the stable commitment to a single course of action to be a prerequisite for organisational rents, because superior performance often derives from competitive advantage in the economies of scale of a strategic initiative (Ghemawat 1991; Ghemawat and Del Sol 1998). These authors suggest that flexibility can bear substantial opportunity costs: creating and preserving alternative courses of action may deprive crucial resources from contributing to the momentum and strategic thrust needed to establish challenging strategic initiatives. In some situations, flexibility may thus bring more disadvantages than advantages. To avoid these situations, while still preventing detrimental inertia in dynamic markets, managers are challenged to strike an effective middle course between stability and flexibility. Such tensions between flexibility and stability are arguably related to those between exploration and exploitation, responsiveness and efficiency, and scope and commitment: organisations need to be competent in navigating these interfaces in order to achieve organisational

rents. Each organisation is likely to have its own particular and most effective middle course.

The proposed flexibility assessment competence estimates the value of individual flexibilities, such as adopting a path that allows for alternative courses of action at a later point in time. The term 'flexibility value' is used in Chapter 8 (Figure 8.2) to describe the relative position in a linear trade-off between benefit and cost.

On the one side of the value continuum, the concept of flexibility benefit refers to the sum of two differences between stochastic measures.[2] The first is the difference between a measure of the potentially negative effects of committing to a singular course of action and a measure of the potentially negative effects of the rollout of the same strategic initiative containing less initial commitment (more flexibility). The second is the difference between statistical measures of potentially positive effects. These two differences correspond to the benefit of reducing risk exposure and of enhancing opportunity respectively. As flexibility (an alternative course of action) will not always be needed, its benefit is only realised in a proportion of all future scenarios. By contrast, flexibility costs, including resource expenditure and opportunity costs, have relatively certain and immediate effects.

In the case of Speditio's river crossing, the flexibility to choose between raft and bridge at a later point when more information is available has the benefit of allowing the delivery team to cross the river even when the current is strong. This minimises the risk of not being able to sell to the target market. Analogous to this is a situation where the choice between rollout plans is 'bridge' versus 'bridge-or-raft', with the more flexible approach maximising the opportunity to deliver quickly to the market via the more convenient raft in the case of low current. Speditio's direct costs of flexibility are the relatively longer route to the crossing, and the loss of economies of scale due to the smaller-scale packaging needed to make a bridge crossing possible. On top of these costs, any negative effect of flexibility on the overall team performance (such as a less motivated steersman for the raft) have to be taken into account in order for management to arrive at the overall flexibility value when deciding which route to take at Point 1.

The next section explores in more detail the general and idiosyncratic conditions associated with shifts in the flexibility cost-benefit continuum.

## General Conditions

*External Parameters:* Complex systems theory provides an initial pointer towards the optimum balance of flexibility and stability. By focusing on controllability, its concept of 'requisite variety' suggests that the optimum

level of flexibility is achieved when the level of internal variety matches that of environmental variety (Ashby 1958). Strategy scholars working from this premise (Volberda 1996) have argued that the optimum level of flexibility resides where the internal means of adaptation suffice to allow firms to cope with the range of environmental changes. According to this premise, the greater the external variety, the higher is the flexibility value. Flexibility value decreases as soon as there is more variety within the system than outside, leading to unnecessary flexibility costs that are not offset by additional useful manoeuvrability. This basic initial consideration implies that Speditio's management would have to choose the flexible rollout path, because the external variety of river current strengths is greater than a delivery plan based on the raft crossing could accommodate. Further flexibility, perhaps the option of shipping the product by plane, would entail more costs than benefits as there is already sufficient flexibility in the system to cross the river at any strength of current.

Matching external with internal variety, however, is only possible if all areas of external variety can be identified in advance. Because strategic initiatives have a temporal dimension, decision-making precedes full knowledge of the likelihood of future developments. Not all states of the future can be matched ex ante with the flexibility to adopt appropriate courses of action in the future. What is more, not all potential future occurrences have the same impact on the success of the strategic initiative. Thus, management is interested in estimating both the likelihood of an event's occurrence, and its potential impact. The higher the likelihood and the higher the impact, the higher the value of the corresponding flexibility will be. If historical data or long-term weather forecasts suggest a relatively high probability of a strong river current, Speditio managers are likely to be more concerned with providing an alternative to crossing by raft. The higher the anticipated impact of a strong current on a raft-based delivery plan (increased waiting times, delivery cancellation), the higher will be the value of being able to choose between the raft and the bridge when uncertainty resolves.

Worren et al. (2002), among others, empirically reinforce the major importance of uncertainty and impact of occurrences by arguing that flexibility value increases when increased customer and competitor dynamics lead to prospective margin pressures. Similarly, Bhattacharya et al. (1998) infer from their study of flexibility in product development that 'a firm should tune its definition process to the prevailing level of market uncertainty' (p. S50). Thus, if environmental conditions are stable and predictable, and the impacts of possible changes are understood to be small, flexibility value is low, and vice versa. Volberda (1998) also suggests, however, that the value of preparing for a future eventuality also rises

when the the cause-effect relationships of changes are poorly understood. If the occurrence is certain, but its impact potential is unclear, flexibility is also seen to offer value.

In sum, the external parameters indicated to effect flexibility value are the expected number and frequency of significant occurrences in the competitive environment, the uncertainty surrounding the occurrence expectation, the expected impact of the occurrences, and the ambiguity surrounding the impact expectation.

*Internal Parameters:* While the magnitude of flexibility costs and benefits is dependent on the unit of analysis (e.g. project stream, project, business-unit), the flexibility cost-benefit balance may remain largely unaffected. At the level of the firm, the wide range of possible states of a very complex world increases the need for responsiveness (Pitsis et al. 2003; Tether and Metcalfe 2003) and makes the consequences of managerial decision-making difficult to gauge (Kauffman 1993). Despite the increased need for flexibility, the costs associated with responsiveness may also be very high due to the expensive coordination activities necessary when preparing complex systems for different scenarios (Miller and Olleros 2001). At lower levels of firm activities, project sub-units may have a narrower range of possibilities to benefit from environmental development, while being able to maintain flexibility at lower cost. Thus, although high complexity of business activity increases both flexibility costs and flexibility benefits, it may have little influence on the trade-off (flexibility value only increases nominally, but does not shift on the continuum depicted in Figure 8.3).

Flexibility value also depends on the magnitude of resources locked-in through decision-making. If the proportion of committed resources is high in relation to the overall level of resources used for the deployment of a strategic initiative, even the impact of small and infrequent environmental changes is significant. In the example of Speditio, an unsuccessful river crossing may put the entire target market sales at risk. This would encourage decision-makers to opt for the more flexible approach with raft and bridge as alternative courses of action, despite the higher associated costs. The costs of failure to cross by raft may exceed those of factoring in flexibility as it puts the entire initiative at risk of serious delays.

Finally, the minimum resource commitment necessary to achieve a set goal caps the level of useful flexibility, and therefore provides a further boundary condition. Particular activities may only begin if a threshold level of scarce resources is committed. This would be true in a situation in which Speditio is required to commit to paying a salary to the raft steersman even if he may not be needed. If his/her salary were part of the flexibility and only to be paid upon usage of the raft, he/she might not be willing to embark upon the journey. Vested stakeholder interests may hinder the

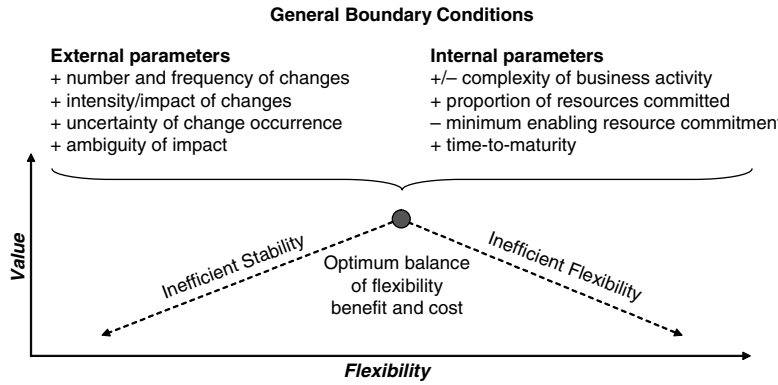


*Figure 8.3 General conditions influencing the optimum flexibility value*

start of project rollout, if insufficient stability is guaranteed. This increases flexibility costs and diminishes flexibility value. (Miller and Olleros 2001). This boundary condition is related to the notions of minimum efficient size and the starting investment capital that triggers business activity. As a result, there may be a limit to the amount of testing or parallelisation that a firm can pursue in order to choose or learn from alternatives as environmental uncertainty unfolds. Beyond a certain limit, flexibility benefit begins to decrease, and its cost increases (decreasing marginal value). Flexibility value is also linked to the longest possible time available until flexibility has to be converted into stability to allow the initiative to proceed (Pacheco-de-Almeida and Zemsky 2003).

In sum, the internal parameters affecting flexibility value are the proportion of committed resources at risk, the minimum of commitment needed to guarantee progress, and the maximum possible time delay to making a final decision. Figure 8.3 summarises this discussion of general boundary conditions for flexibility value, including both external and internal parameters.

## Idiosyncratic Conditions

In this section, we seek to illustrate that reaping flexibility value is not an automatic occurrence, even if uncertainty and the other conditions listed above suggest it would high.

Few authors have studied the link between the usefulness of flexibility and idiosyncratic organisational conditions (Sanchez 1995; Volberda 1996). Sanchez refers to 'coordination flexibility', which, in effect, indicates that planned flexibility has to be matched by managerial abilities to

respond to environmental changes. Here, an effective response is understood as the timely switch from one course of action or resource configuration to an alternative that has been preserved throughout the deployment of a strategic initiative.

Volberda also views organisational design as a key enabler for realising flexibility. Technology, structure and culture all determine a firm's ability to handle future variety (see also Zelenovic 1982) through effective monitoring and learning systems. These systems gather and process information to guide flexibility decision-making (Galbraith 1973; D'Aveni 1994), thereby providing the means to express and compare flexibility value and cost. The more efficient a firm is in the creation of new knowledge and the resolution of environmental uncertainty, the more likely it is that managers will choose the appropriate course from the range of possible actions, thus enabling a higher realisation of flexibility value.

Information can be inconclusive, however, and its interpretation is subjective. A lack of objective flexibility cost-benefit comparisons adds a further level of complexity. Because actors at different levels have different perspectives on the attractiveness of a given flexibility, they will disagree as to the appropriate responses. Managers charged with pursuing a flexibility, and executives charged with evaluating a portfolio of flexibilities, will differ in their opinions as to when a flexibility offers benefit. It is for this reason that transparent criteria may help to exploit flexibility (decide to modify the course of action); internal and external stakholders need to accept these criteria in advance. This suggests that flexibility value is influenced by a firm's ability to act in a disciplined way to the resolution of uncertainty. In the example of Speditio, a clear definition of a threshold level of river-current strength, and what constitutes a reliable source of information (e.g. radio), could help to avoid divergent interpretations that could delay or prevent usage of the safer bridge crossing.

Structure and culture also influence the degree of conservatism or innovation. A conservative setting is commonly associated with a strong and homogenous identity and narrow scope for creativity. Repositories of unwritten rules and beliefs may limit managerial responsiveness by (implicitly) specifying the appropriate course of action (Camerer and Vepsalainen 1988). If the Speditio team has a tradition of using rafts to cross rivers that leads it to disregard the potentially more sensible option of using the bridge, a theoretically valuable flexibility is rendered useless. By way of contrast, an innovative setting encourages a broader scope for reaction to external stimuli and preparation of responses (Johnson 1988). Worren et al. (2002) found that entrepreneurial intent and a climate of innovation relate to a higher degree of realised performance benefit through flexibility. These conditions encourage the realisation of the full

extent of an expected flexibility value. Firms with higher degrees of conservatism will find it difficult to realise flexibility value, even if they operate superior systems for gathering and interpreting information. If the resolution of uncertainty (knowledge of strength of river current) is not met by the designated alternative course of action (use of bridge), flexibility loses its value.

Finally, organisational decision-making behaviour also stands to moderate the achievable flexibility value. Given the difficulty organisations have in embracing the logic of sunk costs (Russo and Schoemaker 1989), their tendency towards escalating commitments (Staw 1976, 1981) and overconfidence (Camerer and Lovallo 1999), the political impetus not to reveal failure (McGrath 1999; Sitkin 1992), and the natural desire to succeed, managerial responses may be biased and this is likely to reduce flexibility value. Likewise, when studying the stage-gate process of a firm's attempt to identify promising courses of action and terminate unattractive courses, Keil and McGrath (2007) confirmed decision-making biases by revealing that the firm's initial expectations for termination at its stage gates were out of sync with the observed (much lower) rates of termination.

In sum, the organisation-specific conditions discussed include the effective creation of flexibility, the effective gathering and processing of information that reduces uncertainty until flexibility expires, the effective usage or abandonment of flexibility, and effective organisational mechanisms that ensure a disciplined treatment of flexibility through appropriate structures and culture. This is summarised in Figure 8.4.

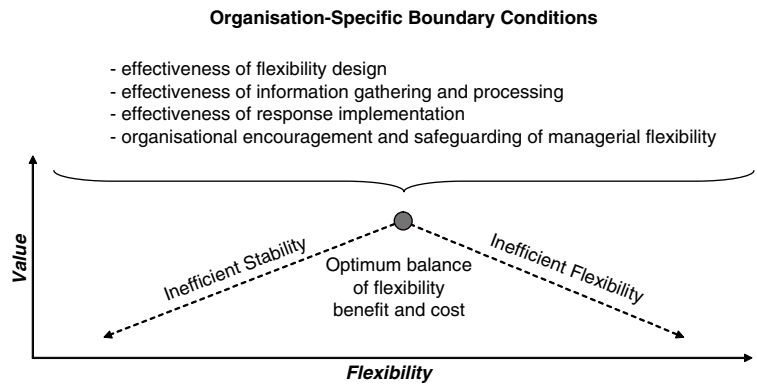


*Figure 8.4 Organisation-specific conditions influencing the flexibility value optimum*

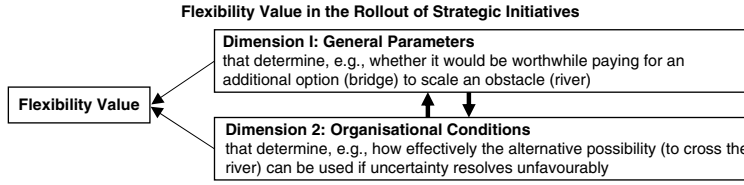


*Figure 8.5 Inter-related assessment and realisation of flexibility value*

### Conceptual Framework

Although not an exhaustive list, the above strongly suggests that both general parameters as well as organisation-specific conditions determine flexibility value. While it is intuitive and comparatively well-researched that flexibility value is conditional on the level of uncertainty and its implications for the firm, the analysis also shows that flexibility assessments may provide a more realistic value if the firm-specific context, in which flexibility is created and used, is considered.

When they deploy strategic initiatives, managers make choices between different types and amounts of materials, human resources, technology, market segments, channels and suppliers. Alternatively, they may find it beneficial to delay final commitments to a single alternative (Point 2 in Figure 8.2) for any of these, thereby preserving choice. The decision to delay the final choice (Point 1 in Figure 8.2) is guided by the decision-maker's impression of flexibility value.

Inserting Speditio's decision problem into the theoretical framework introduced in the first section of this chapter, illustratively summarises the importance of two relatively distinct considerations: how much flexibility value *could* be realised by the project team and how much it *can* realise (see Figure 8.5).

In the following section, we take further the discussion of Chapter 8 to explore whether and how research on managerial approaches to flexibility assessments captures the interdependence between the assessment and realisation of flexibility value, and the notion that the duality of general and organisation-specific conditions governs the flexibility cost-benefit trade-off.

## MANAGEMENT OF STRATEGIC INITIATIVES

As the resource-based view suggests, a firm's competencies to manage a complex set of resources can determine the achievement of competitive

advantage and the generation of organisational rents (Barney 1991; Amit and Schoemaker 1993). As part of an overall set, the competence for the assessment of flexibility value may enhance the effectiveness of resource allocation decisions in the design of strategic initiatives, improving both the rollout efficiency of strategic initiatives and the economics of the operations resulting from it. Strategic initiatives could include product developments, platform investments, market entries, or organisational transformations. A characteristic of the strategic initiatives implied here is that they are novel forays into unknown terrains. Managers of strategic initiatives more often than not deal with high levels of technical and external uncertainty and cannot easily leverage historical experience and learning. As the effects of resource configurations decisions with respect to, for example, suppliers, technologies, and materials are not always fully understood ex ante, the deployment plans for strategic initiatives contain many elements for which flexibility could be useful. In the following section, we explore the current understanding of suitable approaches to the planning and management of strategic initiatives in dynamic environments, with particular emphasis on project risk management. We then go on to examine the suitability of propositions derived from recently developed real options approaches, seeking to highlight conditions whereby integrating project risk management and real options approaches within the theoretical framework proposed will yield an increase in flexibility value.

## Project Risk Management

In the strategy literature, a traditional focus on stable planning processes has recently been complemented with a stronger focus on flexibility (Mintzberg et al. 1998). For example, 'low-cost probes' into the future are seen as one of the methods of better aligning strategic choices with environmental circumstances (Brown and Eisenhardt 1997; Eisenhardt and Sull 2001). These probes are a valuable means of reducing uncertainty before committing to a particular strategic initiative. However, when eventually charged with the implementation of a strategic initiative, project managers are committed to a pre-defined goal, although knowledge of the future can still be low. Here, the literature suggests two methods of preparing for the resolution of uncertainty: (a) devising a sequence of actions for realisation of the initiative, and complementing it with a range of alternative courses of action to reach the defined goal (Morris and Hough 1987), and (b) taking small steps, iteratively defining plans for the near-term realisation of strategic initiatives (Pitsis et al. 2003).

The first method (prescriptive) creates flexibility for a variety of future occurrences that can be gauged at the time of planning. The second

method (incremental) waits for the resolution of uncertainty, and plans accordingly. An incremental approach that plans successively and in small steps is optimally responsive but is likely to carry excessive costs of unnecessary flexibility. In many ways, this is an extreme form of preserving flexibility, forfeiting almost all benefits of stability. While the responsiveness to environmental changes is very high, the blanket rule to preserve flexibility is likely to incur flexibility costs even if there is no benefit (incremental planning methods would generally prefer the 'raft + bridge' route in the Speditio example). In contrast, the prescriptive project planning approach sets out the (complete) sequence of action early, and specifies a limited amount of alternative courses of action building on preliminary information. The specification of these alternatives is guided by the assessment of flexibility value. When complementing a planned course of action with alternatives, management aims to prepare for the resolution of uncertainty – such an approach is often called 'risk management'. It reflects the decision problem described in the Speditio example more than the incremental planning approach.

