Alexander Brem

The Boundaries of Innovation and Entrepreneurship

Conceptual Background and Essays on Selected Theoretical and Empirical Aspects

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With a foreword by Prof. Dr. Kai-Ingo Voigt

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Bibliographic information published by Die Deutsche Nationalbibliothek
Die Deutsche Nationalbibliothek lists this publication in the Deutsche Nationalbibliografie; detailed bibliographic data is available in the Internet at <http://dnb.d-nb.de>.

Dissertation Universität Erlangen-Nürnberg, 2007

1st Edition 2008

Editorial Office: Frauke Schindler / Anita Wilke

Gabler-Verlag is a company of Springer Science+Business Media.
www.gabler.de

Cover design: Regine Zimmer, Dipl.-Designerin, Frankfurt/Main
Printed on acid-free paper
Printed in Germany

ISBN 978-3-8349-0833-9

Gewidmet meiner Tante Anneliese

Alle Autoreneinnahmen aus dem Verkauf dieses Buches werden der Uni-Kinderklinik Regensburg gespendet (www.kuno-ostbayern.de).

Foreword

Both academic fields, innovation management and entrepreneurship, have been developed over years quite separately and (if at all) with only few contacts and interactions between each other. But looking at this fields with a 'fresh eye', they can be interpreted as essential parts of an holistic macro-model of innovation and entrepreneurship. This model describes the whole process from the creative early steps of idea management and opportunity recognition over idea development up to the (successful) commercialization of these ideas. It is one of the characteristics of this process that the focus in the early steps is on innovation management, while entrepreneurial skills and methods are more important in its later phases.

This book by Alexander Brem, which is based on his doctoral dissertation he successfully completed and defended in 2007, introduces in its first chapter such a new and interesting macro-model of innovation and entrepreneurship, which - by the way - helps us to identify and locate the scientific questions and problems he is dealing with in the following parts of his book:

In the second chapter, he (re-)considers the well-known market-pull/technology-push-debate, shows empirical evidence that the integration of both views might be the critical success factor. One of the highlights of this book is presented in chapter three - the concept of an integrated idea management which shows many innovative elements and is supported by empirical results of an exploratory study.

Together with additional (empirical) results concerning the timing strategies of market entry (chapter five), the entrepreneurial behaviour within organizations (chapter six, here with special respect to the role of 'serial entrepreneurs') and possible gender-related differences in founding intentions of people within and outside the enterprise (chapter four) deepens our understanding of the suppositions and critical factors for entrepreneurial success. It must be mentioned that the central ideas of this book have successfully been presented by the author and discussed at almost all major, high-ranked international scientific conferences in the field of innovation management and entrepreneurship in the years 2006 and 2007.

In each chapter, the reader of this book will find an excellent survey of literature and 'state of the art' in the academic fields considered. The reader, either from theory or from practice, will additionally profit from many outstanding ideas as well as numerous empirical results introduced in this book, which - last but not least - underlines the impressive, above-average ability and qualification of the author for scientific work.

Kai-Ingo Voigt

Preface[1]

First of all, I would like to thank Prof. Dr. Kai-Ingo Voigt for his personal interest in my work and for the opportunity to facilitate my Ph.D. at the Friedrich-Alexander-University Erlangen-Nuremberg. His guidance and support made this work possible. Special thanks are to Prof. Dr. Nicole Koschate, who was the co-reviewer. I would also like to express my appreciation to Prof. Dr. Siegfried Maaß, Prof. Dr. Claus Schnabel and Prof. Dr. Werner Pfeiffer for their support in my final dissertation examinations.

I am sincerely grateful to all my colleagues at the Chair of Industrial Management for many fruitful discussions and the fun we had during the last years. Moreover, I owe many thanks to the whole team of VEND consulting GmbH for their immense support. It was a great pleasure for me to have the chance of combining academic research and entrepreneurial practice!

Furthermore, I would like to thank all co-authors, companies and external research partners – without them, my work would not have been possible.

I am indebted to Verena Stich for the invaluable support concerning her proofreading and support in English.

Finally, special thanks are to my dear girlfriend Stefanie Krämer. Together with my family, who I would like to thank very much as well, she was the main reason for the final success of my dissertation.

Alexander Brem

1 In general, this book is written in American English. Hence, appropriate rules regarding spelling, wording and grammar are applied. Headings are all in capitals, legends and captions in lower case. With the exception of proper nouns, the main text is in lower case. The citations follow the rules of the Harvard style system.

Because of the special structure with several specific chapters, an overlap of contents cannot be entirely avoided. This is necessary to ensure the overall understanding of the particular context in each chapter.

The author absolutely disagrees with all kinds of stereotyping by gender, race, nationality, ethnicity, etc. However, to improve and simplify readability, partly male and partly female indications for the appellation of persons are used, with no gender-related role typology being either stated or wanted. Even if only one kind of indication is used, always both genders are addressed.

Abstract

Hardly anybody would disagree that innovation and entrepreneurship are the main triggers for the long-term success of a company. However, both fields have been treated within different scientific directions for many years. Based on this situation, the first chapter gives an overview of the theoretical background and presents recent models in this area. Finally, a process-oriented, innovation-entrepreneurship framework is derived and discussed in this chapter. The following sections will deepen selected essential aspects of the presented framework.

For this, the second chapter deals with the integration of market pull and technology push activities in the innovation process, based on a case study in German software industry. The results indicate that a balanced and active integration of both views is essential for future innovation successes.

The subsequent third chapter is about innovation management in emerging technology ventures as an example of a successful linkage between idea management and innovation. The empirical part of this chapter consists of qualitative research results focused on emerging technology ventures and shows the possible impact of an integrated idea management approach.

The fourth chapter indirectly deals with the 'entrepreneurial event', discussed in the first chapter: Is there a gender-related difference in founding intentions? Based on quantitative research, this part shows the importance of entrepreneurial education for later 'entrepreneurial-thinking' people, as the entrepreneurial intention is higher among both females and males through focused entrepreneurship education at universities.

After a new product or process has been developed, the next critical decision is the timing and the alternative roles of a market entry. Thus, within the fifth chapter, important aspects of time-to-market issues are discussed. Some empirical evidence from the automotive supplier industry illustrates the boundaries of pioneer vs. follower strategies.

Finally, the sixth chapter addresses the challenge to establish a persistent entrepreneurial behaviour in organizations. This is accomplished by the example of serial entrepreneurs, as they illustrate the 'best case' of a future employee or business founder because such a person continuously

searches for new innovations and opportunities of realization. On the basis of these research results, corresponding conclusions can be drawn how to adapt this for other organizational units as well.

At the end of the thematically focused chapters, concluding remarks summarize the main results of the whole work.

Deutschsprachige Zusammenfassung

Innovation und Entrepreneurship bilden wesentlich das Fundament des langfristigen Unternehmenserfolges – kaum jemand wird dieser Aussage widersprechen. Nichtsdestotrotz wurden beide Gebiete lange Zeit in verschiedenen wissenschaftlichen Bereichen diskutiert, obwohl deren inhaltliche Beziehung offensichtlich zu sein scheint.

Ausgehend von dieser Problemstellung wird im ersten Kapitel der theoretische Hintergrund beider Bereiche ausführlich diskutiert. Zudem werden aktuelle Modelle, die eine Verknüpfung von Innovation und Entrepreneurship zum Thema haben, vorgestellt.

Darauf basierend werden einzelne Teilgebiete ausgeführt und diskutiert, welche in einem umfassenden Bezugsrahmen zusammengeführt werden.

Aus dem so aufgebauten Bezugsrahmen werden in der Folge verschiedene konkrete Themenstellungen abgeleitet und vertieft. Dabei werden neben theoretischen und qualitativen Methodiken auch quantitative Techniken der empirischen Forschung angewandt.

So hat das zweite Kapitel die Integration von Market Pull und Technology Push im Innovationsprozess zum Gegenstand. Dabei konnte im Rahmen einer Case Study mit einem Softwareunternehmen vielversprechende strategische und methodische Ansatzpunkte aufzeigt werden.

Das dritte Kapitel beschäftigt sich mit dem Innovationsmanagement in jungen Technologieunternehmen, da sich diese durch ihre Größe und hohen Innovationsgrad besonders gut für eine solche Betrachtung eignen. Hierbei wird ein Integriertes Ideenmanagementmodell vorgestellt, welches neben den internen Ideenquellen auch die Einbindung externer Ideengeber vorsieht. Der empirische Teil dieses Kapitels umfasst Ergebnisse basierend auf problemzentrierten Interviews.

Im vierten Kapitel wird der Frage nachgegangen, ob und inwiefern die Gründungsneigung von Studierenden von deren Geschlecht abhängt. Die Ergebnisse hieraus liefern diverse Hinweise auf die Verbesserung der aktuellen Entrepreneurship Ausbildung, darüber hinaus jedoch auch Hinweise auf unterschiedliche Motive und Motivationen von potentiellen Unternehmern.

Nach einer erfolgreichen Produkt- oder Prozessentwicklung ist die nächste kritische Entscheidung die des Timings des Markteintritts, denn hierbei kommen mehrere alternative Strategien in Frage. Mit Hilfe einer quantitativen Erhebung in der Automobilzulieferindustrie werden alternative Strategieoptionen auf deren Erfolgsaussichten hin untersucht.

Das abschließende sechste Kapitel hat die Herausforderung des kontinuierlichen Entrepreneurship zum Gegenstand. In diesem Zusammenhang werden sog. Serien-Gründer untersucht, da bei solchen Personen die maximale Unternehmer-Orientierung vermutet wird. Diese soll helfen, für andere Organisationen unterschiedlicher Größe auch Anhaltspunkte zu liefern, wie man solche Unternehmertypen zum einen erkennen, und zum anderen zielgerichtet ausbilden kann.

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Introduction

"The only way to change is by changing your understanding."[2]

Inspired by this citation, the main goal of this book is to create and advance the understanding of innovation and entrepreneurship, especially of the way from initial ideas to lasting realizations.

This book is based on extensive research of the last three years. The goal hereby is to present an outstanding, scientific noteworthy work, which shows the qualification and ability of the author for a scientific work with an appropriate presentation. Hence, selected key works and results of recent research will be shown, supplemented with a comprehensive framework and overview at the beginning.

As teamwork is seen as one of the most important factors for interdisciplinary and up-to-date research, some chapters are based on works and projects together with internal and external researchers. The work is in general divided into six chapters. With the exception of chapter one, which is theoretic-conceptual, all sections are based on qualitative or quantitative empirical research. Moreover, to ensure high-quality research, they were further advanced by submitting and presenting them at well-known international scientific conferences as well as by being included in conference proceedings and international high-quality journals. For this reason, five out of six papers ran through various double-blind peer-review processes.

However, besides chapter three, each presented chapter is in form and content completely revised, partly based on feedback at the various conferences.

In the following, each chapter will be shortly introduced.

[2] Anthony de Mello (1931 - 1987)

Chapter 1: From Innovation to Entrepreneurship – A Process-Oriented Framework

This chapter gives an overview of the interfaces of innovation and entrepreneurship, what they have in common and where they differ. Based on that, several existing models and approaches will be introduced and reviewed. Finally, an own framework for further considerations will be derived and discussed.

This framework will serve as an overall thematically linkage between the following chapters.