Good project risk managers are perceived as those that assess the probability of an event's occurrence and the extent of its impact on project rollout (Chapman and Ward 2002). As part of the planning exercise, risk management identifies threats to project delivery, and plans for resource allocation to the preparation of alternative courses of action. Such activity considers various future scenarios, and designs alternatives, in order to minimise the adverse effects of misaligned project designs in cases of unfavourable environmental developments. The steps associated with effective, traditional risk management are often clustered into the following categories: risk identification, assessment/prioritisation of risks, planning alternative courses of action, and monitoring of risk development (Weick and Sutcliffe 2001; Chapman and Ward 2002; Loch et al. 2006). The decision about which risks to match with the creation of managerial flexibility is often made by assessing the likelihood of the unfavourable occurrences and gauging their likely impact upon the effectiveness of planned resource use. The resources available to create alternative courses of future action are then allocated to the prioritised risks.

This approach does take into account some of the general conditions for flexibility value, but it has a number of shortcomings. Firstly, a ranking of risks does not constitute an analysis of the cost-benefit trade-off. Project planning theory seems consistent with managerial reality in that decision-makers aim to know which risks are most deserving of attention. This ranking, however, only leads to effective decision-making if it is compared with the costs of creating the possibility for alternative future actions, because this determines which flexibility is likely to be the

most valuable to the project initiative. Secondly, but no less importantly, although some firms do not establish flexibility if its costs are too high, this decision is not informed by a flexibility cost-benefit analysis, but rather by nominal budget constraints. As a result, it is possible that project managers establish flexibility in areas in which market uncertainty is high but the cost-benefit ratio is unattractive instead of those in which the flexibility cost-benefit ratio is attractive but risk is not prioritised, or those in which the cost of creating worthwhile flexibility exceeds budgeted resources.

Another shortcoming is that risk management, by definition, often creates flexibility only in an attempt to avoid the impact of unfavourable occurrences – flexibility created in order to access the fruits of potential favourable occurrences is often not part of the analysis. Managers following this prescription might exclude valuable flexibility from the planning of strategic initiatives. While some of the negative project prospects are avoided through flexibility, positive prospects would be foregone due to a lack of appropriate alternative courses of action (Loch et al. 2006). In the Speditio example, this would mean that risk managers would be inclined to create flexibility when the decision is between raft-only and raft-or-bridge, because the latter reduces the potential risk of the former. They would be less interested in creating flexibility if the decision was between bridge-only and raft-or-bridge. Here, flexibility would allow them to benefit from a potential opportunity, as the river can be crossed quicker by boat when the current permits.

Successful planners and risk managers are expected to build on their experience of how their firm functions and implicitly consider the feasibility of flexibility use during the deployment of initiatives. For example, while a contractual flexibility may seem highly valuable, historical supplier relationships may render it unattainable. In such cases, project risk managers benefit from considering whether organisation-specific conditions allow for the realisation of a flexibility that could be created in order to prepare for the resolution of uncertainty. The institutionalised form of risk management also comprises monitoring routine, which documents the resolution of uncertainty (Chapman and Ward 2002). When creating flexibility, risk managers consider the firm's information gathering and processing mechanisms. In the case of Speditio, they would, for example, not preserve flexibility (bridge-crossing) where uncertainty (river current) is expected to resolve itself quicker than management could react (current intensifies or weakens more rapidly than the project team is able to recognise the change and travel to the bridge).

In sum, conventional project planning and risk management theory tend to take into account both general and organisation-specific conditions when describing the assessment of flexibility value in strategic

initiatives. Nevertheless, the literature fails to fully explain why some managers make better flexibility–stability balancing decisions. This is because a more direct and explicit assessment of flexibility value has not yet been associated with more successful planning or uncertain project initiatives. The theory implicitly suggests that risk prioritisation (as a substitute for a direct cost-benefit assessment) and a general predisposition towards unfavourable uncertainty are part of effective project planning. Managers behaving consistent with the current project planning literature would thus rely on a skewed basis for making decisions as regards the level of flexibility necessary for project rollout. These managers are unlikely to make optimal resource allocation decisions.

## Real Options Concepts

A 'real' option, based on a real asset rather than a financial asset, creates value by generating future rights to take action (Black and Scholes 1973; Myers and Majd 1983). Because an investment into a strategic initiative containing the managerial flexibility to abort has characteristics similar to those of a financial option, the initial idea was that statistical algorithms for estimating option values can be applied. Real options applicability extends to the managerial flexibility to expand or contract activities, switch between activities, or start new activities (Trigeorgis 1996) and real options theory offers a disciplined methodology by which to assess the level of such flexibility. Under conditions of uncertainty, initiatives with higher flexibility would be ranked higher among a firm's investment valuations. While this is helpful in guiding the selection of strategic initiatives, it may also serve as a means of informing the design of initiatives that have been selected for execution – in Speditio's case, the choice of route to the market on the other side of the river.

Prescriptive real options methods include Monte-Carlo simulations, decision tree analysis and direct application of the Black and Scholes formula (Copeland and Tufano 2004). However, in practice, managers often have only a limited understanding of options pricing models and the decision problems they face tend to violate the assumptions of these models (Borison 2005; Lander and Pinches 1998). Survey evidence also suggests that managers' assessments of real options deviate from normative models (Howell and Jagle 1997), organizations lack systematic approaches to the assessment of real options (Busby and Pitts 1997) and managers apply real option analyses in only a small minority of their capital investment decisions (Graham and Harvey 2001).

Nevertheless, scholars have begun to observe patterns that resemble the basic propositions of real options: the disciplined assessment of flexibility

value as a decision-making criterion. For example, McDonald (2000) finds that the use of less formalised investment decision rules and 'rules of thumb' can serve as a substitute for more sophisticated real options calculations. Bearing in mind that empirical findings in related decision-making literatures (Bowman 1963; Kunreuther 1969) show that pragmatic heuristics often outperform badly used optimal rules, there is a tendency to extract from the original prescriptive real options literature those elements suitable to inform a theory of strategic management under uncertainty. For example, McGrath and Nekar (2004) show that pharmaceutical product development decisions follow 'real options reasoning'. Thus, using a real options lens to interpret managerial assessment of flexibility value in the deployment of strategic initiatives implies bounded rationality (Miller and Shapira 2004) and limited methodological sophistication (Bowman and Moskowitz 2001). 'Whether advocated in its strong form as a core valuation tool, or in its more moderate forms as a ranking tool, a heuristic or a metaphor, the appeal of real options thinking lies in its promise of structuring decision making under uncertainty' (Adner 2007, 364).

In this chapter, we explore the propositions of real options theory for the assessment of flexibility to ascertain its propensity to guide scholarly understanding of managerial decision-making heuristics in uncertain projects. Thus, it is not so much the mathematical sophistication, but rather the disciplined and structured approach to flexibility, that makes real options interesting. In contrast to the selection problems on a portfolio level, where the option to stop or continue a strategic initiative provides flexibility, flexibility assessments are referred to future managerial opportunities to adopt different courses of action towards a defined goal.

As regards the general conditions of flexibility value, real options-like assessments of flexibility take account of the uncertainty and impact of a potential future occurrence. These assessments also consider the anticipated variability range of future impacts. In Speditio's case, the assumed stochastic distribution of the strength of the river current, the cumulative probability of the current being too strong, and the impact of such a current would enter the real options assessment of flexibility. These measures are used to gauge the expected benefit of the ability to avoid unfavourable situations or to take advantage of favourable circumstances before comparing it to the costs of flexibility. This usually includes a term for the opportunity cost of not firmly committing to a single course of action. As discussed earlier, Speditio's opportunity costs of flexibility are incurred due to the need to take a longer route and package the transported goods in a less economical way.

While real options theory sees the flexibility value assessment as an explicit valuation of individual flexibilities, taking account of environmental

dynamics, it does not adjust the flexibility value for conditions foreign to financial markets. For example, as is mentioned above, the proportion of resources affected by future occurrences, in relation to the total resources required to roll out a strategic initiative, may also influence the value of managerial flexibility. If flexibility causes some project team members (i.e. the raft steersman) to refuse to participate in the project delivery, then it may in fact inhibit the deployment of a strategic initiative, despite the fact that a real options-like assessment suggests that it is of value. Moreover, real options-based explanations of decision-making disregard the fact that the establishment, maintenance and execution of managerial flexibility are all based upon complex patterns of human behaviour that are more unreliable than financial market mechanisms. Ideal organisation-specific conditions, however, should not be taken for granted. For example, although flexibility is created when adopting the raft-or-bridge route to the market, the Speditio project team may disregard the need to monitor weather forecasts as a predictor of the strength of the river current. This forfeits the information required to reap the benefits of flexibility. In line with the observations of Keil and McGrath's (2007), project teams may also fail to use the extra information gained and, therefore, fail to execute flexibility as planned. The raft steersman, who has an interest in crossing the river by boat so as to underline the need for his presence in the organisation, may be an influential team member with the power to convince the other members of the team to cross by raft even if the information about the river current suggests that this is impractical. That these organisation-specific factors should be an important component in a real options interpretation of managers' assessments of flexibility has been part of a recent debate, with McGrath et al. (2004) asking whether 'achieving flexibility has more to do with effective project management and appropriate organisational structure than with inadequacies in or misapplication of real options theory'.

These insights call for more attention to the organisation-specific conditions for flexibility benefit. Although real options theory, in addition to conventional project planning concepts, offer a useful perspective through which effective managerial decision-making can be explored, the theory suffers from a disproportionate emphasis on general parameters (see Figure 8.3). The set of flexibilities considered valuable in real options theory may differ significantly from the set of flexibilities that managers can put into effect. In some circumstances, managers following real options heuristics may create alternative courses of action when they face constraints that will prevent them from creating and using flexibility. Therefore, real options-based flexibility assessments would need to embrace considerations of organisational capability levels in order

to more appropriately describe how successful managers navigate the flexibility–stability challenge. Thus, a flexibility assessment competence must go beyond the current understanding of real options usage. Adner and Levinthal (2004) briefly hint at the possibility that 'the applicability of real options can be extended if organisations compensate for endogeneity through changes to organization design and control systems' (p. 127). If the phrase is turned around, it implies that the real options-based descriptions of managers' assessment of flexibility value should take into account the organisational conditions that moderate flexibility value.

## DISCUSSION

The fundamental tension between stability and flexibility was noted in Chapter 8, with researchers arguing for either more flexibility or more stability but seldom adopting an integrative approach that sheds light on the trade-off between the two so as to allow for an assessment of the optimal level of each (Volberda 2003). Exploring the trade-off between flexibility and stability, we have identified a set of boundary conditions under which flexibility creates or destroys value in the rollout of strategic initiatives. In the proposed framework, we combine general and organisation-specific conditions that influence the attainable flexibility value. This complements the current perception of flexibility usefulness as a function of how much is unknown and at stake, with how much responsiveness is realistically feasible. While a particular flexibility, containing a choice between future alternative courses of action, may generally be valuable – for example, Speditio's raft-or-bridge flexibility – its execution effectiveness may differ between firms. Some firms are better than others at gathering and processing information, making appropriate flexibility usage decisions and providing the appropriate organisational context for flexible rollouts of strategic initiatives. Speditio's value, resulting from adopting the raft-or-bridge deployment route is not only dependent upon parameters such as the uncertainty of the river current but also upon the ability to monitor weather reports, make the rational decision to use the bridge when the current is strong, and provide a suitable climate for the rollout of the initiative with multiple possible course of action (raft or bridge) in the future.

As is highlighted above, conventional planning and management theory views the creation of flexibility as beneficial if there are high levels of uncertainty and potentially large impacts. Internal specifics, such as the proportion of firm resources at risk, are also considered. In addition, feasibility constraints, including project and firm structures and cultures are,

in part, implicitly considered in the decision-making. However, project planning theory does not explain how managers explicitly value flexibility. Prescriptive project planning guides instead advocate the assessments of uncertainty and its impact as the main criteria for decision-making. This view inaccurately explains why some firms are more successful in their rollouts of strategic initiatives than others. If project planners always behaved consistently with the larger part of the project planning literature, flexibility would be created where uncertainty or impact are high, despite the fact that the flexibility itself may not have a net-positive value. In that case, Speditio's raft-or-bridge flexibility may not be created at all, if the uncertainty of the river current is not perceived to be one of the few most significant uncertainties as it is only for these that the project budget allows the creation of alternative courses of action. This could happen regardless of whether or not the 'raft-or-bridge' flexibility offers higher benefits than costs.

In addition, project planning and risk management literature focuses heavily on the mitigation of negative uncertainty. Thus, flexibility is expected to be created more often if large problems can be avoided rather than if potential benefits can be harnessed. As an alternative to the situation depicted in Figure 8.2, Speditio could face a choice between crossing the river by bridge or by raft-or-bridge. Because, in this case, flexibility, which would come at the cost of paying a raft steersman, offers management the benefit of potential advantages, instead of hedging against potential disadvantages, it is less likely that management will choose to preserve flexibility than when faced with the choice between the raft or raft-or-bridge.

Managers deciding in a manner consistent with project planning literature would often prefer to not insert flexibility into the design of strategic initiatives. In short, conventional project planning theory suggests that managers create and use less flexibility than might be necessary in volatile market environments. A flexibility assessment competence based on what is often seen as good practice for strategic planning and project management in dynamic markets is likely to forego responsiveness, miss-specify the flexibility–stability level and fall short of creating advantage through flexible resource allocation.

By contrast, real options interpretations of managerial decision-making are based on a more structured and explicit assessment of flexibility, which embraces both threats and opportunities. A real options assessment of flexibility (as qualitative as this may be) is seen to embrace external parameters such as uncertainty, time to maturity, and impact. However, internal parameters, which include the complexity of the strategic initiative, the proportion of resources committed and the minimum enabling resource

commitment, are not generally taken into consideration. In addition, organisation-specific conditions, such as the project staff propensity to successfully adjust and use the flexibility provided, are disregarded. Until now, real options theory has not accommodated the fact that factors such as firm-specific structure and culture adjust flexibility value upwards or downwards. Because the real options view of the value of managerial flexibility assumes optimal conditions, such as rational exercise of options at the best possible moment, a manager behaving consistent with real options concepts may be prone to create more flexibility than can be handled by the project.

While a firm that follows conventional project risk management techniques may fail to create flexibility when it is valuable to do so, a firm following real options-like assessments may create flexibility in situations where flexibility costs outweigh flexibility benefits. The potential refusal of the raft steersman to participate in Speditio's venture, which contains the possibility of him having to cross the bridge and not being needed, is not part of a real options-like flexibility assessment. This can lead to the decision to create flexibility even when organisational conditions render it worthless. A flexibility assessment competence following real options-like decision heuristics is, thus, likely to fail to allocate resources in the most efficient way. As a result, analogous to conventional project risk management, managers employing this method may not strike an optimal flexibility–stability balance.

However, it is evident that both project planning and real options theory offer insights that could remedy weaknesses respectively. Project planning and risk management theory could profit from adopting a more structured and direct approach to flexibility value assessments offered by real options concepts, while real options concepts could benefit from a stronger consideration of organisation-specific realities. The suggestion is that managers successful in rolling out strategic initiatives under uncertainty plan for more effective resource allocations, because they directly assess the flexibility–stability trade-off and do not fail to consider organisation-specific realities in the process. A theory of project planning, amalgamated with the fundamental insights from real options theory, may explain the decision-making behaviour of these managers more accurately than either theory alone. The negative bias of conventional methods would be avoided through direct cost-benefit comparisons of flexibility and the positive bias of real options concepts could be avoided by considering the organisational feasibility of options exercise. This is summarised in Table 8.1.

Fundamental to this understanding is that firms harbouring an effective flexibility assessment competence may be able to create options for responding to environmental changes more efficiently than competitors

*Table 8.1 Overview of how project planning theory and real options theory achieve and fail to explain flexibility value assessment heuristics that lead to an effective management of the flexibility–stability balance*

| Flexibility Value Assessment | | | | |
|---|---|---|---|---|
| | Main Advantages | Main Disadvantages | Assessment-bias | Consequence |
| Project Planning | Implicit consideration of both sets of conditions | Lack of deliberate, explicit assessment; negative predisposition | Estimated flexibility value < possible flexibility value | Inefficient preference for stability |
| Real Options | Explicit assessment of flexibility value | Assessment methods ignore organisation-specific conditions | Estimated flexibility value > possible flexibility value | Inefficient preference for flexibility |
| Combined Approach | | | Estimated flexibility value ≈ possible flexibility value | More effective balance of flexibility and stability |

whose flexibility assessment competencies are less developed. The importance of a more nuanced understanding of managers' assessment of flexibility and its performance implications stands only to increase as markets continue to evolve increasingly quickly. In line with the resource-based view, a firm that strikes a better balance between flexibility and stability may be able to generate higher rents than its competitors who follow the current prescriptions of either conventional project planning techniques or real options concepts. This is a significant insight for managers of strategic initiatives who increasingly have to compete in volatile market environments, and it presents an opportunity for future research.

Because the proposed competence for flexibility assessment is a complement to the general set of organisational capabilities necessary for the realisation of strategic initiatives, it resembles a higher-order competence as discussed by Schreyögg and Kliesch-Eberl 2007. A flexibility assessment competence will emphasise stable exploitation patterns in

some environments, while encouraging flexible reorientation in others. Depending on external and internal parameters, as well as on organisation-specific conditions, the most suitable design for strategic initiatives varies between strictly prescribed and loosely sketched sets of activities. This higher-level importance of the flexibility assessment capability underscores the need for a better understanding of managerial decision-making under uncertainty.

These insights offer a number of possibilities for further research on flexibility decision-making in strategic initiatives. Firstly, empirical research could strive to illuminate management practices that do explicitly assess and pro-actively manage flexibility levels, thus detailing the relationships between specific managerial decisions and actions that lead to more effective responses to environmental changes. It would be particularly interesting to study what could be a shift of managerial attention from optimal planning towards a dynamic management of strategic initiatives as markets become increasingly volatile. Secondly, the assumptions made in quantitative real options valuations might cause greater problems in the context of the rollout of strategic initiatives as even fewer formulae inputs can be derived from replication than on a portfolio-level of analysis. In this context, research could focus on the qualitative and directional value of flexibility in order to inform the flexibility management process. Third, propagating a stochastic treatment of the value of managerial flexibilities, real options concepts are insightful, but they need to be extended to cover the entire management process from assessing options, through managing options over their lifetime, to executing options. The combination of option valuation tools with more holistic approaches to flexibility in projects may shed more light on managerial heuristics for flexibility management.