Chapter 2: Pull vs. Push – Strategic Technology and Innovation Management for a Successful Integration of Market Pull and Technology Push Activities

This chapter is based on two different conference articles, submitted and presented at the 16th International Conference on Management of Technology with the theme 'Management of Technology for the Service Economy' in May 2007 in Miami (USA), and the 5th International Symposium on Management of Technology focused on 'Managing Total Innovation and Open Innovation in the 21st Century' in June 2007 in Hangzhou (China).[3] Furthermore, the present version of the paper was invited to a special issue 'Management of Technology' of the International Journal of Technological Innovation, Entrepreneurship and Technology Management (Technovation).[4]

Chapter 3: Innovation Management in Emerging Technology Ventures – The Concept of an Integrated Idea Management

The content of this chapter is – due to copyright reasons – entirely taken from the International Journal of Technology, Policy and Management, Special Issue on Technology Based Entrepreneurship and the Management

[3] Both together with Prof. Dr. Kai-Ingo Voigt (University of Erlangen-Nuremberg)

[4] Together with Prof. Dr. Kai-Ingo Voigt (University of Erlangen-Nuremberg), currently under review.

of Knowledge Bases (Vol. 7, Issue 3, 2007).[5] An earlier version of the journal article was submitted and presented at the Institute of Electrical and Electronics Engineers (IEEE) International Conference on Management of Innovation and Technology in June 2006 in Singapore.[6]

Chapter 4: Gender-Related Differences of Founding Intentions: The Role of the Micro-Social Environment, Education and Perceptions of Fostering and Inhibiting Factors

Since 2006, there has been a research cooperation between the University of Erlangen-Nuremberg (Chair of Industrial Management, Prof. Dr. Kai-Ingo Voigt) and the European Business School Reichartshausen (Chair of Entrepreneurship, Prof. Dr. Heinz Klandt). One outcome of this is a research paper, submitted and presented at the European Council for Small Business and Entrepreneurship (ECSB) 52nd World Conference with the conference theme 'At the Crossroads of East and West: New Opportunities for Entrepreneurship and Small Business' in June 2007 in Turku (Finland).[7]

Chapter 5: Pioneer vs. Follower: The Time-to-Market Dilemma – Results from an Empirical Study

This chapter is based on an article submitted and presented at the 30th Product Development and Management Association (PDMA) Conference, themed 'Creativing and Appropriating Value in Innovation Management' in October 2006 in Atlanta (USA)[8].

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[5] Original source of publication: Brem, A. and Voigt, K.-I. (2007a), 'Innovation management in emerging technology ventures – the concept of an integrated idea management', Int. J. Technology, Policy and Management, Vol. 7, No. 3; Journal website: http://www.inderscience.com/ijtpm.

[6] Together with Prof. Dr. Kai-Ingo Voigt (University of Erlangen-Nuremberg)

[7] Together with Simone Chlosta (European Business School Reichartshausen), Stavroula Laspita (European Business School Reichartshausen), Christian W. Scheiner (University of Erlangen-Nuremberg, Prof. Dr. Heinz Klandt (European Business School Reichartshausen), Prof. Dr. Kai-Ingo Voigt (University of Erlangen-Nuremberg).

[8] Together with Prof. Dr. Kai-Ingo Voigt (University of Erlangen-Nuremberg), Christian W. Scheiner (University of Erlangen-Nuremberg) and Alexandra Schütte (University of Erlangen-Nuremberg).

Chapter 6: Serial-Entrepreneurs in the Business Foundation Process – Insights from a Case-Driven Explorative Study

This part is based on a submission and presentation at the Strategic Management Society (SMS) Special Conference with the focus on 'New Frontiers in Entrepreneurship: Strategy Governance and Evolution' in May 2007 in Catania (Italy).[9]

Finally, the work closes with some concluding remarks, summarizing the main results from the six chapters.

The specific linkage between these chapters and the innovation-entrepreneurship framework, introduced in chapter 1.3.3, will be explained in section 1.4.

[9] Together with Prof. Dr. Kai-Ingo Voigt (University of Erlangen-Nuremberg), Christian W. Scheiner (University of Erlangen-Nuremberg) and Madlen Schwing (University of Erlangen-Nuremberg).

1. From Innovation to Entrepreneurship – A Process-Oriented Framework

1.1 Introduction

A company's competitiveness strongly depends on its innovativeness at the 'global frontier' (Porter and Stern 2001, p. 28), as innovation is not only an important factor for economic progress, but also an essential element in the competition of companies and nations in general (Beaver and Prince 2002). Innovativeness can be characterized by several attributes, Weber (2005) for instance defines an innovator as a company which:

- Searches and finds gaps,
- always looks for things to change or new things to do,
- has ideas that no one else has,
- does not give up too early,
- is ready to accept risks,
- sticks to ideas even against big resistance,
- takes chances that are futile to others.

Hence, corporate innovation management must play many different roles. The challenge is to manage the whole process from initial ideas to lasting realizations, which means to combine innovative and entrepreneurial tasks at the same time. Unfortunately, there is no common sense about how such processes and tasks shall look like, especially because innovation and entrepreneurship are still treated within different science streams.

Therefore, this chapter will give a review of relevant literature in both areas. Furthermore, some recent models linking innovation and entrepreneurship will be discussed. For further considerations, a comprehensive framework will be introduced.

1.2 Innovation and Entrepreneurship – Boundaries and Linkages

So far, there is less consensus among researchers regarding innovative and entrepreneurial activities, especially when it comes to precise terms and definitions (Garcia and Calantone 2002; McFadzean et al. 2005). Hence, the first two parts of this section are dedicated to give a short literature review in both areas.

1.2.1 Innovation

One of the first and most famous definitions of innovation can be traced to Joseph Schumpeters' forces of creative destruction (Schumpeter 1934):

- The introduction of a good or a significant improvement in the quality of an existing good.
- The introduction of a new method of production, i.e. an innovation in processes.
- The opening of a new market, in particular an export market in a new territory.
- The conquest of a new source of supply of raw materials or half-manufactured goods.
- The creation of a new type of industrial organization, i.e. an administrative innovation.

Therefore, all kinds of innovation include a specific level of newness, which is certainly concerned with novelty. Still, innovation is not simply invention: "Innovation incorporates both creation or discovery aspects, and diffusion or utilisation aspects" (Deakins and Freel 2006, p. 117), or, more theoretically, "innovation is commonly defined in terms of tangible entities that can be utilized by different people on different occasions, i.e. something is adoptable or diffusible" (Ford 1996, p. 1113). Pragmatic views of innovation define it as the successful implementation of creative ideas (Woodmann et al. 1993) or "as a process that provides added value and a degree of novelty to the organization and its suppliers and customers through the development of new procedures, solutions, products and services as well as new methods of commercialization" (McFadzean et al. 2005, p. 353).

The starting point for an innovation is mostly an invention (Utterback 1971) plus exploitation (Roberts 2007), but without successful commercialization, the invention will not become an innovation (Hauschildt and Salomo 2007; Gerpott 1999; Dewar and Dutton 1986; Martin 1994). Carter and Calamtone (2002) claim that innovation is a technology based opportunity of a new market or new service, while for example Glynn argues that any method different from traditional ones is already an innovation (Glynn 1996). As it is assumed that over 60% of economic growth is based on technological progress and not on improvements in labour productivity (Freeman and Soete 1997), it is not surprising that innovation is

mostly seen as a certain kind of technological advance. In this context, the most common classification is the distinction between newness to the market and newness to the company (e.g. Cooper 1993; Hauschildt and Salomo 2007). Based on the evaluation of innovation studies, Tidd et al. (2005) state that "innovation is a process, not a single event, and needs to be managed as such", and that "the influences on the process can be manipulated to affect the outcome – that is, it can be managed" (p. 87). Thus, innovation management consists of all activities for the optimization of the whole innovation process (Olschowy 1990).

The application of value chains in the context of innovation is rather common. Especially in recent times, combinations with entrepreneurial processes are made as well (Mellor 2003). In this context, Hansen and Birkinshaw (2007) offer a model of an innovation value chain, which includes the mentioned process orientation and corresponding phases (see Figure 1-1).

	Idea generation			**Conversion**		**Diffusion**
	In-house Creation within a unit	**Cross-pollination** Collaboration across units	**External** Collaboration with parties outside the company	**Selection** Screening and initial funding	**Development** Movement from idea to first result	**Spread** Dissemination across the organization
Key questions	Do people in our unit create good ideas on their own?	Do we create good ideas by working across the company?	Do we source enough good ideas from outside the company?	Are we good at screening and funding new ideas?	Are we good at turning ideas into viable products, businesses, and best practices?	Are we good at diffusing developed ideas across the company?
Key performance indicators	Number of high-quality ideas generated within a unit	Number of high-quality ideas generated across units	Number of high-quality ideas generated from outside the company	Percentage of all ideas generated that end up being selected and funded	Percentage of funded ideas that lead to revenues; number of months to first sale	Percentage of penetration in desired markets, channels, customer groups, number of months to full diffusion

Figure 1-1: The innovation value chain (Hansen and Birkinshaw 2007)

They differ between three stages, namely idea generation, conversion and diffusion, which will be partly used later in this work as well. However, also in this view of innovation, only successful diffusion in the market and within the company defines an innovation.

In general, innovation is seen as a main vehicle for a new company to profitably enter a market and is a central force for driving competition among companies (Dosi et al. 1997). But is this true for small and big companies at the same time? In this context, Penrose (1959) states that a small company is not only a large company in miniature, so they are supposed to differ in their innovation activities as well (Voigt et al. 2003). Large companies are supposed to have a higher rate of innovativeness than smaller ones (e.g. Mowery and Rosenberg 1998), but this view was partly refuted, as small companies can be as successful in innovative activities as large corporations (e.g. Herbig et al. 1994; van Dijk et al. 1997; Koeller 1996; Schwalbach and Zimmerman 1991). This perspective is supported at the latest by the introduction of Christensen's 'Innovators Dilemma' (1997), according to which large companies have difficulties with abandoning well-established routines and practices, while smaller companies are much more flexible and adaptable. Therefore, they are supposed to be more innovative, especially when it comes to the creation of new industries. However, as far as technology diffusion and more process-oriented innovations are concerned, large companies are supposed to have an advantage, due to their financial resources and process know-how (Smith 2006; Teece 1986).

Still, innovativeness does not appear to be a major explanatory factor of successful innovation (Cohen 1995), as such factors can depend on other characteristics like a certain industry, not only on an optimum size of a company (Burton 1999). Even R&D is not only an 'undocked' special department for innovation anymore. Especially in large companies, R&D departments are increasingly forced to buy and sell all types of results from research activities, as the sole focus on 'producing' and buying patents is not sufficient anymore. Congruously, this part of the company also accounts for a certain business risk not only by selling and buying licences, researchers and small research companies or facilities, but by actively pushing internal and external venturing as well as spinning in and spinning out projects (Gibson 1981; Ortt and Smits 2006). Martin (1994) calls this 'interpreneurship' with the alternatives of technology acquisition and licensing, R&D consortia, strategic alliances combining complementary assets and between rivals. For these new roles, adequate human resources are needed.

Hence, in former times, large companies were known for their avoidance of entrepreneurs, but since their huge importance for the company's long-term success is recognized, exactly these companies are trying to hire and encourage such people (Knight 1987). Thus, these companies are (re-)discovering the attractiveness of 'downsizing', to encourage innovation and especially entrepreneurship through external venturing. When and how this shall be applied, will be discussed later in this work.

1.2.2 Entrepreneurship and Entrepreneurs

Similarly to the phrase 'innovation', there is no common definition of the term 'entrepreneurship' either (e.g. Brazeal and Herbert 1999).

Once again, Schumpeter (1934) was the first to stress the important role of entrepreneurship in economy and society. His 'process of creative destruction' precisely articulates the activities of entrepreneurs for change. In this context, the entrepreneurial function is supposed to be the driving force that is defining new standards of human efforts (Schumpeter 1934), or as Drucker (1985) indicates, innovation is the core instrument of entrepreneurship. "Forces will oppose the new ideas, and to overcome that resistance requires aptitudes that are only present in a small fraction of the population and that define the entrepreneurial type as well as the entrepreneurial function" (Schumpeter 1950, p. 132). Hence, the corporate innovation process can be seen as the essence of entrepreneurship (Larson 2000), and companies with entrepreneurial postures are described by being risk-taking, innovative, and proactive (Covin and Slevin 1991). Or, as Beaver (2001) states, "innovation coupled with the ability to think and manage strategically are the key factors that distinguish and elevate the entrepreneurial firm from the small business venture" (p. 425).

In this context, Herbig et al. (1994) highlight that entrepreneurs themselves do not consciously innovate, but intentionally seek opportunities. Stevenson et al. (1999) define entrepreneurship as a process by which individuals – either on their own or inside organizations – pursue opportunities beyond the resources they currently control. In this context, 'opportunity' is defined as a "future situation which is deemed desirable and feasible" (Stevenson and Jarillo 1990, p. 23). A noteworthy trend in literature goes to emphasize the concept of entrepreneurship itself, rather than focusing on personality-driven or psychological factors (Cornwall and Perlman 1990; Chell 2001; Zhao 2005). Thus, entrepreneurs "capture

ideas, collect resources and combine these to create a new product or service that adds value to the organization's offering to the market" (Johnson 2001, p. 138).

Consequently, this definition makes it clear that entrepreneurship is not only about starting an own business, but also about new venture creation and business development in established companies as well.

This is very important, as especially in large corporations, entrepreneurship is the main trigger for the implementation of innovations (Butler 2004; Johnson 2001; Knight 1987; Zhao 2005), and this is in contradiction to earlier views on the role of entrepreneurs (e.g. Moore and Tushman 1982). Therefore, "an entrepreneurial company is one that engages in product-market innovation, undertakes somewhat risky ventures, and is first to come up with 'proactive' innovations, beating competitors to the punch" (Miller 1983, p. 771). Thus, this adaptation of entrepreneurship is called 'intrapreneurship'.[10]

1.2.3 Conceptual Linkage

To date, there has been very little comment in the literature on the relationship between innovation and entrepreneurship (McFadzean et al. 2005), as for example even Schumpeter (1934, 1950) does not explicitly explore the linkage between both fields. This is surprising as the areas of innovation and entrepreneurship have been discussed for many years (Zhao 2005), but not treated within one literature stream, although their definitions would already implicate this (Brazeal and Herbert 1999). Only general statements can be found like 'entrepreneurship is held to promote wealth creation through innovation' (Drucker 1985), entrepreneurial skills are needed for the innovation process (Martin 1994), or "successful commercial exploitation is a prerequisite of entrepreneurship, innovation and entrepreneurship are ultimately determined by the market" (Minkes and Foxall 1982, p. 42). However, discussions or even further linkages of both areas are missing.

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[10] As e.g. Johnson (2001) or Zhao (2005) already give a comprehensive overview of related terms like intrapreneurship, corporate entrepreneurship, corporate venturing, and small business owner, no further explanations will be given at this point.

Still, in recent years first efforts can be noted of some authors who try to link the domains of innovation and entrepreneurship (e.g. Smith 2006; Deakins and Freel 2006; Kohtamäki et al. 2004). For instance, Bessant and Tidd (2007) state in their recently published book "Innovation and Entrepreneurship" that most texts in both areas "tend to be too theoretical, whereas innovation and entrepreneurship are inherently about management practice and creating change" (p. XI). Some already rather comprehensive approaches will be introduced later.

But how can such a linkage be described? In this context, Brazeal and Herbert (1999) state that innovation and entrepreneurship can be seen as both a process and the corresponding outcome. Hence, the end of an innovation is concurrently the starting point for entrepreneurship (Mets 2005).

However, Schumpeter (1934) states that "being an entrepreneur is not a profession and usually not a lasting condition" (p. 78). Entrepreneurs do not necessarily continue as business founders, they can choose to work as managers as well. Nevertheless, from a macroeconomic perspective, these entrepreneurs should continue starting new businesses and companies, as research indicates that they are 'different', e.g. in their achievement motivation (Stewart and Roth 2007).

In addition, more and more companies are realizing that their internal organization and their external market environment need a strong entrepreneurial approach to innovative activities (Ortt and Smits 2006). Consequently, missing entrepreneurial awareness combined with organizational routines often do not lead to commercial outcomes of innovative efforts because of the still existing distinction between an entrepreneur and a manager. The entrepreneurial attitude needs to be anchored throughout the entire structure of the company, especially the management (Burton 1999), with the goal of creating 'entrepreneurial managers' (Minkes 1987). Therefore, Thompson (2004) states: "If we want more innovation, we need more entrepreneurs" (p. 1093).

However, the question whether innovation or entrepreneurship 'was first', e.g. if entrepreneurship is the exploitation of innovation (e.g. Amit et al. 1993; Drucker 1985; Stevenson and Jarillo 1990) or whether innovation is the primary act underpinning entrepreneurship (e.g. Block and MacMillan 1993; McFadzean et al. 2005), must remain unanswered.

1.3 Development of an Holistic Approach of Innovation and Entrepreneurship

1.3.1 Overview of Recent Models

In fact, some researchers have already made attempts to combine innovation with entrepreneurship within a model. The most important ones will be introduced in the following, whereby this list is not claimed to be exhaustive.

1.3.1.1 Brazeal and Herbert (1999)

Brazeal and Herbert (1999) emphasize that the concepts of change, innovation, and creativity have been largely ignored by entrepreneurship researchers and vice versa, although, in their view they are integral components of entrepreneurship and a basic requirement for entrepreneurship research to become a more important management research field.

In this context, based on literature research, the authors derived an innovation-based entrepreneurial process model (see Figure 1-2).

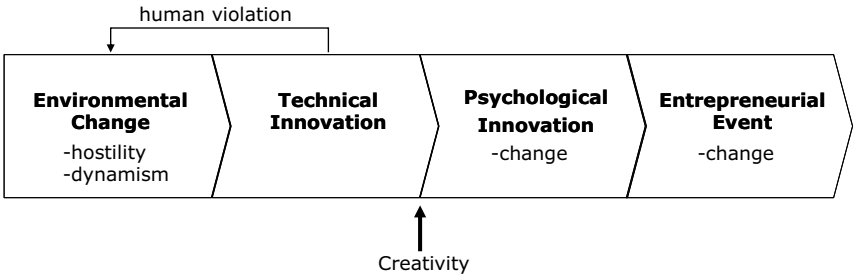

Figure 1-2: A simple model of the entrepreneurial process (Brazeal and Herbert 1999)

Therefore, environmental change driven by hostility and dynamism leads to innovation in a technical sense. With the influence of creativity, certain change is needed in order to bring the innovation forward. At the final point, the innovation leads to an entrepreneurial event, which is defined by the innovation and their later exploitation (Brazeal and Herbert 1999). Moreover, this 'event' is driven by an 'opportunity', which is one of the most important duties for an innovation manager and entrepreneur as well. Such an opportunity is characterized as a future state that is desirable and achievable (Stevenson et al. 1999).

Hence, entrepreneurship is the ability to identify or create market opportunities in the objectives of a company, including not only to detect or create an opportunity, but also to exploit it (Minkes and Foxall 1982) However, there are different graduations of commitment to entrepreneurship (see Figure 1-3).

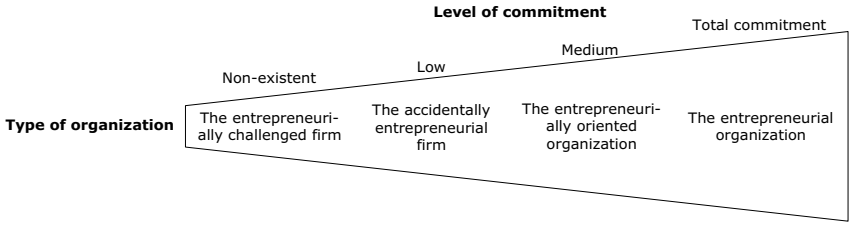

Figure 1-3: Graduations of commitment to entrepreneurship within organizations (Brazeal and Herbert 1999)

The model of Brazeal and Herbert (1999) shows the early phases of the linkage between innovation and entrepreneurship, as they focus on the literary roots of both areas and consequently try to link them. Particularly the differentiation between two innovation phases (in a technical and psychological way) and the accentuation of change and creativity is noteworthy, as for instance creativity is often seen as the main bottleneck for technological progress (Jehle 1986), and at the same time as a main factor influencing innovation success (Twiss 1992). Moreover, the accentuation of change as the main trigger for initiation of innovation is supported by the view of Zaltmann et al. (1973). Nevertheless, this model neglects the various sub-categories of change, e.g. incremental vs. transformational or proactive vs. reactive (Sadler 1995). Moreover, the approach is strongly simplified, as it does not include further organizational aspects or hints for adaptation.

1.3.1.2 Zhao (2005)

Another approach in this area stems from Zhao (2005), in which he argues that "a combination of entrepreneurship and innovation holds the key to organizational sustainability in this period of rapid change and nonlinear dynamics" (p. 25). Based on six case studies, Zhao (2005) points out three main propositions:

- "Innovation and entrepreneurship are complementary because innovation is the source of entrepreneurship and entrepreneurship allows innovation to flourish and helps to realize its economic value.
- Entrepreneurship uses innovation to expand business scope and boost growth. Therefore, entrepreneurship and innovation are dynamic and holistic processes that are not confined to the initial stage of a new venture.
- The development of entrepreneurship and innovation, and interaction between them for the successful commercialization of innovation, require an organizational culture and a management style that are innovation-focused and supportive" (p. 34-35).

As a key result, Zhao (2005) indicates that entrepreneurship and innovation are continuous processes in organizations and that both are complementary in enhancing business performance. His derived '5-S approach' consists of the dimensions strategy, system, staff, skills and style (see Figure 1-4).

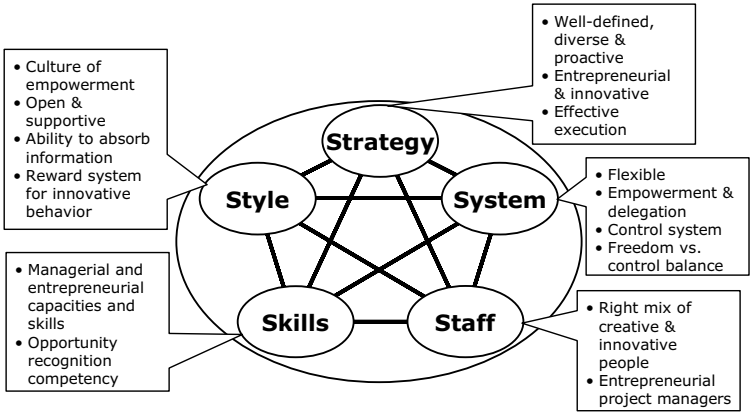

Figure 1-4: '5 Ss' dimensions and descriptions (Zhao 2005)

Especially regarding the necessary skills, Zhao (2005) gives a comprehensive summary, according to which such persons need:

- "the ability to search for and identify innovative opportunities;
- a proactive attitude to the promotion of innovation through a strategic vision;
- the ability to create a cultural environment that fosters innovation and entrepreneurship;

- the ability to develop effective plans to implement innovation and commercialization procedures;
- the ability to integrate research, design, and market information to convert new ideas and inventions into commercially viable innovations;
- and the ability to develop effective and realistic procedures for the evaluation of R&D projects in terms of innovation, quality, and commercial value" (p. 38).