## CONCLUSION

This chapter has synthesised conditions that influence the trade-off relationship between flexibility and stability in the rollout of strategic initiatives. It has proposed a framework of 'general' and 'organisation-specific' conditions for flexibility value and go on to examine how the insight of this duality features in conventional project risk management as well as recently developed real options concepts. It finds that while individually both conventional project planning theory and real options concepts fall short of capturing the totality of the flexibility–stability balancing act, taken together they can explain managers' more deliberate assessment of flexibility value as a function of general and idiosyncratic organisational

conditions. Traditional approaches implicitly take into account many of the organisational conditions driving flexibility value, but they do not consider that an effective management of the flexibility–stability balance involves a direct and explicit assessment of flexibility value. On the other hand, real options theory can offer a more constructive view in seeing firms to attend to key value drivers of flexibility, but they tend to ignore managerial considerations of organisational factors that mediate flexibility value. Marrying the two approaches may better explain the flexibility assessment competence harboured by organisations that are successful in navigating the challenges of ever-faster changing markets.

## NOTES

1. Speditio is used to illustrate the arguments presented in this chapter and was chosen for its concreteness and ease of understanding rather than for its factual importance or realism. However, Speditio reflects several features of reality that may not initially be apparent. For example, in the case of the Motorola-led satellite telephony rollout, Iridium, managers did not know ex-ante whether the commercialisation of the competing technologies used in terrestrial mobile telephony (≈uncertainty of river current) would impede the market launch of their own consumer service. They chose an expensive, low-orbit constellation of their satellites to realise their goal (≈stable 'raft-only' course of action) instead of an initially less expensive high-orbit constellation that could have been adapted (≈flexible 'raft-or-bridge' course of action). From Iridium's perspective, this choice led to unfavourable outcomes, which eventually caused them to go bankrupt, while a flexible rollout plan could have enabled managers to configure resources in a way that allowed for a successful service rollout similar to that pursued after emerging from bankruptcy protection. For more information, see De Weck et al. (2004).
2. We do not discuss the different possibilities and constraints of computing flexibility value and cost in this chapter. Instead, it focuses upon the conditions that are causally linked with increases or decreases in flexibility benefit and flexibility cost, using a conceptual definition of flexibility value. The substantial difficulties in computing impact values of unknown future occurrences are discussed extensively in the literature on investment valuation (Borison 2005) and strategic decision-making (Miller and Shapira 2004)

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# 9. A dynamic capability framework: generic types of dynamic capabilities and their relationship to entrepreneurship

**Einar Lier Madsen**

## ABSTRACT

This chapter deals with the categorisation of dynamic capabilities, especially generic types of dynamic capabilities are proposed along existing theory of entrepreneurship, exploration and exploitation. Examples of actual and proposed types of dynamic capabilities are then introduced and prioritised along the framework. Finally, the relation to entrepreneurship research is discussed.

## INTRODUCTION

The discussion of dynamic capabilities can be said to have its background in the evolutionary theory of the firm (Nelson and Winter 1982). A basic assumption in evolutionary theory is that the world is too complicated for a firm to be fully understood.[1] According to evolutionary theory, it is consequently unavoidable for firms to react differently and, for example, select different strategic adaptations (Nelson 1991). According to Zahra et al. (2006), the intellectual basis of the theory can be traced back to Alchian (1950), and March and Simon (1958), who assumed that because firm leaders make decisions under conditions of uncertainty and limited rationality, they make decisions which are 'good enough' rather than making these optimal through investigation and a choice of problem solution. With this line of reasoning, a leader will not make a once-and-for-all decision, but will have a constant need to adjust and change operational routines and capabilities which have been previously developed. Teece et al. (1997) build upon Nelson and Winters' (1982) view of the organisation

as an assembly of independent operational and administrative routines which are developed on the basis of feedback from the results achieved in the firm. In other words, it is not sufficient alone to exploit the specific internal and external capabilities of the firm, but also the need to develop new capabilities. The concept 'dynamic capabilities' is thus an attempt to provide a better account of what must be done in order for the firm to achieve this goal. However, the possibilities for change must be recognised and discovered. An entrepreneurial orientation (EO) may contribute to an insight into such conditions, as EO is concerned with the identification and exploitation of possibilities by being proactive, innovative and willing to take risks (Miller 1983).

While important conceptual advancements have been made concerning the role of dynamic capabilities and how they are developed, few attempts have been made to categorize different types of dynamic capabilities, place them in a framework, and discuss their relationship to entrepreneurship. This chapter illuminates these issues. First, the definitions of dynamic capabilities will be discussed. A dynamic capability framework is then presented and generic types of dynamic capabilities are deduced. Examples of actual and proposed types of dynamic capability are placed within this framework. Finally, the relationship between dynamic capabilities and entrepreneurship in the form of the leader's strategic entrepreneurial orientation is discussed.

## DEFINING THE DYNAMIC CAPABILITY CONCEPT

The dynamic capability literature attempts to identify and explain the process taking place in the firm when new competitive advantages are being developed. For example, Teece et al. (1997) argue that firms develop advantages as a result of specific organisational processes, positioning of assets, and through development routines that enables them to integrate, build and reconfigure dynamic internal and external competences. Zollo and Winter (2002) and Winter (2003) further consider that dynamic capabilities are activities that generate and modify strategic routines. Understanding what may contribute to changes in the firm is therefore a central concept. However, dynamic capabilities have been criticised for being tautological, endlessly repetitive, and not capable of being operational (Mosakowski and McKelvey 1997; Priem and Butler 2000). In other words, there is a considerable variety in the existing literature.

This diversity of concepts in relation to how dynamic capabilities may be defined is clearly seen in the various definitions. Generally speaking, there can be said to be three main types of definitions (cf. Table 9.1). The first

*Table 9.1 Main types of dynamic capability's definitions*

| Author(s) | Definitions |
|---|---|
| | 1. Definitions focusing on the results of dynamic capabilities |
| Collis (1994, 145–146) | '. . . organizational capabilities as the socially complex routines that determine the efficiency with which firms physically transform inputs into outputs organizational capabilities are embedded in firm routines' (p. 145). The author defines capabilities at different levels: second and higher-level capabilities are 'dynamic' capabilities. 'This captures in a single definition both capabilities as a direct improvement of effiency . . . and as the ability to conceive of new ways to create value' (p. 146) |
| Dosi, Nelson and Winter (2000, 6) | 'A successful large corporation derives competitive strength from its excellence in a small number of capabilities clusters where it can sustain a leadership position over time. This comes very close to the concept of "dynamic capabilities" advanced by Teece et al. (1997)'. |
| Griffith and Harvey (2001, 598) | 'A global dynamic capability is the creation of difficult-to-imitate combinations of resources, including effective coordination of inter-organizational relationships, on a global basis that can provide a firm a competitive advantage'. |
| Hoopes, Madsen and Walker (2003, 893) | '. . . is located in those activities where key innovations improve the value or cost of a firm's product or service. Lacking this capability, a firm cannot overcome the onslaught of subsequent start-up innovations and thereby cannot develop a V-C profile consistently superior to rivals' profiles'. |
| | 2. Definitions focusing on the presence of external conditions |
| Teece and Pisano (1994, 541) | 'The subset of the competences/capabilities which allow the firm to create new products and processes and respond to changing market circumstances' |
| Teece et al. (1997, 516) | 'The firm's ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments'. |
| Eisenhardt and Martin (2000, 1107) | 'The firm's processes that use resources – specifically the processes to integrate, reconfigure, gain and release resources – to match or even create market change. Dynamic capabilities thus are the organizational and strategic routines by which firms achieve new resources configurations as markets emerge, collide, split, evolve and die'. |
| Rindova and Taylor (2002, 6) | '. . . dynamic capabilities can be understood as change processes unfolding at two levels: a micro-evolution through 'upgrading the management capabilities of the firm' and a macro-evolution associated with developing new competencies in order to respond to changing customer demands (reconfiguring market competencies)'. |

*Table 9.1* (continued)

| Author(s) | Definitions |
|---|---|
| | 3. Definitions focusing on abilities or activities which make the firm dynamic |
| Zollo and Winter (2002, 340) | 'A dynamic capability is a learned and stable pattern of collective activity through which the organization systematically generates and modifies its operating routines in pursuit of improved effectiveness'. |
| Winter (2003, 991) | '. . . those that operate to extend, modify or create ordinary capabilities'. |
| Zahra et al. (2006, 924) | 'We view dynamic capabilities as the abilities to reconfigure a firm's resources and routines in the manner envisioned and deemed appropriate by the firm' principal decision-maker(s)'. |

comprises those definitions associates dynamic capabilities to the results of this activity (Dosi, Nelson & Winter 2000; Griffith & Harvey 2001). The second variant of definitions focus on the fact that external conditions in the form of a dynamic environment must be present in order to develop dynamic capabilities (Teece et al., 1997; Eisenhardt & Martin 2000). The third type comprises those dynamic capabilities which make the firm dynamic (Zollo & Winter, 2002; Winter, 2003; Zahra et al., 2006).

The problem with the first approach is that the dynamic capabilities cannot be studied individually; they have to be studied through an evaluation of measurable results associated with dynamic capabilities (Collis 1994; Griffith & Harvey 2001). Consequently, one looses the possibility to investigate the content, development and building of dynamic capabilities. An objection to the second approach is that the firm clearly can integrate, build and recombine its skills even though the environment is changing at a slower pace. It should also be added that changes may occur within the firm itself which are not related to the environment. For example, it could be thought that a change of key staff would necessitate a change of routines and to be dynamic. To limit dynamic capabilities to dealing with environmental therefore seems to narrow. Therefore, here we build on the definitions suggested by the third group of authors which suggest that dynamic capabilities are something which can make the firm dynamic. These authors (Zollo & Winter, 2002; Winter 2003; Zahra et al. 2006) distinguish between ordinary capabilities and dynamic capabilities, stating that the former comprise the firm's ability to solve problems and carry out tasks or to achieve a result, while dynamic capabilities are regarded as *the ability to change and reconfigure ordinary capabilities*. For example, the ability to carry out product development (an ordinary capability) will not

be the same as the ability to *change*) these product development capabilities (a dynamic capability) (Zahra et al. 2006).

However, a number of authors include particularly relevant elements in their definitions. The role of the entrepreneur or management will be decisive concerning changes within the firm, something which Zahra et al. (2006) include in their definition. In Zollo and Winter's (2002) definition, dynamic capabilities are seen as structured and permanent in the meaning of learnt, stable and structured, and as such do not comprise a set of disjointed elements whereby the firm is linked to the environment. Thus, dynamic capabilities can be considered as the ability to change the way the firm solves its problems (a higher level *dynamic* capability to alter capabilities). In other words, the dynamic capabilities can be acquired and developed in themselves. This is something else than only the ability to solve a problem (an operational/ordinary capability)[2] or the presence of rapidly changing challenges/problems (an environmental characteristic). Here, I build upon the definitions of Zahra et al. (2006), Winter, Zollo (2002), and Winter and Teece et al. (1997), and define dynamic capabilities as:

> *Dynamic capabilities are acquired abilities which enable the firm to integrate, build/develop and reconfigure internal and external resources of the firm and ordinary capabilities in the manner, assumed and regarded as appropriate by the principal decision maker(s) in the firm.*

In addition to that mentioned above, this definition also takes into consideration that the firm's resources may be broadly found outside the organisation (Teece et al., 1997; Eisenhardt & Martin, 2000), and that this may contribute to the development of the ordinary capabilities and existing resources. The definition also suggests that dynamic capabilities are something which may be learnt, and that the mechanism of learning is significant for the development of dynamic capabilities (Teece et al. 1997; Eisenhardt and Martin 2000; Zollo and Winter 2002).

## A DYNAMIC CAPABILITY FRAMEWORK

In general, two approaches are made in the literature towards a definition of dynamic capabilities. The first approach considers dynamic capabilities as an evolutionary process in three stages: searching (variation), selection (evaluation) and routinization (retention/enactment) (Zollo and Winter 2002; Zott 2003). In the first stage, the firm searches for new ideas and how one may manage or solve current problems or new challenges. This occurs on the basis of a combination of external stimuli along with internally-generated information arising from the firm's existing routines.

Through the process of selection, the potential of the new ideas is evaluated regarding increased efficiency of existing routines and the possibility for developing new routines. The ideas are evaluated on the basis of previous experience. The expectations of the advantages which may be achieved through the proposed ideas are scrutinized by analysis and debate concerning the values and risks. Finally, the third stage may be regarded as that which puts the ideas from the selection phase into place. This is a form of routinization which occurs through the implementation of the ideas. Broadly interpreted, one may say that the above processes include all decision-making and problem-solving activities undertaken by the firm (Iansiti & Clark 1994).

The second approach explains dynamic capabilities as organisational processes and mechanisms which build, reconfigure, integrate, reorganise and release internal and external resources in response to environmental changes (Teece et al. 1997; Eisenhardt and Martin 2000). Teece et al. (1997) identify three organisational and leadership key processes essential to dynamic capabilities. These are: (1) The coordination and integration of both internal and external activities; (2) Learning, seen as 'social and collective', and defined as repetition and experimenting, enabling functions to be executed better and faster; (3) Reconfiguration and restructuring of resources based on surveillance of the market and technological environment. A corresponding classification is given by Eisenhardt and Martin (2000), who consider that dynamic capabilities may be grouped into three main categories: (1) dynamic capabilities which integrate resources (strategic decision-making routines and product development routines); (2) dynamic capabilities which focus on the reconfiguration of internal resources (resource placement/adaptation and copying process, management cooperation routines, strategic resource allocation routines for adjustment to the market); (3) dynamic capabilities which acquire and release resources (alliance and acquisition routines, internal knowledge-creation routines, routines for releasing/removal of resources).

Both these approaches imply that firms undergo a process of renewal and development. However, the firms will always face the dilemma of how intensive the focus should be on new development compared to existing activity and current operations. Achieving this balance is a process which can be traced back to Schumpeter (1934/1983) as an enquiry into new possibilities and application of established ideas, and introduced later into the field of organisational learning by March (1991). Here, the idea of achieving a balance between entrepreneurial exploration and strategic exploitation is central. *Explorative* activities are primarily practised through recognition of input, where the aim is to generate a necessary review of new intuitive conceptions and ideas (variation), as well as to

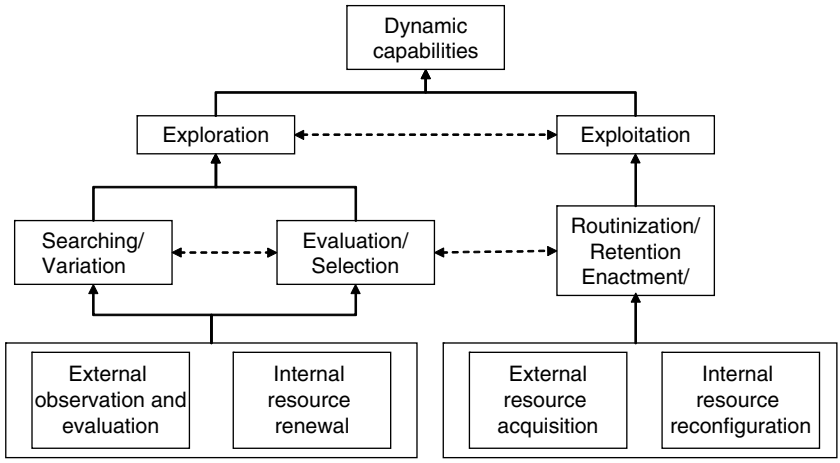


*Figure 9.1 A dynamic capability framework*

select the most appropriate possibilities through a process of evaluation (Zollo & Winter 2002). Exploration implies that variation is established in experiences whereby changes in behaviour can become dominant. In contrast to this, *exploitation* is based more upon behavioural activities, which includes a reproduction of such approaches in different settings, and absorbing these into the established set of routines for implementing specific tasks (Zollo and Winter 2002). Exploitation thus assumes a more predictable behaviour where previous experience or resources provide a basis which may be utilised. Zollo and Winter (2002) argue that the association between exploration and exploitation can go either way; i.e. that exploitation can also influence exploration. The fact that this may be the situation appears to be a reasonable assumption, and which can also provide the possibility to conceptualise leadership challenges by managing these two processes simultaneously.

Zollo and Winter's (2002) search and evaluation may be considered as sub activities of exploration, while their third stage, routinization, may be considered as exploitative activity. Similarly, Eisenhardt and Martin's (2000), and Teece et al.'s (1997) resource building and reconfiguring may be seen as exploration, while integration and reorganization may be considered as exploitation. They also differentiate between external and internal resources which both can be linked to exploration as well as exploitation. On the basis of the above review, it can be argued that dynamic capabilities comprise a framework at three levels (see Figure 9.1). At the top level, these are concerned with exploration and exploitation. In turn these can be shown to comprise searching and evaluation (exploration

processes) and routinisation (an exploitation process). Finally, these three evolutionary processes may be grouped into four main types of dynamic capabilities. It can be argued that these are concerned with: searching for possibilities and the evaluation of these; acquirement of resources; exploitation and transforming internal resources, and developing new resources and integrating these. Below, these dynamic capabilities are designated as: (1) *External observation and evaluation*, (2) *Internal resource renewal*, (3) *External resource acquisition*, and (4) *Internal resource reconfiguration*. The dynamic capability framework is illustrated in Figure 9.1.

This illustrates that dynamic capabilities are multidimensional and include four very different concepts. This, in itself, may be seen as a challenge. The different types of dynamic capabilities will work in very different ways, according to the situation in which the firm is found at any given time. Some may be extremely important under conditions of major changes in the setting, for example idea-generating capabilities which are associated with external observation and evaluation. Others may be of greater significance in periods of internal pressure within the organisation (for example, internal resource reconfiguration). This implies that not only are dynamic capabilities different and work in contrasting ways, but it also indicates that various internal firm factors such as resources and entrepreneurial orientation can have different consequences for the development of the various dynamic capabilities.

## GENERIC TYPES OF DYNAMIC CAPABILITIES

The four generic types of dynamic capabilities are discussed in the following:

*(1) External observation and evaluation* comprise dynamic capabilities which monitor the environment, provide impulse to new ideas, discover new possibilities and evaluate these. To reveal potential may be said to be the core of all entrepreneurial and innovative activities (Stevenson & Jarillo 1990). In this regard, an idea is seen as something which can lead to a possibility which can be evaluated and eventually utilised (Shane & Venkataraman 2000). A firm must have the ability to appraise the environment so as to constantly develop new ideas and business opportunities. The ability to appraise markets and technologies, and the willingness to adopt best practice, are therefore important (Teece et al. 1997). Searching for new ideas in this manner can provide an insight into how existing problems or new challenges may be managed and solved (Zollo & Winter 2002). The expectations of the advantages to be reaped from the ideas proposed

may be evaluated through analysis and in debate of the values and risks involved (Zollo & Winter 2002). This is closely associated with that which is described as searching and evaluation in the evolutionary perspective. In this respect, it may be argued that strategic evaluation and choice will have to be made. As such, the process establishes a framework for the entire strategic activity for change within the firm, not least the attachment to previous solutions and activity patterns, the level of experimentation and the extent of external exploration and integration.