The approach includes all organizational levels and units, and the detailed description of each dimension helps to understand the tasks and challenges within them. However, Zhao (2005) himself describes his model as a starting point for further considerations. The author does not show a real model of innovation and entrepreneurship, but several possible dimensions for consideration. Additionally, the introduced five dimensions have no clear boundaries and include no implementation suggestions.

1.3.1.3 McFadzean et al. (2005) and Shaw et al. (2005)

Based on analyses of different innovation models in the context of corporate entrepreneurship, McFadzean et al. (2005) propose their own holistic view of innovation (see Figure 1-5).

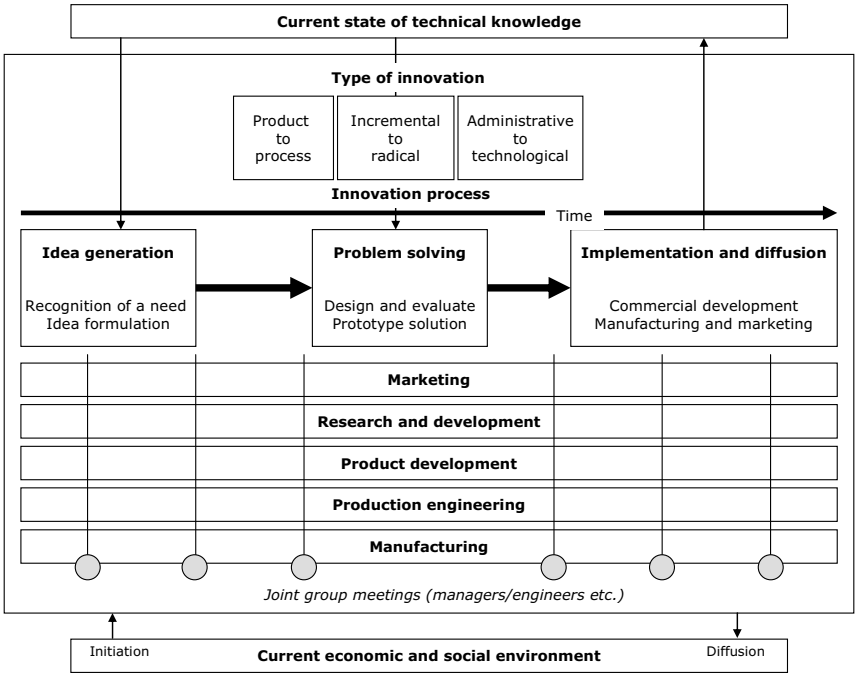

Figure 1-5: Synthesized model of innovation (McFadzean et al. 2005)

Their starting points are the indirect interaction between the current economic and social environment as well as the direct interaction with the current state of technical knowledge. Depending on the kind of innovation, different types of innovation processes are started. At the beginning, there is the idea generation phase followed by the problem solving phase and the final idea implementation and diffusion stage. Simultaneously, the project management is organized via joint group meetings of all various functional departments.

Based on that understanding of innovation, they make an attempt to link entrepreneurship with innovation, as they noticed a current gap between the process, innovation, and the entrepreneur (see Figure 1-6).

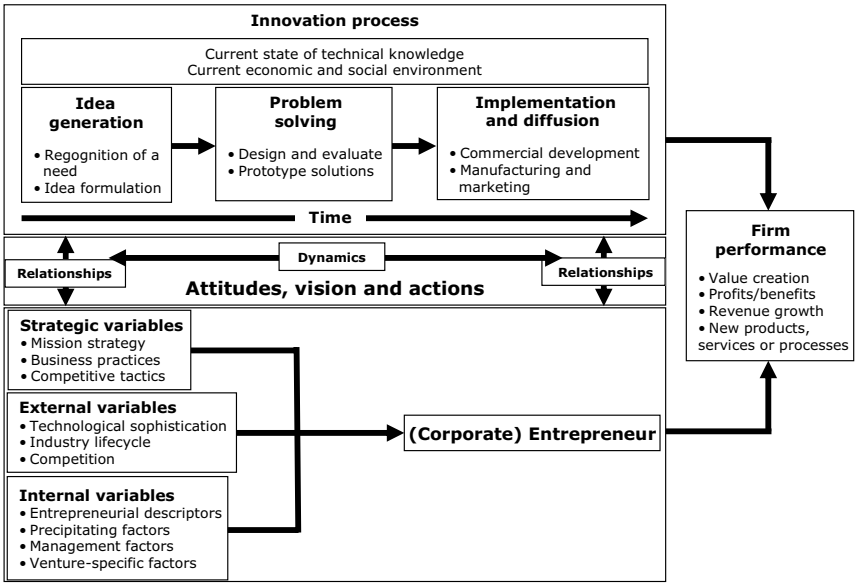

Figure 1-6: Linking entrepreneurship with innovation (McFadzean et al. 2005)

Hence, McFadzean et al. (2005) classify company performance dependent on the innovation process and the variables of an entrepreneur. They rate especially the mentioned attitudes of an entrepreneur as an essential factor in comprehending the link between entrepreneurship and innovation because these strategic, external and internal variables determine the later company performance, as they cover all innovation-related issues. Through attitudes, visions and actions, relationships and interactions between both areas are built.

Another paper of Shaw et al. (2005) describes this approach on a more detailed level. They differ between two different levels of entrepreneurship and innovation, the first one being the macro-model (see Figure 1-7).

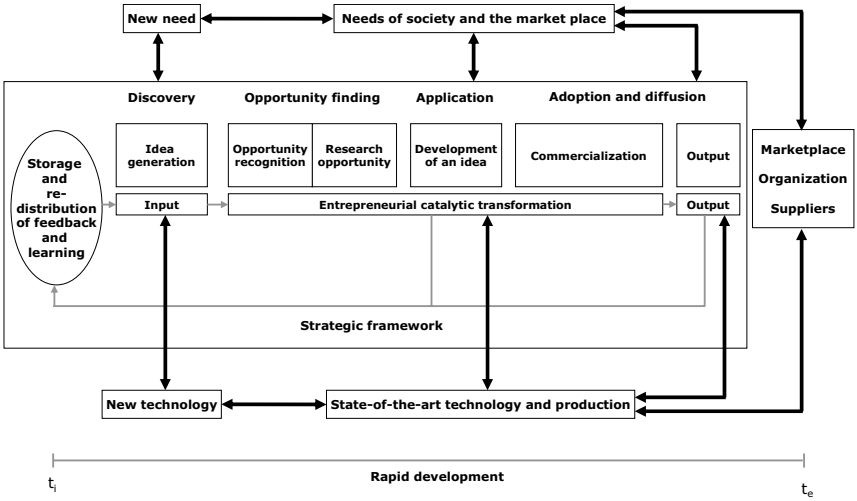

Figure 1-7: The macro-model of entrepreneurship and innovation (Shaw et al. 2005)

The macro-model especially focuses on the environmental drivers of innovation: society needs, new technological advances as well as frequency and rate of innovation development.

Thus, the process starts with the drivers of innovation following the technology push/market pull paradigm with a new need and/or a technology. Consequently, the interaction of both factors influences the market place and its participants. After the idea generation, the innovation process begins with two distinct stages, opportunity recognition and research and evaluation of the recognized opportunities. Subsequently, the development of the idea takes place in the application phase, which will be discussed in more detail within the micro-model. The following phases of commercialization and diffusion are decisive for the innovation success, and lead to both new market and new technological knowledge, which is further input for new innovations. However, only a lasting interdivisional exchange and use of knowledge assures constant impulses for new innovations (Miller et al. 2007). Finally, due to the increased pace of change within the market place, the rapid development time bar shows the high importance of timing in this context.

The micro-model of entrepreneurship and innovation highlights the important factors that emphasize the entrepreneurship and innovation processes to show how innovation can be successfully managed in an envi-

ronment of high risk and uncertainty, divided in five basic categories: inputs, entrepreneurial catalytic transformation, outputs, contextual factors, and relationships between the various elements (see Figure 1-8).

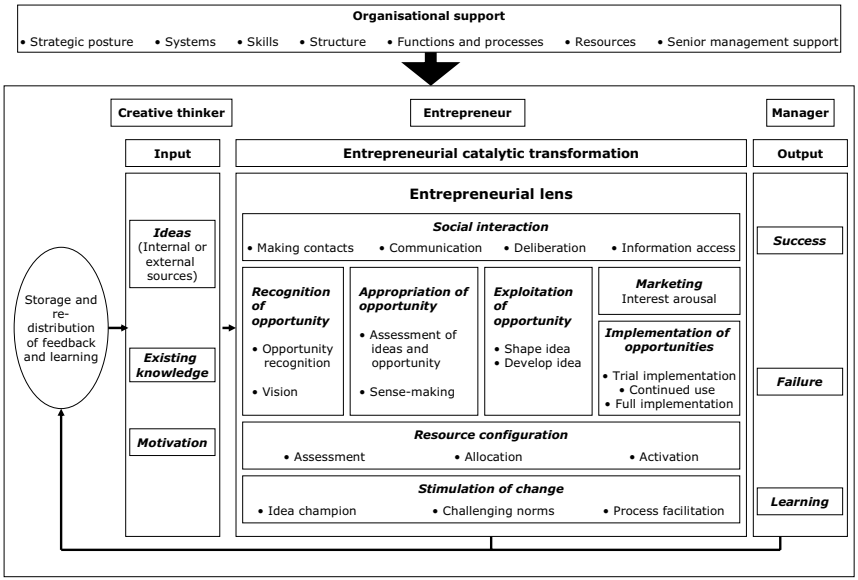

Figure 1-8: The micro-model of entrepreneurship and innovation (Shaw et al. 2005)

In the input phase, the main trigger is creativity, as it assists in the emergence of new and novel ideas that will open and support the whole innovation process, especially the 'birth' of an idea (Cumming 1998). The entrepreneurial catalytic transformation is the area of the entrepreneurial point of view to push creative ideas. The entrepreneur's task is to permit certain processes and information to pass through, but to stop others at the same time. This procedure is necessary, as a promoter who proactively manages the whole process is essential for a successful innovation process. Within this entrepreneurial lens, the entrepreneur's abilities of opportunity recognition, appropriation and exploitation are required. Hence, the lens acts as a focal point, performing a convergent activity and bringing together the inputs for later innovations. Therefore, it allows various ideas to pass through as well as discard others and transforms strategic opportunities into commercialized outputs through creative work. Finally, during the marketing and implementation of opportunities, interest arousals, trial implementations, continued use and full implementa-

tions take place, with the goal of leading towards implementation and enabling creative transformation, forming value-added outputs, and finally commercializing opportunities.

Social interaction is a central feature of the entrepreneurial process as it creates a situation for the successful exchange of information and resources, which leads to reduced uncertainty. The resource configuration is important as it includes required elements like individuals, funds, available time, etc. A stimulation of change is required to manage and monitor the transformation phases ensuring optimization and entrepreneurial orientation. However, these stimulations are an enduring challenge, as "organizations are not meant to change" (Smith et al. 1982, p. 276).

The process output consists of success and failure as well as learning aspects, if they are useful and appropriate. In any case, further learning should lead to improved knowledge for future innovative activities.

An organizational support structure belongs to the contextual factors, which are supposed to provide the flexible conditions conductive for innovation.

These introduced approaches by McFadzean et al. (2005) and Shaw et al. (2005) are already theoretical proved, and their differentiation between macro and micro level can be found in other papers as well (e.g. Dunphy et al. 1996). Nevertheless, they focus almost solely on corporate entrepreneurship activities, and therefore neglect all other kinds of entrepreneurial behaviour. In this context, no suggestions for (internal and/or external) implementation of innovative ideas are integrated. Furthermore, the necessary different roles within the innovation process are not further explained.

Hence, further research is needed to show all correlations between innovation and entrepreneurship.

1.3.1.4 Other models

As stated, the introduced models are not all approaches that exist in this field. Other authors come from closely connected areas as knowledge management, R&D management, etc., for example an approach from Burton (1999). Thus, competitive or collaborative advantages are based on successful innovations, which are results of knowledge creation, knowledge protection, and diffused entrepreneurship. As this approach offers no

further insights for the combination of both areas, there will not be any supplementary explanations at this point.

Ireland et al. (2006) write from a corporate venturing point of view, deriving a framework for sustainable corporate entrepreneurship. Especially their emphasis on the importance of structure and culture is remarkable, as for instance, culture is one of the main success factors for innovative and strongly growing companies (Riedesel 2007). In this context, Herbig et al. (1994) note that innovation is mainly driven by the complex interaction between structure and culture, but only the concurrent presence of both factors makes it working. This model is very detailed, but because of its sole focus on entrepreneurs themselves, it is not relevant in a further development of a holistic innovation and entrepreneurship model.

An interesting methodology is from Carson and Tuder (1979), who introduced a three-stage model of new product development with the stages of opportunity search, new product development and commercialization. Especially in the opportunity search phase, they highlight the importance of entrepreneurial orientation and entrepreneurial teams. But as they limit their research only to the area of product development, there will be no further discussions in detail.

1.3.2 Introduction of Further Theoretical Framework Components

As mentioned before, there is further research needed in order to provide a comprehensive approach of innovation and entrepreneurship, in addition to the already introduced models. Based on criticism of these models and other missing aspects, in the following selected approaches and theories will be presented as input for the later new framework. In this context, several questions remain unanswered:

- What kind of strategy alternatives can be distinguished in general?
- What are the critical functions in the innovation process, and how can they be solved?
- What options does an organization have to realize their ideas?

Hence, particular relevant approaches will be presented.

At the beginning, generic strategy alternatives from Mintzberg and Waters (1985) will be taken into consideration (see Figure 1-9).

Strategy	Major features
Planned	Strategies originate in formal plans: precise intentions exist, formulated and articulated by central leadership, backed up by formal controls to ensure surprise-free implementation in begin, controllable or predictable environment; strategies most deliberate
Entrepreneurial	Strategies originate in central vision: intentions exist as personal, unarticulated vision of single leader, and so adaptable to new opportunities; organization under personal control of leader and located in protected niche in environment; strategies relatively deliberate but can emerge
Ideological	Strategies originate in shared beliefs: intentions exist as collective vision of all actors, in inspirational form and relatively immutable, controlled normatively through indoctrination and/or socialization; organization often proactive vis-à-vis environment; strategies rather deliberate
Umbrella	Strategies originate in constraints: leadership, in partial control of organizational actions, defines strategic boundaries or targets within which other actors respond to own forces or to complex, perhaps also unpredictable environment; strategies partly deliberate, partly emergent and deliberately emergent
Process	Strategies originate in process: leadership controls process aspects of strategy (hiring, structure, etc.), leaving content aspects to other actors; strategies partly deliberate, partly emergent (and, again, deliberately emergent)
Unconnected	Strategies originate in enclaves: actor(s) loosely coupled to rest of organization produces(s) patterns in own actions in absence of, or in direct contradiction to, central or common intentions; strategies organizationally emergent whether or not deliberate for actor(s)
Consensus	Strategies originate in consensus: through mutual adjustment, actors converge on patterns that become pervasive in absence of central or common intentions; strategies rather emergent
Imposed	Strategies originate in environment: environment dictates patterns in actions either through direct imposition or through implicitly pre-empting or bounding organizational choice; strategies most emergent, although may be internalized by organization and made deliberate

Figure 1-9: Types of strategy alternatives (Mintzberg and Waters 1985)

The authors show all different kinds of strategy with the corresponding major features on a continuum between 'planned' and 'imposed'. Obviously, these are extreme positions of possible strategic options. An emergent strategy must not implicate that management is out of control, only that it is willing to learn. Emergent strategies also enable a management that cannot appraise a certain situation or which does not know enough about the varied activities of its organization, to surrender control to those who have the information current and detailed enough to shape realistic strategies. Especially when it comes to corporate innovation strategy, these strategy alternatives need to be kept in mind.

Moreover, critical functions within the innovation process need special attention. For this, Roberts and Fusfeld (1981) give a good overview of functions, personal characteristics, and organizational activities (see Figure 1-10).

Critical Function	Personal Characteristics	Organizational Activities
Idea Generating	Expert in one or two fields. Enjoys conceptualization; comfortable with abstractions. Enjoys doing innovative work. Usually is an individual contributor. Often will work alone.	Generates new ideas and tests their feasibility. Good at problem solving. Sees new and different ways of doing things. Searches for the breakthroughs.
Entrepreneuring or Championing	Strong application interests. Possesses a wide range of interests. Less propensity to contribute to the basic knowledge of a field. Energetic and determined; puts self on the line.	Sells new ideas to others in the organization. Gets resources. Aggressive in championing his or her "cause". Takes risks.
Project Leading	Focus for decision making, information, and questions. Sensitive to the needs of others. Recognizes how to use the organizational structure to get things done. Interested in abroad range of disciplines and in how they fit together (e.g. marketing, finance).	Provides the team leadership and motivation. Plans and organizes the project. Insures that administrative requirements are met. Provides necessary coordination among team members. Sees that the project moves forward effectively. Balances the project goals with organizational needs.
Gatekeeping	Possesses a high level of technical competence. Is approachable and personable. Enjoys the face-to-face contact of helping others.	Keeps informed of related developments that occur outside the organization through journals, conferences, colleagues, other companies. Passes information on to others; finds it easy to talk to colleagues. Serves as an information resource for others in the organization (i.e. authority on who to see or on what has been done). Provides informal coordination among personnel.
Sponsoring or Coaching	Possesses experience in developing new ideas. Is a good listener and helper. Can be relatively objective. Often is a more senior person who knows the organizational ropes.	Helps develop people's talents. Provides encouragement, guidance, and acts as a sounding board for the project leader and others. Provides access to a power base within the organization – a senior person. Buffers the project team from unnecessary organizational constraints. Helps the project team to get what it needs from the other parts of the organization. Provides legitimacy and organizational confidence in the project.

Figure 1-10: Critical functions in the innovation process (Roberts and Fusfeld 1981)

Especially the dimensions gatekeeping and sponsoring/coaching are not considered within existing models yet. But as the goal is to have a continuous innovation process, these categories need to be included in a holistic approach. Similar roles are suggested by Martin (1994) as well: Idea generator, technological gatekeeper, champion, leader, market gatekeeper, and coach.

Finally, entrepreneurs within large organizations must have different options for realizing their ideas on their disposal, sometimes called "incubator organization" (Martin 1994, p. 289). In this context, Burgelman (1984) offers an organizational design for corporate entrepreneurs, which differs several options with the dimensions operational relatedness and strategic importance (see Figure 1-11).

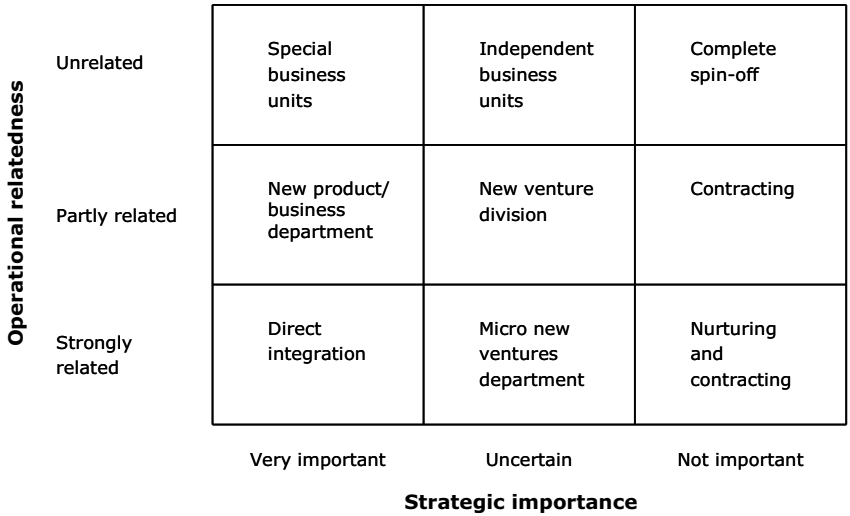

Figure 1-11: Organization designs for corporate entrepreneurship (Burgelman 1984)

Hence, all alternatives between a direct integration into a functional area as well as a complete spin-off are possible. Especially new venture divisions or spin-offs are very popular and successful strategic options within large corporations (Voigt et al. 2006c).

A step further goes a typology from Linz (2001), who strictly differs between external and internal venture alternatives (see Figure 1-12).[11]

[11] Because of page restrictions, the typology will be shortly introduced. For a detailed description of each alternative see Linz (2001), p. 166-174.

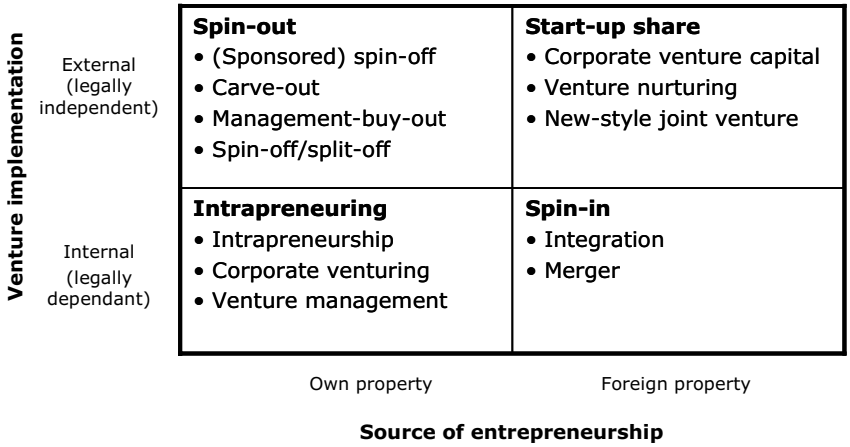

Figure 1-12: Typology of different venturing alternatives (Linz 2001)

Linz (2001) distinguishes between the legal status (dependent vs. independent) and between the company's property and foreign property. Therefore, ideas can be implemented through internal entrepreneurial activities, and in addition, through external entrepreneurial resources. According to this, the latter option is close to a kind of 'innovation outsourcing'. This is an important point, as therefore, the commercialization of innovation does not always need to be conducted internally, but can be 'bought' externally as well.