*(2) Internal resource renewal* comprises dynamic capabilities which integrate new resources in original and effective resource configurations. The ability to improve or adapt a business concept when resources are introduced, combined or modified, are important and distinctive features (Eisenhardt & Brown 1999). Such dynamic capabilities may, for example, comprise product development routines, or strategic decision-making, where the management combine their various skills and practical experience to establish profitable products and services (Eisenhardt & Brown 1999). This capacity is thus associated with the ability to create and manage associations which stimulate latent and dispersed knowledge resources such that in combination these contribute to the development and launch of new products and services. According to Teece at al. (1997), decentralisation and local independence support such processes. A central resource-integrating capability to succeed, in addition to management skills, will thus be input from the employees. These may be individuals who have a personal creative ability and capacity. Mobilisation of employees is of significance in acquiring a broad set of development resources thus avoiding dynamic capabilities becoming too costly. Therefore, a change-culture has to exist or be established among the employees where these accept frequent changes in their work-tasks and areas of responsibility.

*(3) External resource acquisition* comprises dynamic capabilities which acquire and/or link the firm to external resources. Resources may be acquired through external contacts and connections. The acquirement of new resources through the accumulation of equity in the firm can, however, take an excessive amount of time in dynamic markets. Resources may be difficult to access. There is also a considerable risk of investment in the wrong resources, and of being manipulated. This is especially the case when negotiating with major partners in a situation of asymmetric power balance. One solution to this challenge is the development of personal business associates where confidence can provide access to supplementary resources, and thereby reduce the risk of opportunism and consequently transaction costs. The organisation network is essentially concerned with

human contacts and which surmounts the need for an organisational structure, commercial connections and so forth (Hall 1993).

*(4) Internal resource reconfiguration* comprises dynamic capabilities which reconfigure or restructure internal resources. This may involve instigating and implementing newly approved initiatives to change within the firm. This may occur through adaptation or imitation processes where the newly-acquired knowledge and the approved choices are adapted for use in new competitive situations (Zollo and Winter 2002). This provides the opportunity to reorganise the firm's resources and the possibility to experiment with new ideas (Dougherty 1995). Learning in the form of repetition and experimenting (Teece et al. 1997), resource relocation/adaptation and methods of cooperation (Eisenhardt and Martin 2000) are all of significance. According to Eisenhardt and Martin, the acquirement of knowledge and learning can occur through contact with research institutions and educational establishments, external professional associations and researchers in other firms. These knowledge-accumulation routines can contribute to the liberation and eventual removal of resources. However, increased skills in all parts of the organisation establish contributions that are difficult to identify and which comprise an inimitable contribution to the firm's strategy (Teece et al. 1997). This serves as a source of continual renewal of all the firm's resources.

The dynamic capability framework presented above, shows that dynamic capabilities are created and developed along two main dimensions. The first dimension is a balancing process between exiting and future activities in the firm. This is a consideration of the exploration of new possibilities vs. the exploitation of existing resources. The second dimension says something about how this process is carried out – whether one is oriented towards activities of external or internal character. This is illustrated in Figure 9.2. Here, the four main types of dynamic capability are located in respect of these two central main dimensions. Quadrant (1) is concerned with the dimensions of externally oriented exploration. We can thus place *External observation and evaluation* in this quadrant. Quadrant (2) is also concerned with exploration, but here this is an internal activity where we may locate *Internal resource renewal*. In quadrants (3) and (4), we can locate the dynamic capabilities which are concerned with the exploitation of the firm's resources. *External resource acquisition* belongs to quadrant (3) – the external side, while *Internal resource reconfiguration* is placed on the internal side of the model (quadrant (4)).

Different types of dynamic capabilities described and/or utilised in the literature can be placed into this framework, i.e. organized according to this four generic types of dynamic capabilities. Examples of proposed and employed dynamic capabilities are illustrated in Table 9.2.

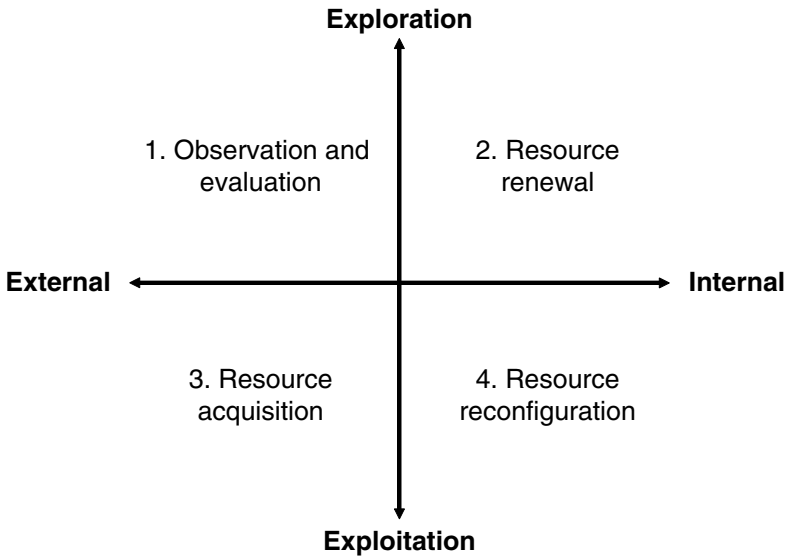


*Figure 9.2 Dimensions and generic types of dynamic capabilities*

## DYNAMIC CAPABILITIES AND ENTREPRENEURIAL ORIENTATION

This far we have not discussed in more detail how dynamic capabilities can be related to entrepreneurship. However, a central claim or assumption in the literature is that management practice and entrepreneurial activities can create and advance new combinations of resources (Brown & Eisenhardt 1998; Eisenhardt & Martin 2000; Schumpeter 1934/1983). This provides a clear and close association between entrepreneurship and resource-based theory, especially dynamic capabilities. A firm's degree of entrepreneurship is, as dynamic capabilities, important to new combinations of resources (Penrose, 1959; Brown & Eisenhardt 1998; Eisenhardt & Martin, 2000). Therefore, both concepts are attached to how the firm deploys and develops resources, as well as influencing strategy development and performance of the firm. In other words, the theory assumes that entrepreneurial management practice and actions result in such change activities. That is to say that flexibility in establishing new combinations of resources will lead to the introduction of new products and services and/or access to new markets (Eliasson, Wiklund & Davidsson 2002). In other words, the two concepts have a number of common denominators, but are also different.

*Table 9.2 Examples of proposed and employed types of dynamic capabilities in the literature*

| Generic types of dynamic capabilities | Concepts/variables | References |
|---|---|---|
| (1) External observation and evaluation | Ability to scan the environment to evaluate the markets and competitors | Teece et al. (1997); Zollo & Winter (2002) |
| | Surveillance of markets and technologies | Teece et al. (1997) |
| | Willingness to adopt best practice (benchmarking) | Teece et al. (1997); Eisenhardt & Martin (2000) |
| | External integrative capability | Kickul and Liao (2004); Madsen et. al (2006) |
| | Idea generation capability | McKelvie and Davidsson (2006) |
| | Sensing and interpreting the environment | Coh et al. (2005) |
| | Assessment of strategic alternatives | Teece et al. (1997) |
| | Strategic path aligning capabilities (governance structure/board) | Borch and Madsen (2007) |
| | External reconfiguration and integration capability | Borch and Madsen (2007) |
| (2) Internal resource renewal | Internal coordination and integration | Teece et al. (1997) |
| | Patching (add, combine and split) | Eisenhardt and Martin (2000) |
| | Knowledge reconfiguration | Verona and Ravasi (2003) |
| | Product development routines | Eisenhardt and Martin (2000), |
| | New product development capability | McKelvie and Davidsson (2006) |
| | New process development capability | McKelvie and Davidsson (2006) |
| | Market disruptiveness capability | McKelvie and Davidsson (2006) |
| | Internal integrative capabilities | Kickul and Liao (2004) |
| | Innovative capabilities | Kickul and Liao (2004) |
| | Development of specialized offerings | Coh et al. (2005) |

| Generic types of dynamic capabilities | Concepts/variables | References |
|---|---|---|
| | Reconfiguring market competencies | Rindova and Taylor (2002) |
| | Market responsiveness | Griffith et al. (2006) |
| | Dynamic capability | Sher and Lee (2004) |
| | Gain and release of resources | Eisenhardt and Martin (2000) |
| | Process R&D | Zollo and Winter (2002) |
| | Decentralisation and local independence (delegating) | Teece et al. (1997) |
| | Strategic decision-making routines (management) | Eisenhardt and Martin (2000) |
| (3) External resource acquisition | Alliance and resource acquisition routines | Eisenhardt and Martin (2000) |
| | Reconfiguring market competencies | Rindova and Taylor (2002) |
| | External coordination and integration (collaboration) | Teece et al. (1997) |
| | Replication and brokering | Eisenhardt and Martin (2000) |
| | Post-acquisition integration | Zollo and Winter (2002) |
| | Knowledge creation and absorption | Verona and Ravasi (2003) |
| | Integration of external competencies | Coh et al. (2005) |
| | Resource acquisition capabilities | Borch and Madsen (2007) |
| | Learning network capabilities | Borch and Madsen (2007) |
| | Recruitment of managers and expertise | Rindova and Taylor (2002) |
| (4) Internal resource reconfiguration | Reconfiguration and transformation | Teece et al. (1997) |
| | Knowledge integration | Verona and Ravasi (2003) |
| | Knowledge creation routines | Eisenhardt and Martin (2000) |
| | Resource allocation routines | Eisenhardt and Martin (2000) |
| | Restructuring, re-engineering | Zollo and Winter (2002) |

*Table 9.2* (continued)

| Generic types of dynamic capabilities | Concepts/variables | References |
|---|---|---|
| | Upgrading the management capability | Rindova and Taylor (2002) |
| | Learning (repetition and experimentation) | Teece et al. (1997) |
| | Internal resource integration capability | Madsen et. al (2006) |
| | Internal flexibility capability | Borch and Madsen (2007) |
| | Contact with R&D institutions (by employees) | Eisenhardt and Martin (2000) |

Entrepreneurial orientation (EO) reflects first and foremost the firm's willingness or *attitude* concerning engagement in entrepreneurial behaviour (Wiklund 1998), when dynamic capabilities are *activities* which build, develop, integrate and reconfigure internal and external resources. Thus EO and dynamic capabilities appear at different levels. EO relates to a firm's willingness to be innovative, proactive and engage in risk-taking behaviour in order to achieve its strategic goal (Covin & Slevin 1989). Therefore, EO can explain how a firm *exploits* its resources (Wiklund & Shepherd 2003). While EO extends over a more superior strategic level, dynamic capabilities include operational activities which are essentially concerned with the development of the organisation and carrying out diverse operations (for example, product development, alliance building, strategic decision-making, etc.).

It is also a common denominator that the environment is seen as important in connection with EO and dynamic capabilities. However, the literature on dynamic capabilities has essentially been concerned with the firm and its management as reactive in respect to reaction to changes in the environment (Teece et al. 1997, Eisenhardt & Martin 2000). This suggests that the need to develop and change resources must essentially be seen as function of changes in the environment. The EO-concept can be claimed as being counter to this. A main assumption concerning EO is that the firm management acts in a proactive manner, is innovative and willing to take risks (Miller 1983). Based on this it can be said that the management attempts to be forward-looking, to take the initiative and to implement measures which ensure future results. In this respect, they regard their firm as being one step ahead. This is something else that 'just' reacting to changes in the environment, even though this may be a reason for

the firm modifying its entrepreneurial orientation (Covin and Slevin 1989; Lumpkin & Dess 2001). Based on this interpretation they develop a logic concerning why resources ought to be changed and reconfigured. Many researchers maintain and find that entrepreneurial orientation can be a key factor in improving or increasing the firm's output or results (Covin and Slevin 1989; Lumpkin and Dess 1996; Wiklund 1999; Madsen 2007). This suggests that an EO can contribute to increased understanding of the establishment and utilization of resources in the firm. However, there is a scarcity of literature illuminating the possible linkage between EO and dynamic capabilities. Only two studies are found, but both confirms the positive association between EO and dynamic capabilities (Griffith et al. 2006; Madsen et al. 2006). Thus, it can be argued that there is a positive association between EO and dynamic capabilities. Consequently, EO supports the development of dynamic capabilities.

## NOTES

1. This contrasts with neo-classical economic theory which, among other things, assumes full information and rational action.
2. Zahra et al. refer to this as 'substantive capabilities, which can indicate an independent or autonomous capability. That which is most common, however, is to utilise operational or ordinary capabilities (Winter 2003). The latter is that which is also utilised here.

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# PART III

# Dynamic capabilities in practice

# 10. The power of fixed mobile convergence: the changes in the telecommunications industry and the role of dynamic capabilities

**Stefanie Düker[1], Silvia Boßow-Thies[2], Philipp Zimmermann[3] and Dieter Lange[4]**

## ABSTRACT

This chapter provides an in-depth insight into the development of fixed mobile convergence in Germany, thereby investigating the role of dynamic capabilities and how they can enable telecommunication firms to be successful in a converged market. Based on a two-stage, exploratory research method incorporating 17 industry expert interviews and a quantitative survey of 500 German households, we contrast providers' and customers' views on success factors as well as specific convergent services and applications. For fixed-only and mobile-only operators, building and effectively integrating external resources through a customer-oriented partnership strategy and alliancing process will determine success in a converged market. For integrated operators, success will be determined by the effective reconfiguration and integration of resources and capabilities of traditionally separate business units. Dynamic capabilities will be especially important in the areas of product development, marketing, sales and customer service. We hence argue that due to the dynamics within the telecommunications industry the dynamic capabilities view is a useful concept for understanding how firms can transform to meet the challenges of fixed mobile convergence. We conclude by giving recommendations for future research.

## INTRODUCTION

The telecommunications industry is a high-technology industry which in recent years has been characterised by intense competition and fast,

continuous and complex change. At present, it is undergoing an even more radical transformation: The approaching saturation of fixed and mobile voice markets has prompted operators to spread out into new territories in their search for growth opportunities. This has resulted in, for instance, fixed operators providing mobile phone contracts in combination with their core offer, and mobile operators launching data (DSL) services. As a consequence, the boundaries between hitherto distinct fixed and mobile markets are blurring, a phenomenon referred to as Fixed Mobile Convergence (FMC). In most European countries, FMC is still in its infancy stage and usually takes the form of price bundles for fixed voice services, internet, TV, and mobile services. Ultimately, FMC means providing seamless services regardless of the network transmitting the data and the device accessing it (Capgemini 2007). This form of full convergence[5] presents complex technological challenges to operators. Until then, however, there is still a long way to go in terms of network architecture, appropriate devices, and transmission standards (Curwen 2006).

As previously distinct markets are beginning to overlap, a business environment marked by fierce competition, fast-paced change and uncertainty exposes telecommunication firms to many new challenges. As FMC develops, the degree of competitive intensity will rise and the market will become ever more dynamic. Customer needs and requirements will be continuously changing and increasing in their complexity. To be successful in the FMC market, operators will have to find ways of responding to new developments as quickly as the market changes – the question which remains is how. The purpose of this chapter is therefore to provide an in-depth insight into the German FMC market and its trends, examine operators' current FMC perspectives and strategies as well as analyse residential customers' FMC needs. Since the telecommunication market is characterised by rapid change, we will examine the role of dynamic capabilities and how they can enable telecommunication firms to be successful in a converged market. We will further analyse in which areas dynamic capabilities are especially important to succeed in the context of FMC, thereby focusing on the reconfiguration and integration of external and internal resources.

This chapter begins with an overview of the FMC concept and the transformations taking place in the telecommunications industry. Even though this transformation process is a worldwide phenomenon, we will focus on Germany as one of the largest European markets to provide concrete FMC figures and examples. In addition, we will focus on the residential market as it will be quite difficult to convince residential customers of FMC while the benefits of convergent solutions for business customers are mostly apparent. We will then draw upon the dynamic capabilities

literature to examine how firms can be successful in a rapidly changing business environment. Having highlighted the impact of FMC and the dynamic capabilities approach, we will outline our methodology and data collection procedures. Based upon a study on FMC in Germany conducted together with Capgemini Telecom, Media and Networks GmbH, we adopt an exploratory, two-stage research method, incorporating interviews with industry experts as well as a representative quantitative customer survey. The research findings will then be presented with a focus on resource integration and reconfiguration processes. The chapter concludes by giving recommendations for future research.

## FIXED MOBILE CONVERGENCE – THE TRANSFORMATION OF THE TELECOMMUNICATIONS INDUSTRY

### The Concept of Fixed Mobile Convergence

The telecommunications industry is a highly dynamic industry which, in recent years, has been characterised by substantial technological advances and a growth in innovative new services. The industry is further marked by the growing trend towards consolidation and intra-industry convergence, particularly the convergence of fixed and mobile markets (Gerpott 2003; Curwen 2006; Wirtz 2001).

Even though the telecommunications industry is buzzing of FMC, there is no clear-cut definition of the term. For the purposes of this chapter, we will define two forms of FMC offerings: Full FMC service and selected FMC service. A full FMC service comprises mobile voice and data as well as fixed voice and data (DSL) services. As a selected FMC service are considered those bundle offers which include mobile voice and data plus either fixed voice or fixed data (DSL). Furthermore, FMC is a multifaceted concept as it comprises different integration levels of convergence. At its simplest, FMC involves what is popularly known as *bundling* – that is, where an operator offers packages of fixed and mobile voice minutes. This approach, termed commercial convergence, is considered the earliest and therefore easiest stage of FMC, as it is mainly a matter of tariff structures. Device-based convergence refers to providing customers with a handset that enables them to use a service (e.g. voice telephony) over both fixed and wireless networks, seamlessly switching from one mode to the other as the customer changes location. A more advanced form of FMC – converged services – is the provision of integrated services over linked fixed and mobile networks. These services are made available via a common

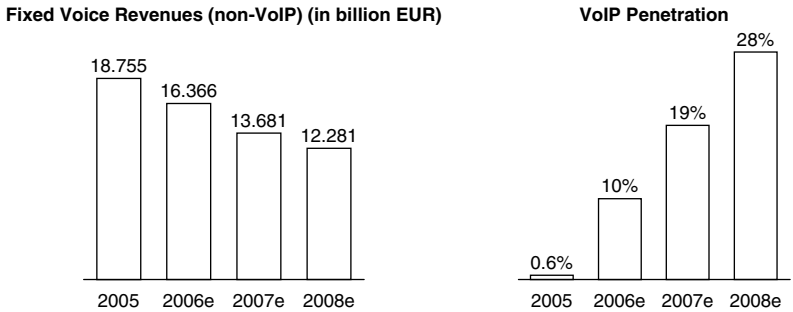
application server and are accessible from different devices. The ultimate form of FMC is a converged network, which means having a single infrastructure for fixed and mobile access alternatives. Overall, several examples can be found for the different integration levels of FMC, although the levels are not distinct and can overlap. Currently, most FMC examples in Germany and throughout Europe are at the level of commercial convergence, i.e. reflecting the early stage of the FMC development. Nevertheless, the more advanced levels of FMC are just about to gain more importance. This leads to the question of which factors are driving the development of FMC, which we will focus upon in the following section.