Spin-out describes an organizational and legal autonomization. Criteria for such a step are lacking strategic fit of the idea, high risk and higher potential for external growth.

The alternative of a start-up share is like a capital investment, with financial as well as strategic aims. The advantage here is that the commitment of the investor can be modified, depending on the venture's financial and strategic performance.

The main goal of an intrapreneuring strategy is to motivate and integrate own employees. The special attention paid to individuals within the process is a very important issue, because it is less likely that a person who develops an idea or invention which looks commercially promising, will exploit it within their current organization. They are more likely to set up a company on their own to open the corresponding market (Martin 1994).

Moreover, negative drivers like fear of criticism, feeling of futility and lack of intention in the organization enforce these effects (Bower 1971). Hence, it is essential to offer such individuals equal and valuable alternatives within the existing company to avoid unintentional spin-offs because of frustration or dissatisfaction.

Finally, spin-in is the complete converse option to a spin-out. In this case, a formerly legally independent company is integrated into the main organization unit, mostly through an acquisition.

Which one of these options is more appropriate for a company or an individual needs to be decided in the corresponding specific context. For this, Figure 1-13 offers a comprehensive view of both approaches by Linz (2001) and Burgelman (1984).

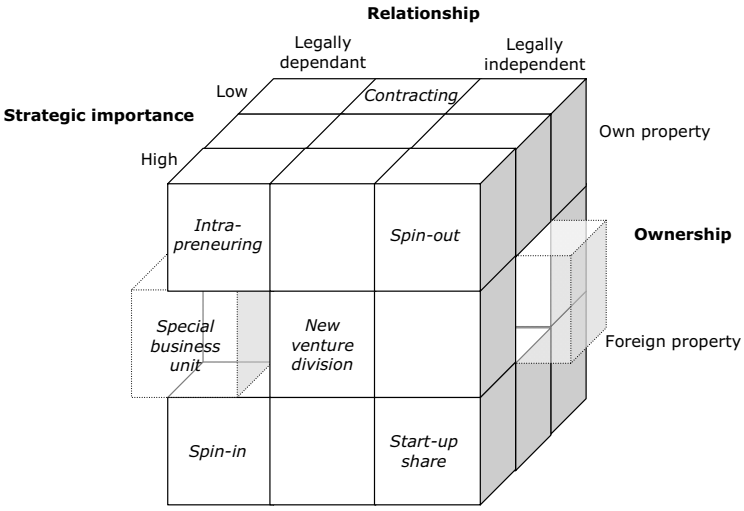

Figure 1-13: Comprehensive view of organizational implementation alternatives

For this, different criteria are needed, which can be combined within three dimensions: Ownership (idea is own or foreign property), importance (high to low strategic importance), and relationship (legal status). Based on that, a decision regarding organizational implementation must be made, with the concurrent alternatives. For example, an idea with own property rights, high strategic importance, and with a desired legal independent status, should be realized with a spin-out. So dependant on the individual rating of the dimensions, other alternatives may apply. In this

context, the suggested dimension 'operational relatedness' by Burgelman (1984) was not considered, because within this framework, especially radical or 'breakthrough' ideas shall be taken into account. And facing the nature of these ideas, they are often not very strong or even not at all related to the current operational processes.

However, further empirical research is needed to exactly determine which strategy option fits best with regard to the individual dimensions. Moreover, detailed implications for corporate strategy, depending on the choice of a certain alternative, need to be framed.

1.3.3 Derivation of Innovation and Entrepreneurship Framework Components

In this chapter, an own framework for the relationship between innovation and entrepreneurship will be derived and presented.

All introduced models already mention the process orientation of entrepreneurial and innovative activities, which is anticipated in literature as well (e.g. Russell 1999). Thus, this process focus will be used for further considerations as well.

1.3.3.1 Organizational Embedding

First of all, the author's view of the organizational embedding of the innovation process will be shown.

Successful innovation requires organizational structures which provide both the freedom to be innovative and at the same time the discipline to turn good ideas into commercial success (Fairtlough 2000). So far, there has been no model integrating the entrepreneurial activities within the corporate value chain. Based on Porter (1985), the starting point for innovative and entrepreneurial activities within the organization is technology development as a supportive activity, whereby technology development can be equated with both R&D or innovation management. The underlying innovation process consists of the phases idea management, opportunity recognition, research opportunity, idea development and commercialization (as introduced by Shaw et al. 2005) and diffusion (as introduced by McFadzean et al. 2005). Hence, commercialization is the real implementation of the idea, with the first contact to customers and markets. However, the diffusion phase comprises the mid to long term establishment of the new product, process or company (see Figure 1-14).

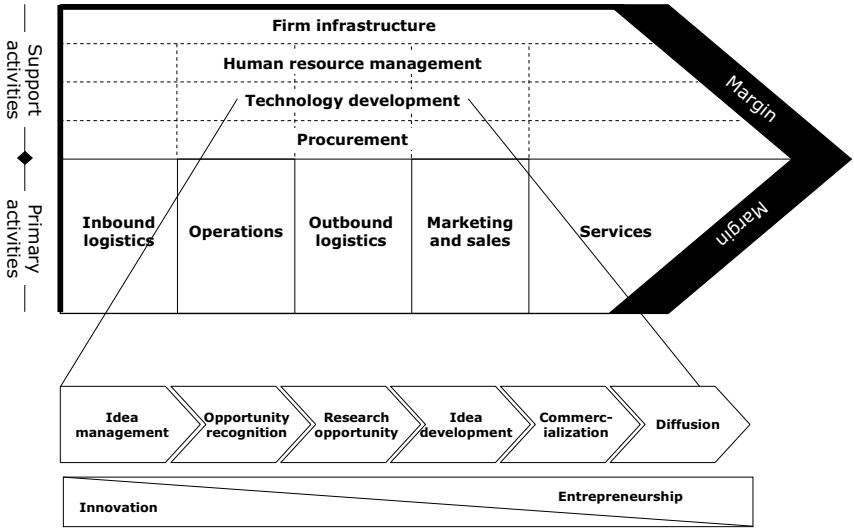

Figure 1-14: The innovation process in context of the corporate value chain

Within the evolution of the single process phases, there is an ongoing shift from innovation to entrepreneurship. At the beginning, the focus is on idea management, later – as the spotlight goes more in the direction of commercialization and diffusion – entrepreneurship gets more into the spotlight. Nevertheless, no single point can be located at which innovation moves into entrepreneurship – it is rather a fuzzy and partly parallel-running process. After this general classification of the innovation process within the corporate value chain, a detailed view on the idea- and innovation process will be shown in the following.

1.3.3.2 Introduction and Linking of Framework Components

Based on the classification of the innovation process in the context of the corporate value chain, progress and environment of the entire process will now be discussed in detail.

Pascale and Athos (1981) explain that innovative companies are characterized by a style of management that is open to new ideas, novel ways of handling staff that encourage innovation, modern systems that are customer-focused and which reward innovation, and finally excellent skills at translating ideas into action. In order to achieve this goal, a holistic framework of innovation and entrepreneurship will be introduced. For this, each component of the framework will be presented in the following.

The origin of the whole process is an environmental change, as described by Brazeal and Herbert (1999) (see Figure 1-15).

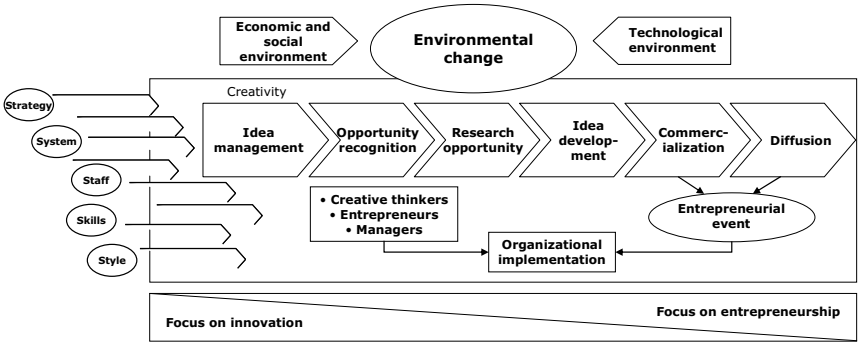

Figure 1-15: Process-based innovation and entrepreneurship approach

Such a change can either be caused by the economic and social environment or by the technical environment, which all must be ongoing monitored and rated (Lembke 1980; Gibson 1981; Martin 1994). In this context, technological knowledge is primary screened by R&D and market knowledge by marketing and sales (Twiss 1992). These changes are certain impulses from the market or technology side to initiate the innovation process, which starts with the phase of idea management (Kobe 2003; Lühring 2003). Therefore, a main factor is creativity in order to create new product and process innovations (Davis 1983; Cumming 1998). Once again, the shift goes from the focus on the innovation to the focus on entrepreneurship. The final point of the innovation process is the entrepreneurial event: After successful completion of the idea development and review, the commercialization starts with the first introduction into the market. The subsequent diffusion phase is designated for the establishment in the market.

Besides external environmental factors, the framework is surrounded and strongly influenced by the internal organization as well. In this context, the '5 Ss' from Zhao (2005) can be applied: strategy, systems, staff, skills, and style. All these dimensions permanently influence the innovation and entrepreneurial processes, as they determine the way and the intention of which all introduced activities are implemented.

The entrepreneurial event itself does not always happen at a specific point in time. It strongly depends on the organization and their environment. Hence, the entrepreneurial event is triggered by the commercialization and diffusion phase. So, once a company decides to realize an idea, appropriate mechanisms and organizational designs need to be specified (Afuah 1998). Therefore, final organizational implementation of the idea depends on several factors, for example the:

- Kind of idea (process, product, etc.),
- current market environment,
- organization structure,
- or market environment.

In this context, several factors are crucial for further decisions regarding the organizational implementation, again namely strategy, systems, staff, skills, and style (Zhao 2005). Depending on changes in one of these categories, totally different results can be obtained. For example, a new product idea can fulfill all requirements like high profitability, excellent technical feasibility, etc., but if it does not fit into the strategy of the company, it will not be an option to develop this product in-house. However, such a background could favour a decision for a later spin-off or joint venture with another company. So ultimately, it is the same dilemma as with other make-or-buy decisions, with all the corresponding complexity (Brem 2007).

Taking a closer look on the organizational design for the realization of ideas, it must be decided which strategic aim will be pursued with the implementation of the idea. Following Linz (2001), different venturing strategies are suitable depending on criteria like 'quality of the business plan' or 'capability of the business idea', all based on a 'stage gate process'. For this, the presented comprehensive view of organizational implementation alternatives (see Figure 1-13) can be used.

Other important factors are the idea contributor and the other involved persons (staff), as they do not only face the organizational pressure (lacking support, access to information, etc.), but also environmental pressure (non-supportive government policy, patent protection, etc.) (Whitfield 1975).