## The Transformation of the Telecommunications Market

In Germany, the telecommunications market is still growing, yet not as dynamically as in the past. The next years will be characterised by declining growth rates of only 1 to 2 per cent (Capgemini 2007). The approaching saturation of fixed and mobile voice markets has prompted operators to spread out into new territories in their search for growth opportunities. Fixed operators are moving into the mobile operators' turf and vice versa. As a result, competition has intensified even more.

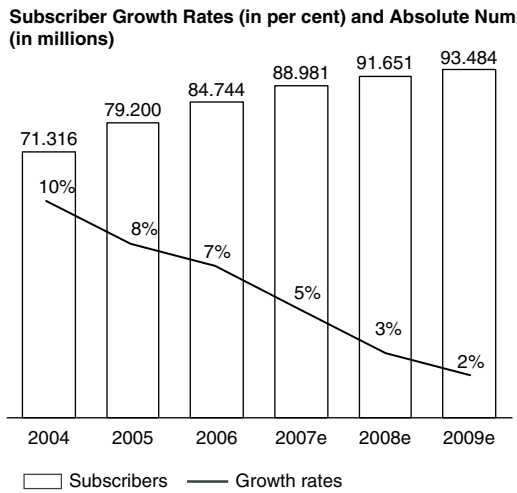
In particular, revenues from traditional fixed telephony have been exhibiting a sharp decline. Fixed voice revenues in 2006 are projected to be 13 per cent lower compared to the previous year, and additional losses of 16 and 10 per cent are expected for 2007 and 2008 respectively (see Figure 10.1). In part, this decline in revenues is due to the high degree of competition among fixed network operators, which has been intensifying ever since the market was deregulated in 1998. A further reason is the growing substitution of fixed voice by mobile voice telephony. Moreover, a cost efficient disruptive technology – voice over Internet Protocol (VoIP) – which until 2005 was software-based and mainly used by early adopters, has entered the mainstream and reached an estimated penetration of 10 per cent in 2006 (see Figure 10.1).

While the market for the traditional fixed phone line is nearly saturated, the German broadband market is rapidly growing: In 2006, the household penetration rate of broadband was 36 per cent, and is expected to reach 50 per cent by 2008 (Bundesnetzagentur 2006). DSL is the predominant access technology with a market share of nearly 97 per cent (Bundesnetzagentur 2006). The provision of DSL leads to higher revenues per user and will soon become the core revenue earning service for fixed network operators. Pursuing an FMC strategy, i.e. adding a mobile component to existing fixed services, is seen as the best strategy to retain customers and to increase revenues.




*Sources:* Bundesnetzagentur (2005); Capgemini (2007).

*Figure 10.1 Fixed voice revenues (non-VoIP), VoIP penetration in Germany*




*Source:* Capgemini (2007).

*Figure 10.2 German mobile market growth: subscriber growth rates and absolute numbers*

Similarly to the fixed voice market, the main issues in the German mobile market are saturation and decreasing price levels. The number of mobile phone contracts exceeded the population figure in August 2006 for the first time (see Figure 10.2). In the next few years, the German mobile market will be characterised by declining growth rates.

At the same time, the average revenue per user (ARPU) for all four

mobile network operators is – at best – stagnating. In part, the fall in mobile voice prices can be attributed to the low price offerings of mobile virtual network operators (MVNOs) who resell capacity acquired from one of the four network operators. In 2006, 30 MVNOs were operating in Germany, with a total market share of around 5 per cent (Capgemini 2006).

As the market approaches saturation, new customers become scarce and growth in terms of subscriber numbers can only be achieved by tempting customers to change from another operator. Therefore, mobile operators are looking for new means to generate revenues. A strategy which has proven quite successful in Germany is Fixed Mobile Substitution (FMS) – taking traffic away from the fixed networks – which commonly takes the form of a Homezone[6] offer. In addition, providers have been introducing and actively promoting an increasing number of mobile data services in an attempt to increase ARPUs. Finally, given the development of the German mobile market, mobile operators have been forced to consider whether, apart from pure mobile strategies, they also have something to gain from FMC.

In the given business environment, an FMC strategy promises to overcome commoditisation as it presents opportunities to offer new services and thus to create new revenue streams. Furthermore, FMC addresses the operators' problem of decreasing customer loyalty: By convincing customers to subscribe to bundles of services, providers can increase subscribers' inhibition to change to a competitor (Curwen 2006). Closely related to the above factors is the growing search for cost savings and efficiencies. Here, FMC promises to reduce the high costs of customer acquisition and retention. It further allows operators to leverage capacity utilisation synergies on infrastructure, human resources, and shared services (Tanner 2004). Also, with consolidated customer operations customer service levels can be increased at a lower cost-to-serve. Finally, recent technological advances make the realisation of convergence possible. Both fixed and mobile networks are moving towards an IP-based infrastructure. The increasing penetration of broadband internet access facilitates the provision of complex services and makes multimedia offers more attractive. In addition, wireless access technologies have further penetrated the market. On the device level, convergent handsets have been developed further, although their user-friendliness still leaves much room for further improvement (Curwen 2006).

At present, the German telecommunications market is clearly moving towards FMC. Deutsche Telekom has been making heavy infrastructure investments and plans to complete its all-IP network by 2012. Meanwhile, most FMC offerings are at the level of commercial convergence, i.e. price

bundles of fixed and mobile services. Fixed network operators Arcor and Hansenet[7] recently announced the addition of a mobile component to their DSL and VoIP bundles. The same trend can be observed among Internet Service Providers (ISPs), where United Internet entered the mobile market in early 2007 and now offers quadruple play.[8] Freenet has been selling mobile contracts since 2005, however so far does not offer fixed mobile bundles. A significant development in the competitive landscape was Vodafone's and O2's entry into the DSL market in October 2006. While O2 already includes VoIP in its DSL packages, Vodafone announced it would introduce this service in the third quarter of 2007. Moreover, 2006 saw the launch of two further FMC offers: Deutsche Telekom' T-One and Arcor's Twintel. Both products, however, proved unsuccessful in the residential market, partly because consumers were unsure about the benefits, and also because of technology problems.

German fixed-only operators, i.e. fixed network operators, cable operators and ISPs, see the addition of a mobile component to their existing fixed services as the best strategy to retain customers and to increase revenues. This can be achieved by entering a partnership with one of the four mobile network operators and becoming an MVNO on the partner's network. German examples of these kinds of partnerships include United Internet's 1&1 and Vodafone, freenet/mobilcom and O2, as well as Hansenet and O2. Kabel Deutschland and E-Plus were involved in cooperation talks in late 2006 and ran a trial of joint sales. E-Plus however decided to enter a distribution partnership with United Internet and agreed on selling 1&1 DSL in a selected number of E-Plus stores. Among Germany's mobile network operators, E-Plus is the only one whose parent company does not own a fixed network in Germany. As it does not intend to build its own infrastructure, the operator relies on partners to complement its capabilities.

Despite the numerous advantages FMC is said to bring about, experts doubt that the market as a whole will grow significantly larger as a result (Capgemini 2007). Competitive intensity will grow as operators from previously distinct markets expand into each other's turf to enter a converged fixed mobile market. All the same, our interviews indicate that most operators expect a growth in revenues for themselves. German providers will therefore face a crowding out: There will be winners, but also many losers. The key question is which factors will determine a successful performance in a converged market.

As pointed out above, current fixed mobile offerings in Germany are at the level of commercial convergence. As market growth further declines and FMC develops, competition will become ever more intense and change will become ever more rapid. A converged telecommunications

market will be even more dynamic than it is today, resulting in even greater challenges for operators. In addition, while the benefits of FMC for business customers are mostly apparent, they will be difficult to convey to residential customers. Our research therefore aims to answer the following questions:

- What is the current stage of the FMC development in Germany? What do residential customers want and require in the context of FMC? What are operators' views on FMC and which strategies are they currently pursuing?
- What is the role of dynamic capabilities in the context of FMC? Can they act as a success factor?
- In which areas are dynamic capabilities, in particular the reconfiguration and integration of external and internal resources, especially important for telecommunication firms in order to succeed in the FMC market?

## COPING WITH CHANGE IN THE TELECOMMUNICATIONS INDUSTRY: THE DYNAMIC CAPABILITIES APPROACH

### The Resource-Based View of the Firm

The resource-based view of the firm (RBV) is a theoretical framework which examines the sources of competitive advantage within firms and the ways in which that advantage can be sustained over time (Wernerfelt 1984; Barney 1991; Penrose 1959; Prahalad and Hamel 1990; Teece et al. 1997).

The resource-based view was developed out of criticism concerning environmental models of strategic management which build on industrial organisation economics. One influential paradigm among these is the competitive forces approach developed by Michael Porter (1980). This approach to strategic management assumes that firms are equipped with homogeneous resources and focuses on monopoly rents. The RBV, by contrast, sees a firm as a pool of idiosyncratic resources and capabilities.[9] The RBV assumes that these resources and capabilities are distributed heterogeneously across firms, and that resource differences are stable over time (Penrose 1959; Wernerfelt 1984; Barney 1991; Mahoney and Pandian 1992). Following Wernerfelt (1984) and Barney (1991, 2001), it is mainly the resources a firm controls and the capabilities to use these resources effectively and efficiently which enables a firm to achieve sustainable competitive advantage. Accordingly, the RBV focuses on rents which

flow from unique, firm-specific resources, in other words Ricardian rents (Peteraf 1993; Grant 1991).

Capabilities are what a firm can do as a result of the combination and application of the resources it controls (Grant 1991). They are the basis for organisational routines which in turn can lead to competitive advantage (Teece et al. 1997). Prahalad and Hamel (1990) suggest that a firm which is able to build core competencies at lower cost and more quickly than competitors will show superior performance in the long term.

The RBV has contributed an alternative perspective on business strategy to the field of strategic management, which was long dominated by the one-sided, market-oriented framework of industrial organisation economics (Grant 1991). The main contribution of the RBV is the ability to explain long-lived differences in firm profitability that cannot be attributed to industry differences (Peteraf 1993). However, the RBV has some weaknesses. Among others, one point of criticism is that the RBV does not take into account the shifting character of the business environment in industries with rapid innovation and dynamic competition (Teece and Pisano 1994). Therefore, the RBV cannot appropriately explain how competitive advantage is achieved in the telecommunications industry. It is this last point of criticism which is most relevant to our analysis, as it prompted the development of the dynamic capabilities approach.

**The Dynamic Capabilities View**

The dynamic capabilities approach extends the RBV in that it analyses the sources of competitive advantage in rapidly changing industries characterised by Schumpeterian competition (Teece and Pisano 1994; Teece et al. 1997; Eisenhardt and Martin 2000; Winter 2003). Dynamic capabilities are defined as 'the firm's ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments' (Teece et al. 1997, p. 516). They are specific organisational and strategic routines that enable managers to alter a firm's resource base – integrating, recombining, gaining and releasing resources – to achieve new forms of competitive advantage in a changing competitive landscape (Teece et al. 1997; Eisenhardt and Martin 2000). Dynamic capabilities which have been researched include, for instance, product development processes, acquisition and alliancing processes, or knowledge creation processes (Eisenhardt and Martin 2000; Teece et al. 1997). Eisenhardt and Martin (2000) observe that there are common features among effective dynamic capabilities across firms, commonly termed best practice. The authors therefore argue that the value of dynamic capabilities for long-term competitive advantage rather lies in the new configuration of resources than in the capabilities

themselves, as these are not inimitable and non-substitutable to the extent the RBV implies. Furthermore, the structure of dynamic capabilities varies with market dynamism (Eisenhardt and Martin 2000).

## Dynamic Capabilities in the Telecommunications Industry

In conjunction with the telecommunications industry, the dynamic capabilities framework has mainly been applied to new product development/innovation processes. Moreover, there are examples of literature on telecommunication firms which do not explicitly refer to the dynamic capabilities theory, but which *ex post* support the theory with their conclusions (Zimmermann 2006).

Huizenga (2004) explores innovation in the European Information and Communication Technology (ICT) sector, identifying the key success factors which contribute to a high innovation performance. Referring to the dynamic capabilities view, Huizenga (2004) finds that successful innovators concentrate on unique and difficult-to-imitate core activities and address strategic issues at an earlier stage than competitors. Furthermore, project matrix-like organisational structures, the absence of hierarchy and strong internal communications are among the key success factors for innovation success (Huizenga 2004). Lawson and Samson (2001, 388) apply the dynamic capabilities approach to innovation and suggest a model of 'innovation capability', arguing that successful innovators possess the higher-order capability to integrate organisation-wide key capabilities and resources into the innovation process.

Barczak (1995) examines the interrelationships between new product development strategy, process, organisation and performance in the telecommunications industry. Barczak (1995) concludes that no one timing strategy – first to market, fast follower or delayed entrant – is best for telecommunication firms but that firm-specific resources and capabilities and their match with the industry's key success factors are more likely to determine performance. Furthermore, Barczak (1995) suggests that the creation of cross-functional project teams is an effective method for telecommunication firms to organise for new product development. Wirtz (2001) examines the causes and effects of convergence in the media and communications industries, focusing on the changes in the value chain and the implications for corporate strategy. While Wirtz (2001) does not explicitly refer to the dynamic capabilities perspective, he explores the recombination and integration of resources and competences to arrive at a new value chain for a converged market. To sum up, the dynamic capabilities view has been applied to the telecommunications market, however not especially to the issue of FMC.

# EXPLORING THE FMC MARKET IN GERMANY

Fixed Mobile Convergence is a top issue in the telecommunications industry which is set to have considerable impact on all provider groups. Our review of secondary data sources revealed that there are only a few academic articles on FMC. Gerpott (2003) examines convergence strategies, drivers, and barriers for the convergence of fixed and mobile markets in Germany. Curwen (2006) adopts an international perspective, examining when and in what form FMC is likely to make an appearance, thereby placing emphasis on technological aspects of convergence and the progress of trials. These articles are of a qualitative nature and also do not address capabilities. In order to gain an in-depth insight into the specific challenges FMC poses to operators, consumer perceptions of convergent products, FMC success factors and the role of dynamic capabilities we conducted a quantitative study with focus on the German market. Since FMC is a new market which is just developing, we chose an exploratory research approach (Zikmund 1997).[10]

Primary data was collected in the context of a study conducted together with Capgemini Telecommunication, Media and Networks GmbH in 2006. The purpose of the study was to examine operator strategies and industry trends as perceived by decision makers of the major German telecommunication companies, customer FMC needs and success factors in the converging industry. In order to gain a broad overview of the market an exploratory, two-stage method was adopted, incorporating, first, interviews with industry experts and second, a quantitative customer survey.

## Analysis of Operators' Perceptions of FMC Trends and Current Strategies

The emphasis of the study was on gaining in-depth information from all provider groups involved in the development of FMC in Germany in order to get a complete picture of current industry trends as well as operator strategies and perceptions. We therefore chose purposive sampling to be able to target the most relevant interviewees (Saunders et al. 2007; Wilson 2006). The sampling frame for the study was all firms in the German telecommunications industry who are relevant to FMC. i.e. fixed network operators, mobile network operators, cable operators, ISPs, MVNOs, equipment manufacturers, and others such as mobile content providers. In total, 29 companies were identified and contacted, i.e. directors and senior managers in an FMC-relevant business area. This resulted in 13 face-to-face and telephone interviews covering all FMC-relevant provider groups.[11] To complement the provider interviews with a

comprehensive and more neutral view of the market, four interviews were conducted with stated telecommunications experts from the academic field.

The interviews were conducted using a semi-structured interview guide that consisted of 12 open-ended questions as well as three scaling questions and lasted between an hour and an hour and a half. The interview guide was organised around the following three topics: Industry challenges and trends, customer acquisition and retention, and convergent products and services. It was designed so as to encourage discussion between the interview partners and included topic specific statements and insights by Capgemini.

### Analysis of Customer FMC Needs

For the analysis of customer needs and preferences, a quantitative customer survey and focus groups were conducted.

#### Representative survey of German households

A customer survey was carried out in the first half of December 2006. Based on a questionnaire on customer needs, TNS Infratest conducted 500 telephone interviews resulting in a representative sample of German households. Participants were asked about their telecommunication behaviour and their preferences concerning combined offerings of fixed line, mobile and internet. More specifically, the customer questionnaire included the same three scaling questions on FMC success factors, convergent services and convergent applications as in the expert interviews. This was done to be able to match providers' and customers' points of views on these issues.

#### Focus groups on highly innovative FMC applications

As one of our aims was to analyse the need for highly innovative convergent applications which have not yet been launched we chose a qualitative approach in the form of focus groups rather than including a question on applications in the customer survey questionnaire. Therefore, two focus groups with early adopters were conducted in November and December 2006 in order to gain a more detailed insight into customer needs concerning FMC and customers' perception of FMC applications. All focus group participants were highly technology-affine and interested in innovative telecommunications applications. The discussion focused on the needs for and acceptance of innovative FMC applications such as unified mailbox, mobile VoIP, Push-to-X, multimedia conferencing or gaming.[12]

# RESULTS

Having conducted a two-stage exploratory survey on FMC in Germany, we will answer the above defined research questions in this section. FMC is about to fundamentally transform the German telecommunications industry. Experts thereby agree that a key challenge for all providers is to identify and appropriately address the needs of residential customers in respect of FMC. Our customer survey revealed that 17 million or 45 per cent of German households are interested in FMC offerings. These are young telecommunication-affine users of which a large majority is employed and earns comparatively high salaries. This FMC target group is thus quite attractive. Yet so far operators have failed to position convergent products which fulfil customer requirements. In the following we will address this issue, thereby focusing on the role of dynamic capabilities.

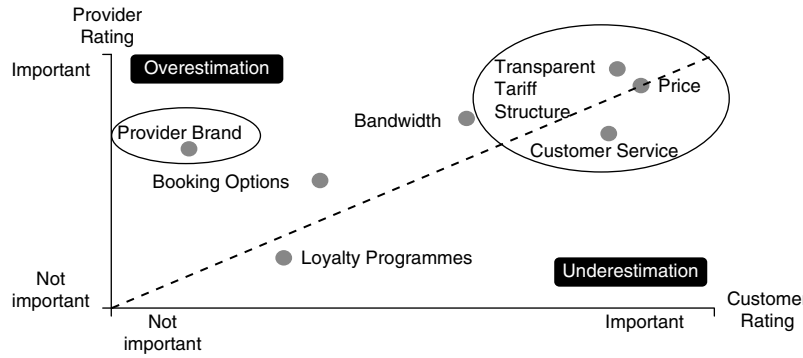
## FMC and the Role of Dynamic Capabilities

With few exceptions, the comparison reveals that providers give a good appreciation about what customers currently value. Yet today this is not reflected in German operators' offerings. The key therefore lies in the execution, e.g. implementation, of a customer-centric FMC strategy to create innovative FMC offerings which adequately address customer needs. Dynamic capabilities are thus essential in coping with a changing business environment and in implementing customer-oriented solutions to eventually hold one's ground in a converged market.

Figure 10.3 highlights this fit of the industry experts' and customers' point of view. In the following, the factors price, transparent tariff structures, customer service and brand will be discussed in more depth.

Our research shows that the *price* of FMC offers is regarded as an essential success factor by customers (4.64).[13] This fits with operators' expectations of convergent offers (4.64). Nevertheless the optimal price-performance ratio has not yet been achieved despite previous price reductions. Attractive, convergent bundle offers need to be cheaper than the sum of the single services they contain. Hence, operators will have to reduce prices which will then push an uptake in demand for converged services. Timing will be a relevant issue here.

Customers indicate that a *transparent tariff structure* is the second most important aspect on which they base their purchasing decision (4.52). This matches the providers' assessment, although they slightly overestimate the importance of this competition factor (4.82). Simplicity is key – complex offerings and extensive product portfolios obviously confuse customers and build barriers of adoption. But creating transparent offers



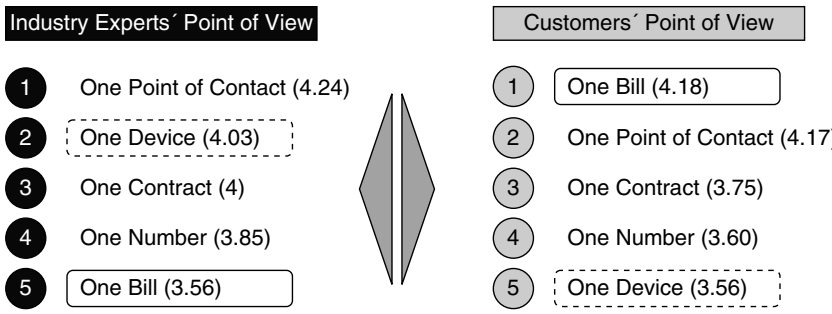

*Source:* Capgemini (2007): expert interviews and customer survey.

*Figure 10.3 FMC competition factors – industry experts' vs customers' point of view*

simultaneously sets limits to certain price policies – a consequence which operators would prefer to avoid. Nevertheless, simply structured offerings which are easy to communicate will characterise successful FMC providers. Operators are aware of this fact, but stuck with the implementation.

Providers recognise *customer service* as an important success factor (4.01), even though our survey suggests that its relevance to customers (4.48) is still underestimated. Customer service can therefore especially act as a differentiation factor. Individual installation service, for instance, as well as the availability and competence of call centres needs to be focused upon – especially since a part of the surveyed customers signal the willingness to pay for individual high quality service. However, operators have difficulties with the provisioning of high quality service – nearly every focus group participant complained about complications when contacting customer service.

An interesting insight is the fact that the interviewed experts completely overestimate the importance of the *provider brand* (3.88 compared to 2.39). Those customers who are attracted by FMC products are interested in telecommunication, know the market and have at least basic knowledge about available solutions. Thus, these users do not need the provider brand as a trust indicator because they rely on their own evaluation of FMC solutions. We argue that a trusted brand will not be a differentiating factor for FMC providers. Providers should therefore put less focus on their brand image when communicating their FMC value proposition, but rather concentrate on pricing, simplicity and customer service. To give more precise implications regarding the implementation of FMC we will




*Source:* Capgemini (2007): expert interviews and customer survey.

*Figure 10.4 Importance of convergent services – industry experts' vs customers' point of view*

focus on convergent services and applications and examine customer orientation as an important FMC success factor.

**Looking beyond the basic FMC value proposition: convergent services**

The results of the customer survey show that there is a general demand for convergent services, especially for those customers already know and of which the benefits are evident. Figure 10.4 contrasts experts' and customers' views on the importance of specific convergent services.

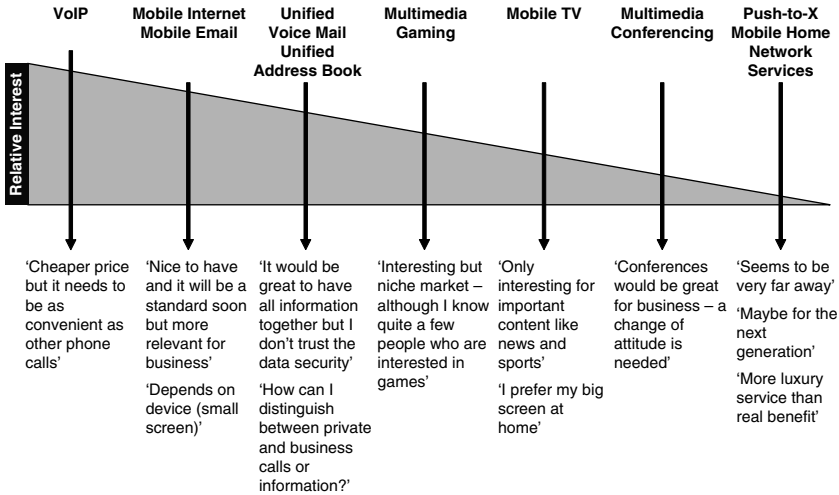
What stands out is the differing perception of industry experts and customers concerning one bill and one device. Customers regard one bill as the most important reason for buying a bundle product, which reflects the demand for more transparency and cost control in telecommunication solutions. By contrast, the interviewed experts assess one bill as being least important compared to other convergent services. The majority regards supplying a single bill as an integral part of a converged offering, but assigns higher importance to providing a single point of contact and one device. Over half of the interviewees mention the availability of suitable end devices as a main technological challenge and essential success factor for FMC providers. The technology and design of handsets is believed to play an important role in determining the attractiveness of FMC for consumers, as devices often act as status symbols. The lack of suitable handsets – in terms of user friendliness, technology and price – is seen as one reason why recent FMC initiatives in Germany by T-Com and Arcor have been more or less unsuccessful. Overall, our results indicate that the provision of integrated solutions with one contract, bill, and customer service is attractive to consumers as they expect to gain on transparency

and convenience. The concept of one device and one number is more difficult: Issues such as personal/business usage or personal/family usage remain unclear and need to be addressed by providers. Solutions will then have to be communicated in a transparent and simple way.

**Looking beyond the basic FMC value proposition: convergent applications**
According to the focus group results, the interest in convergent applications is still limited even among early adopters. The user benefits remain unclear for most applications. The majority of customers perceive FMC applications as an industry push without any communication of the benefits. However, the applications differ in the extent of how difficult to comprehend they are from the customer perspective (see Figure 10.5). To summarise, we suggest that some FMC applications are more likely to attract the mass market while others are more likely to attract single groups of users. Market segmentation will therefore play an important role in a converged telecommunications market.

Early adopters know VoIP and show some familiarity with mobile internet and mobile email. For the FMC applications unified voice mail and address book early adopters also show some interest, but it is not obvious for them how these are supposed to work. Multimedia gaming and conferencing are even more abstruse from a customer point of view. For Mobile TV, however, early adopters see some benefits, but only with regard to special content such as news, sports events and special occasions. Push-to-X and mobile home network services are those applications which seem to be most difficult to comprehend, even for early adopters. The ranking that can thus be derived from the focus groups matches the experts' estimation of the penetration of FMC applications for 2008. Given all of the above, we conclude that German providers principally understand what their customers value and need. Yet recent convergent innovations that were launched on the German market, e.g. Deutsche Telekom's T-One or Arcor's Twintel, failed. Customers did not understand what the benefits of these products were.

**Customer orientation as an important success factor**
All interviewed experts agree that FMC winners will be those companies who are able to create customer-oriented and simple offerings and who succeed in communicating the benefits of FMC to consumers. As one interviewee points out: 'A clear understanding of customer needs and requirements will differentiate the winners from the losers in the FMC market'. Thus, understanding what customers need and accordingly developing the right products at the right time is generally seen as the key to success. Within our research, interviewees expressed doubts that there




*Note:* Push-to-X: Instantaneously push voice, video or other content to a contact or to a group of contacts; Presence and availability info: Status information (available/occupied/ in meeting); Unified voice mail: A centralized voice mail accessible from any device; Unified address book: Having one single address book accessible from any device; Multimedia conferencing: Enables multi-access, multimedia conferencing services with call forking (e.g. a participant's phones/devices all ring simultaneously when the conference team dials out to initiate the conference), video and application sharing features; Multimedia gaming: Enables multiplayer sessions via like peer-to-peer or gaming servers with additional features like game log, freeze and resume; Mobile home network services: Systems for inside-home connection and control of TV/PC interaction, home devices and household appliances, security, etc., accessible via mobile phone.

*Source:* Capgemini (2007): customer focus groups.

*Figure 10.5 Interest in convergent telecommunication applications – statements of early adopters*

exists what is commonly termed a killer application – a specific FMC service – which will drive the mass market demand for convergent offerings. In contrast, innovative FMC applications are more likely to appeal to specific customer segments than to the mass market. The source of a successful performance is therefore seen in identifying and exploiting demand of particular market segments – based on telecommunication behaviour and needs – and addressing these with segment-specific FMC bundles and applications. Recognising both current and future customer FMC needs requires an intimate knowledge of different customer segments. Customer orientation is therefore the key when entering a converged market and should guide an organisation in all respects.

Yet so far, FMC is a supply side phenomenon. Operators seem preoccupied with competitors' moves and less concerned with creating FMC bundles that deliver customer value. As one interviewee points out: 'Innovations are currently too much technology driven and not enough customer-oriented'. As a result, consumers perceive FMC as an industry push without any appropriate communication of its benefits.

As demonstrated in the previous section, German operators principally understand what customers value. Yet as of now they do not act accordingly. We therefore suggest that the majority of German operators are at a stage where they have developed a good understanding of their customers' FMC requirements and the success factors of a converged market. What they need to do now is implement and simultaneously move away from the traditional product-centric approach to a customer-oriented organisation. From a dynamic capabilities perspective, this means that managers will need to reconfigure their firm's existing resource base so as to achieve new capability configurations which enable the organisation to better – and quicker – respond to customer needs. The following section explores the transformations necessary for providers to be successful in the FMC market.

## Resource Reconfiguration and Integration: Transformation to a Customer-Centric Organisation

The reconfiguration of resources is seen as a crucial dynamic capability that enables firms to transform according to the demands of a quickly shifting business environment (Teece et al. 1997; Eisenhardt and Martin 2000). Teece et al. (1997, p. 520) argue:

> In rapidly changing environments there is obviously value in the ability to sense the need to reconfigure the firm's asset structure, and to accomplish the necessary internal and external transformation.

As outlined above, telecommunication operators are facing a rapidly shifting business environment. Due to several factors mobile and fixed operators are driven towards a converged market and only those operators providing convergent offers, i.e. fixed mobile bundles, will gain momentum and prosper.

While the integration of independent fixed and mobile business units is at the one end of the spectrum of organising for Fixed Mobile Convergence, partnerships present another viable solution. Nevertheless both provider groups are facing the comparable challenge of transforming into a customer-centric organisation. Here the reconfiguration and integration of resources concerning mobile and fixed services is a key issue.

Traditionally, telecommunication companies who own fixed and mobile competencies are vertically structured organisations based on access technologies (Pohler et al. 2006). They are hence product-centric organisations. These firms currently face the problem of intra-company competition, with the fixed business unit pursuing FMC and the mobile business unit pursuing FMS strategies. Yet the execution of an FMC strategy ultimately implies merging hitherto distinct fixed and mobile business units to transform the firm into an integrated operator. Experts therefore anticipate a shift in the industry towards horizontal structures with an emphasis on applications and services (Pohler et al. 2006). Businesses are thus expected to become defined by the customer segments they serve.

Accordingly, fixed-only and mobile-only operators who do not own mobile or fixed network infrastructure respectively will need to find adequate partners to be able to offer convergent product bundles. In other words, they will need to source external resources that complement their existing capabilities and integrate both to create a new value proposition. Alliancing is considered a dynamic capability which builds new resources by bringing them into the firm from external sources (Eisenhardt and Martin 2000). For telecommunication firms, forming a partnership is a cost-efficient means of entering new markets and achieving profitable growth in a rapidly shifting business environment. Partnering with content and service providers to create differentiated propositions is currently a crucial issue for all telecommunication firms, as are cooperations with equipment manufacturers. Yet most relevant at the current stage of the FMC development are cooperations between fixed and mobile providers, as these enable firms to provide convergent products in the first place.

Partnership strategy development should start from defining a firm's gaps in capabilities that are required to deliver on customer requirements. In the cases of fixed-only operators, the lacking access to a mobile network constitutes the capability gap. The next step involves an assessment of the skills needed and costs incurred when delivering the required capability in-house compared to sourcing it from external providers. The evaluation criteria for partner identification and selection should be customer-oriented to ensure that customer needs and requirements can be adequately addressed by a joint product. An interviewee explained:

> Operative [. . .] and internal processes need to be as simple as possible for the customer [. . .] since we also have many elderly customers [. . .]. This is even more true for a mobile product and an important criterion when selecting a partner.

Once an adequate partner has been chosen, the creation of integrated operations is a major task. 'Developing a common understanding of the market' is seen as the basis for a successful cooperation. The degree

to which integration will be necessary depends, first of all, on the type of relationship established and, secondly, on the level of convergence the partners aim to provide. For integrated operators as well as for an operator cooperating with a fixed or mobile partner, providing convergent offerings requires the reconfiguration and integration of resources within different business areas. In order to appropriately address those customer needs highlighted in our findings, dynamic capabilities in the areas of market segmentation, product development, marketing, sales and customer service are of essential importance.

**Market segmentation**

To begin with, operators have to rethink their market segmentation strategies. The ability to anticipate needs which customers themselves do not yet realise requires in-depth knowledge about specific customer groups. Given the growing complexity and diversity of demand in the industry, segmentation should be based on telecommunication and FMC needs rather than on socio-demographics. Managers thus need to recombine existing skills and knowledge in order to build expertise that enables the firm to identify new market segments. Decision making processes by which managers decide on the strategies that target those redefined customer groups will have to be highly flexible to match the growing and possibly shifting customer demands (Yoffie 1997). Internal communication processes need to be realigned to allow the customer orientation to permeate the whole organisation.

**Product development**

The product development process is seen as an important dynamic capability by which managers pool their different skills and functional expertise to create new products and services (Eisenhardt and Martin 2000). In the context of FMC, we argue that product development needs to shift its focus from a technology-driven approach to an approach which emphasises the specific needs and requirements of each market segment. Identified customer needs have to be translated into technically feasible products and services. As our research indicates, it is thereby crucial that the usage argument is simple to convey and that the product presents a clear benefit to the customer. According to one industry expert, 'the complexity of providing FMC products will further increase, e.g. in terms of technology or processes, but this has to happen behind the scenes – this is not supposed to be noticed by the customer'. Consequentially, the pricing and structure of a bundle offer, the user interface and applications need to be as simple and transparent as possible. To achieve this, managers need to source and combine expertise from the specific areas a product bundle comprises, typically in the form of cross-functional teams.

**Marketing and sales**

In the transformation to a customer-oriented organisation, marketing and sales are of crucial importance. 'Customer orientation is difficult to communicate to customers when the product offer is getting more complicated, thus communication turns into a success factor'. Thus, the appropriate communication of FMC benefits is what counts, rather than the provider brand. Traditionally, marketing and sales functions are organised in silos according to fixed and mobile services (Pohler et al. 2006). As all internal functions and processes, they will need to be integrated to accommodate a converged product portfolio and, most importantly, to create one face to the customer. The same is true for FMC cooperations. Here, essential questions will be under which brand the joint product is marketed, which provider issues the contract and who provides customer service. In this respect, an interviewee stresses that 'one of the most important points will be who keeps the relationship to the customer and who disappears into the "supplier area"'. Overall, as one manager explains: 'Marketing is the most important task: The challenge is to communicate complex services in a simple and comprehendible manner and to win the customer's acceptance on the basis of the service's benefits'. And the complexity will increase even further. From a dynamic capabilities perspective, the main challenge for management will be to recombine skills and resources from different business units 'with established structures and histories' and to overcome, as one interviewee puts it, 'egoisms'. Indeed, cultural adjustment and the integration of processes are issues which should not be underestimated.

**Back-office functions**

The transformation to a customer-oriented FMC operator involves the integration of back-office functions, such as customer service, billing and customer relationship management (CRM). A main challenge will be the interconnection of IT systems that so far have been operating separately for fixed and mobile services. Regarding customer service, the availability of call centres and the competence of agents will be of increasing importance as the complexity of telecommunication solutions increases. This is particularly important for convergent services as the need for help and advice concerning technological issues will increase. Hence, customer service of fixed and mobile business units will need to be integrated to form one point of contact for customers. As one interviewee stresses: 'Providing one point of contact is a very important convergent service, but it is also very expensive to build the necessary knowledge'. Here dynamic capabilities take the form of knowledge transfer processes that enable management to recombine resources of previously separate customer service departments. Call centre agents, for instance, will have to be trained to be

competent in both fixed and mobile areas. According to an interviewed manager, among the technological requirements to successfully deliver FMC is the integration of 'processes and enabling systems which make the increased complexity in the interaction with the customer more manageable'. Billing systems have to be integrated to accommodate convergent services. A further challenge will be to integrate the redefined customer segments in CRM.

As a summary of this section, we suggest that successful FMC providers will differentiate by achieving the described transformation quicker than the competition (Teece et al. 1997). Following the dynamic capabilities perspective, we argue that success in a converged telecommunications market will be derived from difficult-to-imitate resource configurations which allow firms to anticipate customer needs, practice customer-focused NPD, marketing and sales and provide superior customer service. What is more, success will require the ability to change these resource configurations: Given the fast pace of technological development, the growing complexity of telecommunications solutions, and ever more demanding customer expectations, internal routines and processes of telecommunication firms operating in a converged market will have to be highly flexible and adaptive as well as very time-sensitive (Yoffie 1997).