Because of their essential role within the whole process (Smith 2007), other kinds of implementation alternatives must be taken into considera-

tion depending on the different alternative design possibilities. The most extreme decision would be to found a new, external company (spin-off). For this, a person or team with real entrepreneurial attitude and motivation is needed. If future management only consisted of 'creative thinkers', the probability for long-term success would be rather low. In this context, research shows that there is a huge difference between entrepreneurs and managers (e.g. Stewart and Roth 2007). Hence, these persons must match the different existing and desired roles within the company. This searching and matching is important as Howell and Higgins (1990) found that risk-taking propensity and innovativeness are characteristics of champions of technological innovation, and that particular personality traits predispose some individuals to emerge as a promoter of innovation in organizations – and others do not.

The different roles and tasks within the innovation process need to be discussed with the introduced entrepreneurial background. In order to match the desired organizational functions with the 'right' people, there is a need for a conceptual linking (see Figure 1-16).

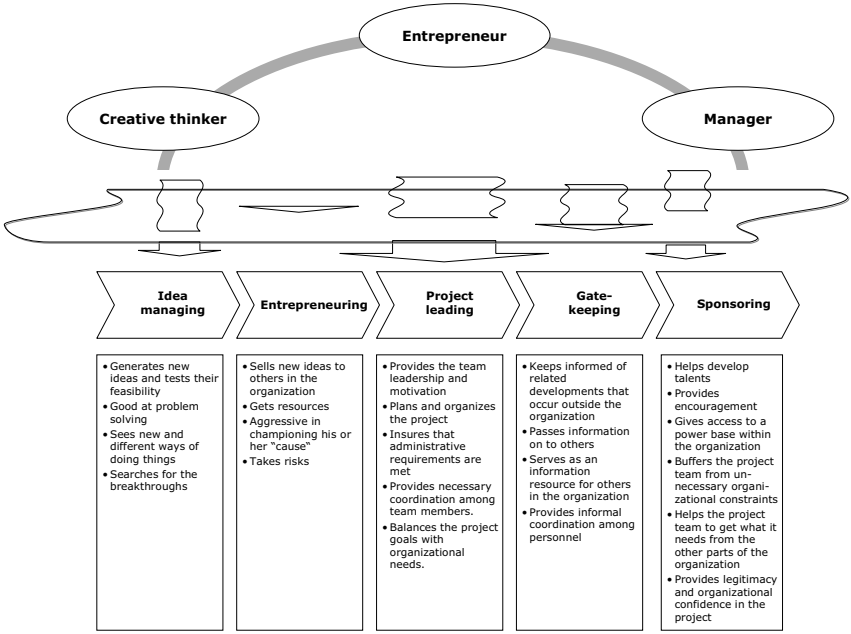

Figure 1-16: Personal roles in the innovation process and their descriptions

Therefore, the corresponding tasks to the introduced innovation process are idea managing, entrepreneuring, project leading, gatekeeping and sponsoring (following Roberts and Fusfeld 1981; Hauschildt and Salomo 2007; Maidique 1980; Twiss 1992). Clear assignments for each role cannot always be made, hence, the arrows are not straight ahead, but waved, i.e. each task can belong to different roles and to certain extents. Moreover, the roles are potentially changing in the course of time as well (Maidique 1980).

The appropriate 'mix' of resources must be determined in dependence of the corporate's internal and external environment, and, of course, depending on the 'quality' of the available resources and their commitment to the company (Salancik 1982; Twiss 1992). To achieve such a desired mix of people, an appropriate training for skill development and career progression is needed on the one hand, and a strategic encouragement of diversity in both people and their work to express their potential on the other hand (Mumford 2000). But organizations can only benefit if perceptions and beliefs about innovation are explicit and volitional (Storey 2000).

In this context, the way of strategy making and thinking is a critical factor for success. So, depending on the way of strategic thinking – according to Mintzberg and Waters (1985) there is a wide range from imposed to planned – different kinds of organizational designs may be applied. This is not only true for the specific tasks and roles within the organizational resources, but also for the innovation and entrepreneurship framework itself.

However, several general criteria must be considered as well: the individual's expertise, the choice of location, the maturity of the industry, the size of the incubator company, innovation and entrepreneurship financing and the personal motivation factors (Afuah 1998; Martin 1994). This is necessary, as for instance, already the location decision can already have a strong influence on the later growth and success of the company (Voigt et al. 2006b). Although these general criteria are of importance, their special roles cannot be part of the following reflections due to otherwise even more increased complexity.

1.3.4 Consolidation to a Framework and Limitations

After the discussion of relevant terms and definitions, recent approaches were introduced. In the following, the most important aspects will be consolidated to a single framework. For a comprehensive view of this framework see Figure 1-17.

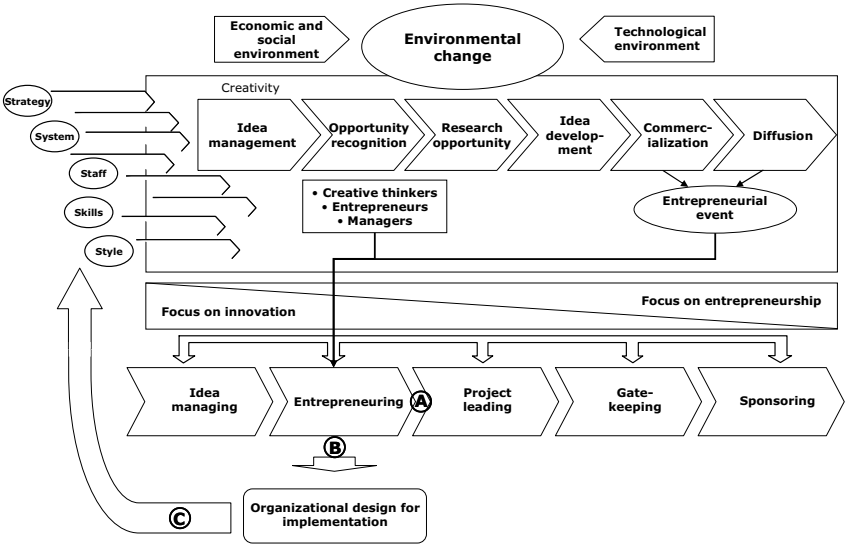

Figure 1-17: Innovation and entrepreneurship framework

On the one hand, triggered by environmental change, the corporate innovation process begins with idea management and ends with the diffusion phase. On the other hand, the innovation process entails certain task, namely managing ideas, entrepreneuring, project leading, gatekeeping and sponsoring. However, both areas do not always occur concurrently, but partly parallel and overleaping.

The combination of an 'entrepreneurial event' with the current kinds of human resources leads to a management decision, if the idea is supposed to go into the standardized product or process development, or will be implemented by entrepreneurial activities.

In the first case ('A'), the idea proceeds with the tasks of project leading, gatekeeping and sponsoring. If the entrepreneurial way is chosen ('B'), the further organizational design for implementation depends on the re-

source situation of the company (e.g. human and financial resources). The ultimate choice can be made by use of the comprehensive view of organizational implementation alternatives (see Figure 1-13).

The left back-arrow ('C') signalizes the opportunity for a later integration of the venture into the company, or at least the partnership for further idea input, combined with future environmental changes and 'entrepreneurial events'. In this context, the person or team of the new venture is in the focus, as their experience and know-how can be utilized for future innovation projects and ventures.

Based on the introduced different understandings of terms and definitions, no simple and generally accepted model or framework can be derived. So, in general, it is always a particular composition of several selected aspects, and depending on the view of the reader, other important factors are not included.

Moreover, the presented research is mainly focused on organizational issues at the corporate management level. Still, this structure alone cannot guarantee later success (Twiss 1992), as other aspects, such as creativity and corresponding methods, are not included in detail yet. The same applies for other related areas like the choice of a specific dimension, or the 'right' selection of an explicit alternative within a special combination of surrounding factors.

The central restriction concerns the fact that the framework and its components are based on other theoretical and partly empirical work, so there is no specific qualitative or quantitative proof for each characteristic yet.

However, these limitations are not surprising as this is the first attempt to gather all recent work in this area and link it with a framework of directly relating innovation and entrepreneurship. For this, the following chapters will give further theoretical and empirical insights into selected areas.

1.4 Linkage to Chapters

"The quality of a new theory should be judged based on its ability to suggest new interpretations of previous research and its ability to offer productive new directions for future studies" (Ford 1996, p. 1133). In this light, some aspects of the introduced model will be further researched. For this, quantitative and qualitative research methods were applied, depending on the specific objectives of the chapter (Blumberg et al. 2005).

To get an overview of the thematically linked chapters, Figure 1-18 shows the classification within the presented framework.

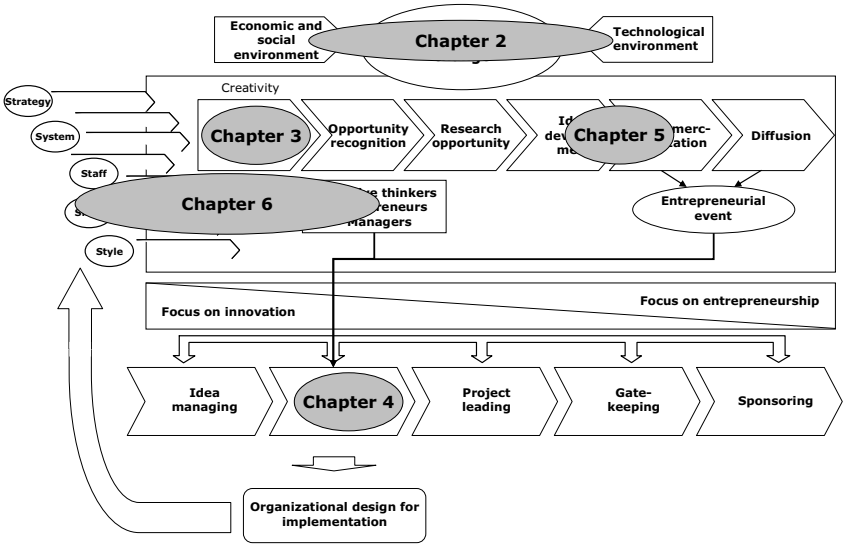

Figure 1-18: Classification of the chapters in the innovation and entrepreneurship framework

Many of the problems innovations are confronted with can be traced to weaknesses especially in the early process phases (Bessant and Tidd, 2007). "Successful innovations are based upon the combination of demand pull and technology push" (Hauschildt 2004, p. 11). Thus, the **second chapter** deals with the integration of market pull and technology push activities in the innovation process, based on a case study in the German software industry. Hence, this chapter is thematically on the interface between the economic and social environment and the technological environment within the framework. The results indicate that a balanced and active integration of both views is essential for future innovation successes.

Innovation management and the 'right' choice and combination of corresponding methods are important success factors to successfully translate ideas into products and monetary success (Rammer et al. 2005). Especially in young and growing companies, there are several promising starting points for a sustainable integration of idea and innovation manage-

ment within corporate strategy. Hence, the **third chapter** is about innovation management in emerging technology ventures as an example of a successful linkage between idea management and innovation. Therefore, it corresponds with the first phase of the innovation process within the framework. This chapter's empirical part consists of qualitative research results focused on emerging technology ventures and shows the possible impact of an integrated idea management approach.

The **fourth chapter** deals indirectly with the introduced 'entrepreneurial event': Is there a gender-related difference in founding intentions? Based on quantitative research, this part shows the importance of entrepreneurial education for later 'entrepreneurial-thinking' people, as the entrepreneurial intention is higher within both females and males through focused entrepreneurship education at universities. Thus, this chapter is established at the framework's task of entrepreneuring.