## CONCLUSION

The aim of this chapter was to analyse how telecommunication firms should respond to the dynamic changes in their business environment in the context of Fixed Mobile Convergence. It provided an insight into current market trends, operators' perspectives and customer needs in the German FMC market. As the telecommunications industry is highly dynamic, we focused on the role of dynamic capabilities, in particular the reconfiguration and integration of resources, for German operators and examined in which business areas they are of particular importance. The results have implications for managers of fixed and mobile providers alike who are confronted with the uncertainty and fast pace of the telecommunications industry. This section will summarise the results and conclude with recommendations for future research.

### Key Findings

Based on the results of our expert interviews, we have shown that FMC is an important issue in the German telecommunications industry which will further evolve in the coming years and which is considered more than

a short-lived trend. Our study further revealed that FMC offerings are of interest to an attractive target group, currently in particular convergent price bundles. This general demand for FMC should be leveraged and furthered by the introduction of convergent offers which fulfil customers' requirements. Thus, the challenge for operators is to find ways of coping with the dynamic market developments and to adequately address customer needs. The study results indicate that German operators principally understand what customers value, but do not act accordingly. We hence suggest that it is the effective and rapid execution of transformation ahead of the competition that will determine success in the FMC market, indicating the high importance of dynamic capabilities in this business environment (Teece et al. 1997). We argue that dynamic capabilities in general and resource reconfiguration and integration in particular play an essential role in enabling firms to achieve this very transformation. The expert interviews also underpinned the hypothesis that telecommunication firms are turning away from the traditional product-centric approach towards becoming customer-centric organisations (Curwen 2006; Gerpott 2003). This applies to both integrated operators and fixed or mobile pure players: FMC requires integrated operators to effectively reconfigure their resource base so as to make traditionally separate parts work hand-in-hand. For fixed-only and mobile-only operators, building and integrating resources through a customer-oriented partnership strategy and alliancing process will be essential in order to successfully provide FMC. The value of partnerships for competitive advantage in a converged market lies in the new resource configurations they create, allowing both partners to better leverage their capabilities and deliver higher customer value. We then showed that reconfiguration and integration processes are particularly important within four areas.

First of all, operators need to conduct market segmentation according to customer FMC needs. Our research suggests that convergent applications are more likely to appeal to specific segments than to the mass market. We conclude that successful firms will know the current needs of different segments and anticipate segment-specific needs that customers themselves do not yet realize to address these with the appropriate FMC products and services. This is in line with earlier findings of Huizenga (2004, 158), according to which '[frontrunners] deepen into the unaddressed and hidden needs of customers and try to provide solutions to customer problems'. This will require firms to recombine knowledge and skills to build expertise on redefined target segments. In addition, continuing research on customer needs is necessary in order to nourish this expertise and to be able to adequately convey FMC benefits to customers with changing preferences.

Second, successful FMC providers will characterise themselves through customer-oriented and effective product development processes which translate identified customer needs into simple and convenient offerings. The creation of product bundles offers the opportunity to compose different offerings which specifically answer to customer needs. We suggest that this can be achieved by the use of cross-functional teams, enabling managers to source and combine expertise according to the individual product. This conforms to the findings of Barczak (1995) and Huizenga (2004), who found that cross-functional, project team-based structures foster innovation success.

Third, we highlighted the importance of resource reconfiguration and integration processes in the areas of marketing and sales. Being traditionally organised in silos according to fixed and mobile services, these functions have to be integrated in order to successfully provide FMC products and to create one face to the customer. As the complexity of telecommunications solutions increases, the appropriate communication of benefits turns into an important success factor. When cooperating with a partner, an essential issue will be which provider eventually keeps the relationship to the customer.

Fourth, our research underpins the suggestion that an effective reconfiguration of back-office functions is important for FMC providers. Here, successful firms will characterise themselves through effective knowledge transfer processes which enable them to provide high-quality customer service and to integrate billing and CRM systems. Since these resource reconfigurations imply the merging of hitherto independently operating departments, a main challenge will be to recombine established structures and processes and to overcome cultural differences.

## Future Research

While articles have been written on FMC and also on dynamic capabilities within the telecommunications industry, this is the first quantitative study with a focus on FMC in the German market which also incorporates the dynamic capabilities theory. We have shown that dynamic capabilities indeed play an important role if firms are to succeed in a converged market. Given the small population of FMC operators in Germany, a small sample size could not be avoided, which limits the possibility to generalise the findings. A European-wide sample of telecommunication firms would therefore be useful in order to gain more insights into internal routines and processes. Since the phenomenon of Fixed Mobile Convergence and its organisational and strategic impact is of very recent origin and will be further evolving, additional and continued theoretical and quantitative analysis is needed. While this chapter provides an insight with regard to

the importance and application of dynamic capabilities within the telecommunications market, additional analysis in this area is desirable to further the theoretical development of the dynamic capabilities view.

## ACKNOWLEDGEMENTS

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## NOTES

1. Ashcroft International Business School, Anglia Ruskin University, East Road, Cambridge, UK.
2. Capgemini TM&N, Neues Kranzler Eck, Berlin, Germany.
3. Capgemini TM&N, Neues Kranzler Eck, Berlin, Germany.
4. Capgemini TM&N, Düsseldorf, Germany.
5. For the purpose of this chapter, the terms Fixed Mobile Convergence, FMC and convergence will be used interchangeably.
6. A 500-metre to a few kilometre wide area is designated as the 'homezone' of the customer and calls made from this area are charged at substantially lower prices.
7. Hansenet acquired AOL Germany in 2006 and announced to continue AOL's mobile offer, launched shortly before the takeover, under the Alice brand.
8. An offer comprising internet, fixed voice, TV and mobile is commonly termed quadruple play.
9. The idea of seeing a firm as a bundle of resources and capabilities goes back to the work of Penrose (1959). However, the approach did not receive much further attention until the mid-1980s, when the resource-based approach was taken up and further developed by Wernerfelt (1984), Prahalad and Hamel (1990), and Barney (1991).
10. Following Yin (2003), different secondary data sources were triangulated in order to corroborate evidence gained from the interviews and the survey. Thus, documentary information was collected from a number of sources including consulting presentations and studies, reports published by external sources such as market research companies and banks, as well as journal and newspaper articles and internet-based data sources.
11. Due to sensitivity of data and confidentiality reasons, the names of interviewees and companies will not be published.
12. See p. 257 for an explanation of convergent applications.
13. On a scale 1 to 5: 1 = not at all important, 2 = less important, 3 = neutral, 4 = important, 5 = very important.

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# 11. Strategic value chain redefinitions: operationalising the dynamic capability view

**Ronald Klingebiel and Dieter Lange**

## ABSTRACT

In this chapter, we aim to bring together the Dynamic Capability View (DCV) of competitive advantage with the pragmatic approaches of strategy professionals. Contrary to popular belief, capability-driven concepts of strategic renewal have been in application for a considerable time. The emphasis here is upon an approach used by several strategic consultancies: namely the Value Chain Redefinition (VCR) concept, which resembles a meta-capability that identifies firm capability levels and needs within specific parts of the organisation. Perhaps a surprising implication is that many of the difficulties associated with the operationalisation of the DCV have been independently resolved by practitioners, even though researchers are still looking for ways of translating and communicating their DCV findings. It can therefore be argued that gaining advantages through dynamic capability configurations is already a more deliberately managed stratagem than is often assumed.

## INTRODUCTION

A capability does not merely represent a further resource in the interplay of other resources such as financial assets, technology, or manpower, but rather a distinctive and arguably superior approach to allocating resources. The capabilities method of resource allocation is somewhat idiosyncratic to companies and is found in repositories of historical learning that create a web of skills and routines. Such capabilities can be very complex and organisations may master complex tasks and solve challenging problems without fully understanding the internal functioning of the responsible capability. Capabilities are, therefore, 'somewhat mysterious

social phenomena' (Dosi, Nelson and Winter 2000) and often remain opaque.

Consequently, it is often difficult to identify the sources of an advantage-creating capability. In fact, the isolation of contributing factors is seen by many as being so difficult that it is often viewed as unmanageable, with any competitive advantage which derives from such a complex set of capabilities being regarded as a result of serendipity (de Rond and Thietart 2007). Thus, how can practitioners benefit from the current dynamic capability debate, since capabilities are notoriously difficult to isolate? Further how can strategists assess the required level of 'dynamism' within their organisational capability web, and how can they do so without excessive search costs and disruptions to capability exploitation?

Despite the problems of finding definitive answers to such questions, we nevertheless argue that DCV is not restricted merely to abstract conceptual beauty. Practitioners in general and strategy consultants in particular have been observed to use capability reconfiguration concepts, which resemble an operationalisation of a meta-capability proposed by the DCV. First, we review the current academic debate on the feasibility of 'management by DCV'. Using participant observation, we then portray a practitioner concept that embraces many of the implications of the dynamic capability view of competitive advantage. Finally, we discuss the congruency between both academic and practitioner approaches, resolving a longstanding perceived dilemma; namely the non-implementability of the DCV.

## DYNAMIC CAPABILITIES

What constitutes a capability? Terms such as core competencies, collective skills, complex routines, best-practices seem to be used interchangeably with capabilities. While not denying the merits of other labels, capabilities are, in this chapter, broadly understood as idiosyncratic patterns of resource allocation, embedded in the organisational structure and culture, representing a repository of past experiences and organisational learning (Winter 2000). Teece, Pisano and Shuen (1997) define dynamic capabilities as 'the firm's ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments'.

Therefore, capabilities are complex processes, involving numerous social interactions. They involve collective organisational problem solving: if a certain combination of skills and routines can be shown to have solved extraordinary challenges, a capability is built that could yield a competitive advantage if it created more value for the firm than the least efficient competitor could achieve (Peteraf and Barney 2003). However, reliable

replication of the success of the problem solving approach is a central notion of the capability concept (Helfat and Peteraf 2003). A singular success can start the creation of a capability, but it is in itself insufficient to constitute a capability until the problem-solving pattern can be (intuitively) reproduced by the organisation. The complexity, time-intensiveness and somewhat opaque and often tacit evolution of a capability are seen by some as rendering it inimitable and therefore as an idiosyncratic source of competitive advantage for the organisation.

In the strategy sphere, capability concepts have attracted considerable attention. Resource-based theory has classified capabilities as a major source of competitive advantage (Barney 1991; Wernerfelt 1984). Because incomplete markets allow for heterogeneity among competing organisations, firms with advantageous configurations of resources and capabilities can generate rent differentials (Amit and Schoemaker 1993). Therefore, the strategic position of a firm varies with the level of advantage-creating capabilities.

However, recent research has warned of excessive capability exploitation in volatile markets. Whereas a reliably replicated capability can create advantages in stable environments, highly competitive markets with changing requirements can render the same capability a key rigidity that may lead to failure. (Leonard-Barton 1992; Burgelman 2002). The strengths of a capability and its reproduction can lead to a barrier to adaptation and to a burden with respect to flexibility and change. Cherished capabilities can create inertia, causing overall organisational immobility (Levinthal and March 1993). In consequence, sustainable competitive advantage is maintained only when firms are able to reconfigure their capabilities in line with external changes. This imperative has been captured by the Dynamic Capability View (Teece, Pisano and Shuen 1997; Eisenhardt and Martin 2000; Winter 2003). Continuous capability renewals match the level of adaptation required by changing environments. For the extreme of high-velocity, discontinuously changing environments, Eisenhardt and Martin (2000) suggest radical dynamisation of capability developments. Thereby, capabilities are seen as unstable, experimental and improvised acquisition and reconfiguration of resources. The emphasis shifts from patterned architectures to adaptive evolution of capabilities. Ad-hoc problem-solving replaces capability replication.

As such, we do not want to challenge the extreme or more moderate understandings of advantage-creating dynamic capabilities. Our aim rather is to highlight the potential obstacles to operationalising the approach for business practitioners. Resource-based research has studied organisations and has found hidden sources of competitive advantage, namely idiosyncratic skills and routines that constitute capabilities. Firms that harbour these dynamic capabilities are often unaware of them or have

only limited understanding of their functioning. In reverse, it would now be interesting to ask how some firms can now re-apply the findings of the dynamic capability literature, in order to proactively nurture dynamic capabilities to position themselves for competitive advantage.

**Identification of Capabilities**

If dynamic capabilities are determining the competitive performance of companies, management will not want to accept the elusive nature of capability mechanisms for the creation and reconfiguration of integrated clusters of skills and routines. There is a need for identification of the sources of competitive advantage. Only if management can identify capabilities and benchmark them against competitor's capabilities, will it be able to proactively improve its strategic position. There is a tension between the idiosyncratic and complex nature of tacit firm capabilities and the practical need for dedicated performance management of isolated components of a firm. The DCV has provided indications to guide the identification of capability sources. Teece, Pisano and Shuen (1997) suggest capabilities reside in three dimensions: positions, paths and processes. If firms were able to understand these corner posts of capabilities, then proactive dynamic capability management might become possible.

*Positions* refer to a set of available firm assets that determine a firm's future resource allocation decision-making. The (protected) ownership and utilisation of technological assets are key differentiators among firms. Similarly, a firm's cash position and degree of liquidity leverage determine its short-term agility. Besides tangible assets, a firm's reputation and its structure influence the scope and type of future activity. All firm assets stand in relation to competitive asset configurations; the strategic position is therefore relative.

*Paths* refer to the historic firm development. Past resource allocation decisions not only lead to a need for investment amortisation, but also to the development of routines that are informed by historic experience. Therefore, 'path-dependency' limits a firm's future manoeuvrability. Learning activities are local and evolve from past experience, making path-dependency a key factor in the assessment of dynamic capabilities.

*Processes* are sequences of activities within organisations devoted to optimal utilisation of firm resources and to improvement of that usage. As Raisch and Holtz elaborate in their contribution to this book, processes embrace exploitative and explorative perspectives. In her seminal work, Edith Penrose (1959) stressed 'it is never resources themselves that are the inputs in the production process, but only the services that the resources can render'. Empirical research has since confirmed that the coordination

of production processes inside the firm is the source of differences in firms' competence in various domains (Garvin 1988). Processes devoted to coordinating and integrating available resources constitute organisational routines and have been regarded as the primary determinants of firm activity (March and Simon 1958; Cyert and March 1963; Thompson 1967; Nelson and Winter 1982).

However, the dynamic component of processes goes beyond the resource-based view and lies at the heart of the DCV, emphasising as it does organisational learning that leads to a reconfiguration of firm resources. However, such learning does not concentrate on finding ways to make things better, quicker or cheaper, but rather on finding ways to go beyond the current frame of activity. Competitive environments require a preemptive organisational sense for change, so that firms can make the necessary transformational adjustments to resource allocations (Amit and Schoemaker 1993). Alert surveillance of competitive behaviour and market developments are prerequisites to such reconfigurations. To this end, benchmarking has been recognised as a valuable process. Teece, Pisano and Shuen (1997) and Schreyögg and Klisch-Eberl (2007) view organisational adaptation as a learnable skill.

In sum, the firm's position and path, as well as its coordination and reconfiguration processes, are the hidden repositories of dynamic capabilities. Whereas position and path are comparatively easy to approximate through systematic strategic analyses, managers may struggle to identify the widely dispersed and intertwined social interactions that constitute routines and processes. Even if a specific dynamic capability could be identified, its replication across other parts of a firm or across competitive firms may prove difficult due to the uniqueness of linkages between social actors. A partial replication of a successful capability may result in the partial or total loss of its advantage-creating propensity.

At first glance, the informative value of the DCV for the managerial profession may, therefore, be limited. DCV insights can influence managerial and organisational mindsets, but can they render strategic heuristics? Tensions between ideal scenarios and implementation reality have always called for pragmatic compromises. While, for example, researchers of real options theory (cf. Chapter 8) criticise the insufficiencies of project management and product development flexibility, companies have had to make do with the best feasible approximations, predominantly risk management heuristics. This chapter contributes to the debate by exploring one observed management concept that resembles propositions of the DCV. Before portraying this concept, however, the tension between replicability of capabilities for the creation of advantage and the reconfiguration of resources to adapt to environmental changes is usefully evaluated.

**Management of Capability Dynamism**

The evolutionary speed and accuracy of capability reconfigurations are the main differences between the resource-based view and the dynamic capability view (Makadok 2001; Helfat and Peteraf 2003). Both appreciate the strength of a capability in the concert of resources to create competitive advantage. However, the DCV asserts that the advantage can only be sustained over time if the capability adapts in line with environmental changes, so that increasing emphasis is placed on the responsiveness of the firm's resource allocation patterns.

Schreyögg and Kliesch-Eberl (2007) identified three interpretations of the DCV with regard to the degree to which the evolution of capabilities is seen to principally determine advantage creation. The *radical dynamisation approach* treats capabilities as momentary phenomena, which are the results of constant experimental, improvised search processes. Here, competitive advantage stems from the encompassing ability to use real-time information to quickly change in response to unforeseeable environmental demands (Eisenhardt and Martin (2000)). Naturally, there are considerable practical limitations to this ideal.

The *integrative approach* recognises the value of both capability architectures and dynamic reconfiguration. The replication of successful patterns of resource allocation should receive as much management attention as the transformation of those patterns when environmental conditions require organisational change. The difficulty of finding the balance of both exploratory and exploitative behaviour presents a fundamental tension. A pragmatic solution suggests either continuous incremental changes or major changes that follow an 'unfreeze-change-freeze' logic. The latter would be a temporal separation of exploration and exploitation (Raisch and Holtz).

The third interpretation of the DCV involves *innovation routines*. Here the separation is not temporal, but rather constitutes a split of managerial tasks in the organisation, with coordination processes separated from reconfiguration processes. The inertia and rigidities of non-dynamic capabilities within the firm are overcome by installing separate innovation routines (Zollo and Winter 2002). In an extension thereof, Schreyögg and Kliesch-Eberl (2007) argue for a meta-capability that monitors firm skills and routines and compares them against the environmental requirements. This meta-capability continuously reviews whether capability commitments, path-dependent lock-ins or structural inertia prevent the firm from achieving a good fit with observed and anticipated environmental developments. The signals emitted from the monitoring capability will trigger change when deemed appropriate and will determine the level of dynamism within capabilities. Because political processes, cultural bias

and emotional resistance can lead to distortions, the innovation routine will be more effective if it is complemented by a supportive context. This context may, for example, facilitate mavericks and 'nay-sayers' and may have a high customer and competitor orientation. In addition, critical forums, established by inviting outsiders to challenge current practices, can mitigate the risk of signal oversight.

There is a managerial necessity for stability to fine-tune and reliably replicate capabilities. A state of complete flux would prevent firms from reaching high levels of competence through certain skills and routines. A lack of critical mass and focus would stifle the creation of competitive advantage, but at the same time excessive stability can lead to unresponsive inertia. The above discussion has shown how three interpretations of the DCV treat this dichotomy in different ways. As a common denominator, capabilities are seen to not be fully flexible: capabilities refer to patterned and replicable sets of activities. Overcoming the threat of capability inertia requires major, not just incremental changes. From a managerial standpoint, it appears to suggest that establishing a separate function that monitors the required level of capability dynamism is the most pragmatic solution to the dilemma. Therefore, if we were to look for ways in which managers can make use of DCV propositions and re-apply them to their organisations, we should focus on additional, higher-level skills and routines that can manage the stability-flexibility trade-off. Alternatively, services such as consultancy projects may provide the means to reconsider and reconstitute capability configurations.

We portray a consulting concept that implicitly employs DCV insights without referring to it. It delineates a heuristic, which tackles many of the challenges of identifying capabilities and managing capability dynamism. Although the DCV has received much scholarly attention, the development of strategic heuristics is still in its infancy. We intend to facilitate DCV understanding among practising executives whilst at the same time, clarifying where the DCV can inform superior management practice. This bridge contributes to moving research theory and professional practice closer together. It also cautions novelty claims of some proponents of the DCV, which are sometimes viewed with bewilderment by managers and executives.

## METHODOLOGY

We illuminate the mechanisms of capability identification and reconfiguration within a single case study. The case object is an analytical heuristic used by a global strategy consultancy for client projects since 2004. The consultancy is referred to as CONSULT. The heuristic is referred to as Value Chain Redefinition (VCR).

The descriptions of the VCR are based on the personal experiences of the authors, gained alongside seven consulting projects in which VCR was used and further improved. Therefore, the empirical method is participant observation. The sources of data are threefold. First, the daily liaisons with the consultancy staff which constitute a rich discourse, shedding light on the development and application of the VCR. Various consultant hierarchies with different business experiences form the basis of this source of data. Second, the project-based interactions with client company staff deepened our understanding of the objective behind VCR applications. Beyond that, we could also collect impressions as to why client firms did not themselves apply a similar methodology, but instead decided to call in external expertise. To an extent, we could also monitor the success record of operational changes after VCR had been applied. Third, we had unrestricted access to the general documentation of the VCR framework as well as to documentation that was created during client project rollouts.

At the time of VCR development and application, there was a deliberated avoidance of recourse to academic research. Therefore, there was little to coerce the behaviour of our data sources (people) in any predetermined direction. VCR was formed and refined over the course of two years, during which the discussions and decisions of CONSULT staff were free from influence from the authors. Staff were in any case largely unaware of the academic literature on dynamic capabilities, although access to practitioner journals, such as the *Harvard Business Review* meant exposure to themes such as 'exploitation verses exploration' was possible.

We chose the VCR approach of CONSULT, because we had unparalleled access to a unique depth of discourse and documentations (Yin 2002). To our knowledge, at least two other strategy consultancy firms also developed similar concepts over the first five years of the millennium.[1] We sought to use the case study for explorative purposes only, but we assume that these other two consultancies experienced a similar cognitive process in developing VCR-like models.

The single case study is meant to underline the existence of management heuristics that incorporate many of the propositions of the dynamic capability view. This can inform future research into the operationalisation of the DCV, especially the translation of theories of competitive advantage into tangible management heuristics.

## VALUE CHAIN REDEFINITION

When strategy consultants sell a management tool to clients, it is most often a comprehensive package. There are hardly any solutions that solely focus

on isolated issues such as dynamic capability creation. Instead, a multitude of theories and concepts are amalgamated and equipped with scorecards for decision-making and roadmaps for action. The Value Chain Redefinition concept is one of those multi-dimensional frameworks, but it has a strong component aimed at organisational capability reconfiguration.

Capability reconfiguration becomes increasingly important in the rapidly changing telecommunications market. VCR has found predominant application in mobile and wireline service operators. Over the past decade, the typical European operator profile has shifted in nature from that of an incumbent infrastructure provider to one that is constantly confronted with rapid technological and structural change. More importantly, the wireline business is coming to resemble a pure commodity with declining revenues for the top-ten European operators. In addition, technological developments such as high-speed broadband access, wireless broadband technologies, internet telephony, and data- and content-services, have made operators' strategic positions more difficult to ascertain and maintain. They have also witnessed increased margin pressure from a variety of alternative operators and new market entrants from adjacent industries. With a further share of core revenue capture by cable or content providers, incumbents have been forced to develop toolsets to enable continual strategic renewal. They are in search of quicker time-to-market lead times for higher-margin service offerings. Future growth in the light of heightened market velocity and volatility will require dynamic mechanisms for adaptation. The operators' quest to identify and strengthen dynamic capabilities led to the engagement with consultants using the VCR framework.

**Identifying Capabilities**

Either prior to the project or as part of the consulting service package, the perceived momentary key success factors for operators in the telecommunications sector are outlined (see Figure 11.1). A cluster of key success factors provide a matrix of strategic best-practices. When companies strive to identify advantage-creating components of their process architectures, they attempt to gain a better impression of the elusive concept of competitive advantage. The key success factor matrix allows for approximations of the dimensions that allow for superior rent generation. The pragmatic rationale behind the exercise is that once a set of strategic goals have been classified, firms can scrutinise their current activities for capabilities that allow them to score more highly against the success factors. Figure 11.1 outlines an indicative, exemplary set of momentary success factors in the telecommunications market.

The prior definition of firm aspirations, to an extent, departs from


*Source:* CONSULT Client Situation (2005).

*Figure 11.1 Targets for the organisational capability search*

academic DCV interpretations. Most refer to a generic concept of competitive advantage that is subject to continuous and partially unpredictable changes. In practice, however, managers need to delineate a target. They need to give competitive advantage a workable definition, which, for a short period of time, is static. Hence, only over time can firms characterise environmental volatility by comparing sequential historic definitions of competitive advantage.

As a next step, the firm narrows the scope of analysis. Within a sub-unit, the resources, skills and routines build the framework for the capability search. Activities constitute the unit of analysis for the VCR concept. Depending on the level of abstraction, this could encompass large activity clusters or detailed, singular activities carried out by individual organisational actors. Following Porter's (1985) conceptualisation, the combination of all firm activities represents the firm's internal value chain. CONSULT's information gathering would include client firm documentation as well as sub-unit staff interviews (Shepherd 1998). Normally there will be very disparate views held within the client firm as regards the number and nature of activities. CONSULT would attempt to disentangle various interviewee statements to construct a coherent activity list. This would show the main processes (activity clusters) and, depending on the client mandate, the underlying individual activities.

Starting from a set of identified activities, CONSULT would start to benchmark individual activities where comparable. Varying process structures within competitive firms then require a certain degree of re-abstracting and rebundling of individual activities. In general, the

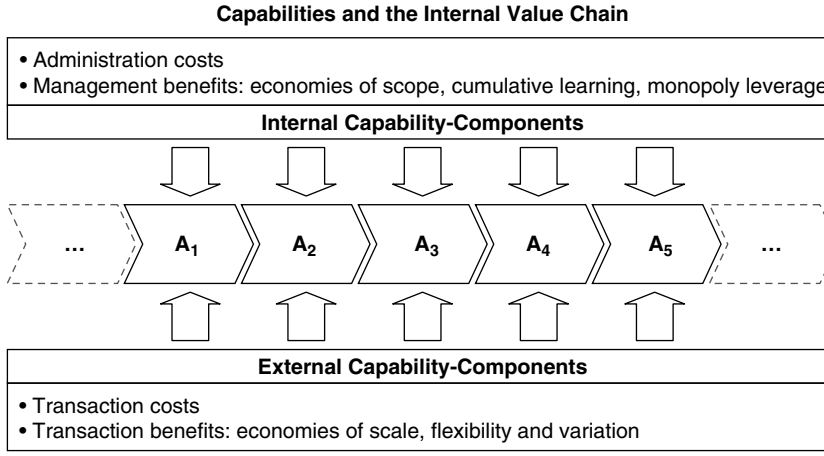


*Figure 11.2 Series of activities (value chain) for capability analysis*

underlying logic follows the one depicted in Figure 11.2. For every identified and comparable firm activity, the combined level of in-house and outhouse value creation is benchmarked against competitor activities. VCR considers a dual source of capabilities that reside within activities.

The list of activities builds the basis for a competitive assessment. With particular reference to the telecommunications sector, CONSULT could benefit from international experience, allowing it to compare activities across competing firms. Every activity within the analysed sub-unit of the client firm would be ranked in a two-dimensional frame. First, the level of delivery competence influences the competitive advantage that a client firm is able to achieve. Here, economies of scale and scope are seen to lead to superior skills and routines. Research and development capabilities, for example, could encompass a number of highly leveraged client firm activities. Equally, high-value customer service could represent a high competence for niche operators, despite the lack of extensive economies. Second, VCR prioritises activities that lie at the heart of a firm's service provisioning, its raison d'être. This is rooted in the assumptions that resource allocation to some activities is more important than to others, irrespective of the level of competence achieved in each. Over the years, incumbent providers of wireline telecommunications have, for example, built up vast expertise in network management. However, with the commoditisation of voice traffic and market deregulation, offers such as managed services for corporate clients come to the fore. Networks have become a means to an end, not a differentiating factor. The idea of ranking activities by a generated level of unique selling point (USPs) can be traced back to Barney (1991),

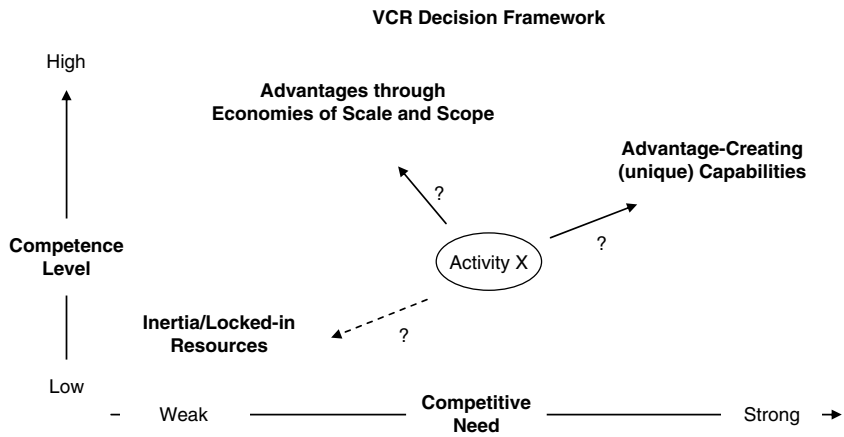


*Figure 11.3 VCR ranking of firm activities*

who stressed that capabilities generate value when they are valuable, rare and inimitable. The ranking by level of competence captures another criterion of Barney's logic: the organisability of capability. These theoretical foundations have been endorsed in the consultant team that developed the VCR framework, although there was an absence of explicit references to the newer dynamic capability interpretations of competitive advantage.

The CONSULT identification and assessment of firm activities has a number of actionable outcomes for the client. First, it has a systematic overview of activities within the relevant sub-unit. At the most detailed level, this set of activities refers to the actual firm routines – a catalogue of firm operations that differs from the usual visualisation, which is often biased through divisional separations, asset specificity or product groups. Decomposing daily firm operations into activities recognises the networked complexity of social interactions between organisational actors. Because this is highly idiosyncratic, activities are then re-abstracted to comparable clusters, so that they can be benchmarked against competing firms' activity clusters. Such benchmarking, by definition, is only feasible through outside expertise, given that individual firms' access to activity information is limited by firm boundaries.

Besides providing a list, VCR also interprets the identified activity sets by their level of competence and competitive need. This classification of activities allows the firm to compare status quo with a target. It signals resource allocation priorities. Moreover, it provides a guideline for buy-or-make decisions for client firms. The firms may pursue a strategy of committing attention and financial resources to crucial capabilities

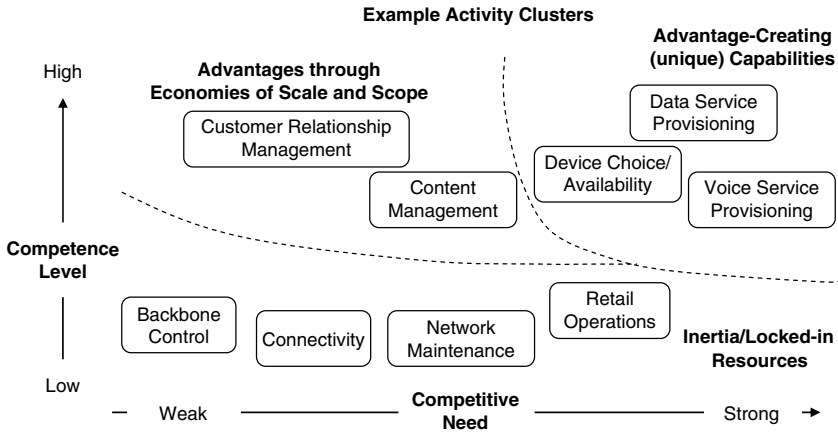


*Figure 11.4 Indicative overview of selective activity clusters of a wireline telephony provider*

primarily to bring them excellence. If so, then such firms need to consider freeing resources from non-core activities. This may require right-sizing and outsourcing, at least in those areas where no significant economies of scale or scope are realised. Figure 11.4 shows an example of classified activity sets at a high level of abstraction. The activity sets in the top, right corner of the figure constitute advantage-creating capabilities. A client company, following the VCR advice, would particularly nurture these sets of activities.

The required degree of dynamism within each capability is determined over time, when VCR is successively applied to a firm. Frequent reconsideration reveals different combinations of activities to render temporary competitive advantage. It shows which capabilities are held by the firm, and which should be there. In addition, by comparing different states of firm activities, the VCR offers a means to compare the internal evolution of capabilities over time. Within VCR, there is no rule as to how often the review should occur or as to how frequently capabilities should be reconfigured. A firm's propensity to commit resources to the VCR exercise determines the frequency of reconfigurations. Therefore, VCR itself is not constantly dynamic, but enables deliberate change. It resembles the unfreeze-change-refreeze interpretation of organisational capability dynamism rather than a seamless search process. So far, consultants have employed VCR approaches and offered external viewpoints that invigorate capability structures. However, it could also be imagined that the VCR concept enters the remit of internal firm strategists. This could make it a

more frequent and formally institutionalised process, similar to the meta-capability proposed by Schreyögg and Kliesch-Eberl (2007).

## DISCUSSION

Dynamic capability proponents conceive adaptive skills and routines as the sources for competitive advantage. These skills and routines are idiosyncratically interwoven with an organisation's social networks and structures, so that their collective identification is viewed as varying between difficult and impossible. Paths, positions and processes determine the dynamic decision points and routes that a firm can take based on its capabilities. There are different interpretations of the degree to which the dynamism supports superior rent creation. While the radical approach sees activities in constant flux, moderate interpretations also stress the importance of reliable exploitation of proven capabilities.

As previously discussed, individual capabilities, such as product development, have been researched in detail. However a comprehensive heuristic for the assessment of firm capability levels has not as yet been provided. Due to the aforementioned difficulties in analytically separating capabilities from the remainder of firm operations, systematic approaches to capability assessments have yet to be realised in terms of a meaningful taxonomy. While academics have struggled to translate DCV findings for re-application in professional practice, we have therefore shown that there are concepts in use that resemble the DCV explicitly without referring to it. The Value Chain Redefinition approach signals that practitioners in actual reality have made the conscious move towards coordinating and reconfiguring their capability structures. Independent from the recent DCV literature, practitioners in general, and consultants in particular, have arrived at similar conclusions: learning organisations that adapt their skill levels and routines to environmental changes are bound to perform better than competitors with more static capability levels. It is therefore arguably that the non-implementability criticisms of the DCV may have been exaggerated.

The VCR is a systematic attempt to capture the entirety of capabilities within a divisible subsection of a firm. Its unit of analysis is reduced to the level of activities; a level of extra detail as compared to the Teece, Pisano and Shuen (1997) reference to processes. The activity level identifies individual organisational actors' actions. The activities are re-aggregated and clustered to provide comparable sets of activities across industry competitors. Not all interlinkages between activities can be neatly separated, which results in a compromise in the attempt to make firm capabilities benchmarkable.

The VCR identification of activities provides a means for firms to coordinate capabilities and to allocate resources to capability refinement and exploitation. In a second step, identified activity clusters, i.e. capabilities, are benchmarked. They are assessed by the level of competence achieved by the firm and by the degree of competitive need. This provides the basis for reconfiguration of capabilities, which introduces a dynamic dimension to the capability management concept of VCR. VCR in itself constitutes a meta-capability, as proposed by Schreyögg and Kliesch-Eberl (2007), and monitors capabilities and signals when there is a threat of capability inertia. The signal strength is enhanced, because an outside consultancy conducts the capability review. The frequency and speed of capability adaptation then depends on the firm's propensity to contract VCR consultants. If VCR becomes part of a company's capability portfolio, the reviews could be carried out more frequently and at lower costs, while the change signal might decrease in strength.

In recent years VCR has been successfully applied in consultancy projects, suggesting that there has been a paradigm shift in business practice parallel to recent academic theory advancements. Some firms increasingly see competitive advantage to be routed in capabilities and stress the need for their adaptation over time. VCR provides firms with a 'meta-capability' that supports them in their reconfiguration endeavours. Although the VCR approach does not explicitly refer to DCV theory, there is a clear overlap between the underlying logics of both concepts, with practitioner usage of DCV thereby advancing further than generally assumed.

The DCV has been derived through the study of firm performances. Such firms, due to the complex and elusive nature of capabilities, were assumed to lack any deliberate or systemic management of the level of dynamism within their capability portfolio. The VCR is an example of a systematic, proactive approach for doing exactly that. In conclusion, we would like to suggest caution as regards two broad perspectives: (a) that which propels the academic DCV insights to unattainable superiority over existing practitioner approaches to the management of competitive advantage, and; (b) that which stresses the notorious inapplicability of DCV propositions to practice, reducing the DCV to a philosophical utopia. We also hope that this chapter contributes to the mutual understanding of the academic and professional communities. In our experience of managing firm dynamics, the two communities often use very different language which results in an impression of discourse dichotomy. However, both pragmatic practitioner approaches and academic theorists have arrived at similar conclusions which could be refined further, if more empirical work were undertaken on the adaptability of firm capability portfolios – based on a grounded discussion between researchers and managers.

## NOTE

1. For the origins of the discussion on value chain analysis, unbundling of activity portfolios and capabilities, see for example Hagel and Singer (1994), Shepherd (1998), Stalk, Evans, and Schulman (1992), Marino (1996).

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