After a new product or process is developed, the next critical decision is the timing and the alternative roles of a market entry (Maidique and Patch 1982). Therefore, within the **fifth chapter**, important aspects of time-to-market issues are discussed, resident at the framework's interface between idea development and commercialization. Some empirical evidence from the automotive supplier industry illustrates the boundaries of pioneer vs. follower advantages and disadvantages. The corresponding findings can be used to better rate and plan the different alternatives of organizational implementation resulting from innovative activities and the later successful market diffusion.

Finally, the **sixth chapter** addresses the challenge to establish a persistent entrepreneurial behaviour in organizations. This is important because the profits from innovations are usually only temporary, until other companies realize how profitable the innovation is and imitate it (Afuah 1998). Moreover, only being innovative is no guaranty for enduring competitive advantages (Vidal 1995). This is accomplished by the example of serial entrepreneurs, as they illustrate the 'best case' of a future employee or business founder, as such a person continuously searches for new innovations and opportunities of realization. Through these research results, corresponding conclusions can be drawn how to adapt this for other organizational units as well. For this reason, that chapter has the framework's role

of recognizing people and establishing continuous entrepreneurial activities.

2. Pull vs. Push – Strategic Technology and Innovation Management for a Successful Integration of Market Pull and Technology Push Activities

2.1 Introduction

"The worldwide scenario nowadays is characterized by phenomena of enhanced frequency of innovations, the shortening of techno-economic life cycles, the rapid generation and commercialization of new technologies and the outbreak of strategic alliances between large firms" (Dias and Bresciani 2006, p. 28). Hence, innovations can be seen as the key factor for the success of a company (Gerybadze 2004), whereby a single successful innovation is no guaranty for enduring competitive advantages anymore (Vidal 1995).

Consequently, organizations and businesses have recognized the need for finding new methods and paradigms to efficiently serve existing and new markets with new and/or modified products as well as services (Ansoff 1965). Thus, the changing global environment is compelling organizations and businesses to permanently seek for the most efficient models to maximize their innovation management efforts (Christiansen 2000). As innovation is a responsibility of all business units and departments, their involvement needs to be determinated accordingly (Tucker 2002), especially because only interdepartmental collaboration promises high innovation performance (Kahn 2005). In this context, an organization's ability to identify, acquire, and utilize external ideas can be seen as a critical factor as regards its market success (Zahra and George 2002).

Technology and technology-oriented companies, especially in the business-to-business area, are traditionally more influenced by new technologies. However, companies in the business-to-consumer sector focus more on end-user and, therefore, market-induced impulses. The related scientific discussion regarding the 'right' innovation management and especially the 'best' source of innovation is similar to the question whether the chicken or egg came first. There are several examples of successful technology-oriented companies as well as market-oriented ones. Therefore, the question is if there is a practicable way to combine both views or even extend them with other related factors.

To get a deeper insight into these topics, the theoretical background will show the current status of the discussion and close with a conceptual framework. Empirical findings will be added by means of a case study, how a German company handles these issues.

2.2 Theoretical Background

2.2.1 Conceptual Classifications

To build a common understanding of market pull and technology push activities, some fundamental considerations will be introduced.

Dealing with technology means to handle different stages of research and consequently, special management duties and responsibilities (see Figure 2-1).

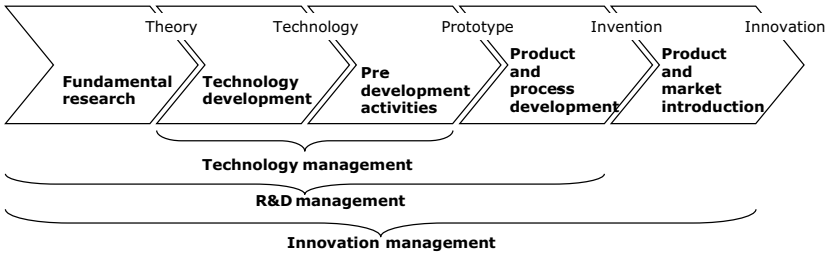

Figure 2-1: Classification of technology, R&D and innovation management (Specht 2002)

Following Specht (2002), the stages of technology development and predevelopment activities belong to technology management. Adding upstream fundamental research and product and process development, the field of R&D management is determined. Finally, innovation management includes additionally the product and market introduction phase. Thus, the innovation management can be defined as "a systematic planning and controlling process, which includes all activities to develop and introduce new products and processes for the company" (Seibert 1998, p. 127) or in short, the dispositive constitution of innovation processes (Hauschildt 2004). Following Thom (1980), these innovation processes can be divided into the stages of 'idea generation', 'idea acceptance', and 'idea realization' (see Figure 2-2).

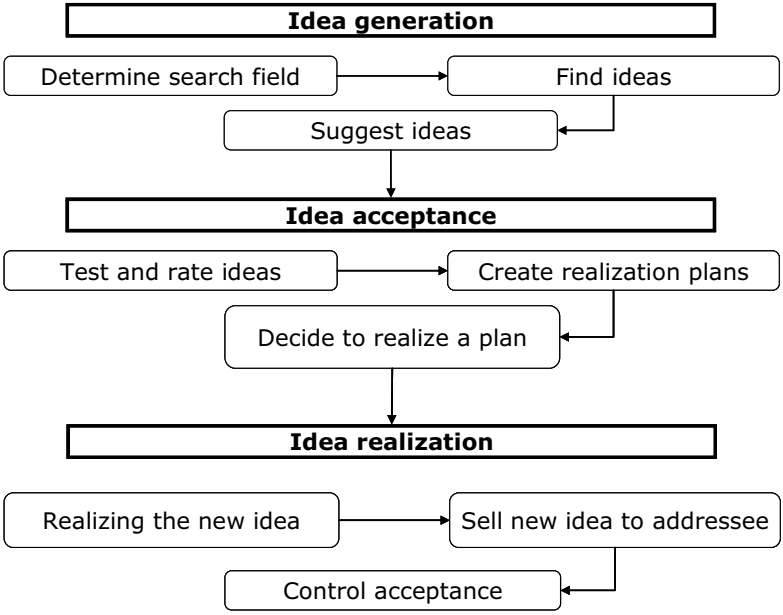

Figure 2-2: Standardized stages of the corporate innovation process (Thom 1980)

Obviously every innovation is based on an idea from inside or outside the company (Boeddrich 2004). To obtain a maximum number of innovative product and process ideas, a holistic view of the innovation process is needed. Hence, the basic approach of Thom (1980) is to collect as many promising ideas as possible; therefore, especially the determinations of the search fields are critical to the whole innovation process. By defining the individual user needs and the current product value, for instance, search fields can be identified (Burgelman et al. 2004). The idea acceptance phase consists of several stages, which the ideas have to pass and where they are enriched (Cooper 2005). When realizing the selected ideas, it is important to choose efficient ways of saving resources (Aeberhard and Schreier 2001). The final success of an idea management strongly depends on the right process structure for the different kinds of ideas and the corresponding adequate organizational implementation (Voigt and Brem 2005b), as successful products and processes are needed as the vehicle through which ideas become effective (Drucker 1964).

2.2.1.1 Fuzzy Front End of Innovation

For further considerations, the understanding of the Front End of Innovation (FEI) plays an important role. Therefore, FEI will be defined and some recent approaches will be introduced.

The term '(fuzzy) front end' describes the earliest stage of an idea development and includes all time spent on an idea as well as activities focusing on strengthening this idea, prior to a first official discussion of an idea (Reid and Brentani 2004). Wellsprings for ideas are both internal and external sources (von Hippel 1988). In this context, the differences to the new product and process development are important to consider (see Table 2-1).

	Front end of innovation	**New product and process development**
Nature of work	Experimental, often chaotic, difficult to plan, Eureka moments	Structured, disciplined and goal-oriented with a project plan
Commercialization date	Unpredictable	Definable
Funding	Variable; in the beginning phase, many projects may be 'bootlegged', while others will need funding to proceed	Budgeted
Revenue expectiations	Often uncertain, sometimes done with a great deal of speculation	Believable and with increasing certainty, analysis and documentation as the release date gets closer
Activity	Both individual and team in areas to minimize risk and optimize potential	Multi-functional product and/or process development teams

Table 2-1: Front end innovation vs. new product and process development (Koen et al. 2001)

Furthermore, the terms (fuzzy) front end and front end innovation are treated synonymous. Following the argumentation of Koen et al. 2001, that fuzziness implies an innovation process phase consisting of unknow-

able and uncontrollable factors, solely the term front end innovation will be used in this paper. In this sense, this phase is partly analog to the introduced idea generation stage, but the focus on the front end is mainly on opportunity identification and analysis (Belliveau et al. 2004; Khurana and Rosenthal 2002). Therefore, the front end is one of the greatest areas of weakness of the innovation process and fundamentally determines the later innovation success (Koen et al. 2001). So, the effective management of the front end results in a sustainable competitive (innovation) advantage. Surprisingly, there has been less research done on this issue so far (Kim and Wilemon 2002).

A flow-oriented approach, the so-called 'idea tunnel', which resulted from an older concept called 'development funnel' (Hayes et al. 1988), is the elementary basic model for front end considerations (see Figure 2-3).

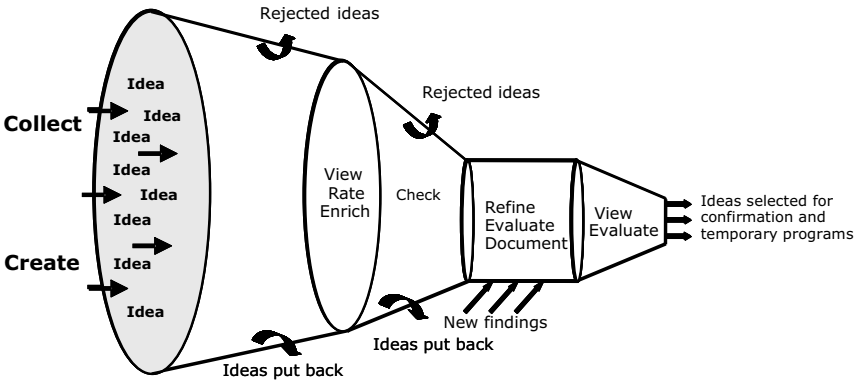

Figure 2-3: The idea tunnel (Deschamps et al. 1995)

Hence, there are two alternative ways of gaining ideas: collecting ideas in the sense that the ideas are already present somehow, at least in the mind of a person or a group. Creating means a well thought-out generation of ideas through creativity methods (Cumming 1998). Consequently, creativity practice methods and techniques are needed to create a continuous spirit of creative evolution (Kelley and Littmann 2005). Key elements for promoting corporate creativity are a motivating reward system, officially recognized creativity initiatives, the encouragement of self-initiated activities as well as the allowance of redundancy (Stenmark 2000).

Nevertheless, several general requirements must be fulfilled in order to generate ideas that will be successful in the marketplace (Boeddrich 2004):

- Considering the company's corporate strategy
- Obvious benefits for the ideas' target audience
- Systematically structured and conducted concept identification phase

Moreover, there are not only general, but also company-specific ramifications to consider which increase the complexity (Boeddrich 2004). That is why there is always a dilemma between giving the front end a certain system and structure on the one hand and forcing creativity as well as implementing externals on the other hand.

Due to page restrictions, the following list of FEI models is not exhaustive, but gives an overview of existing approaches with different focuses.

The most popular one is the new concept development model from Koen et al. (2001), which is supposed to provide a common language for front end activities (see Figure 2-4).

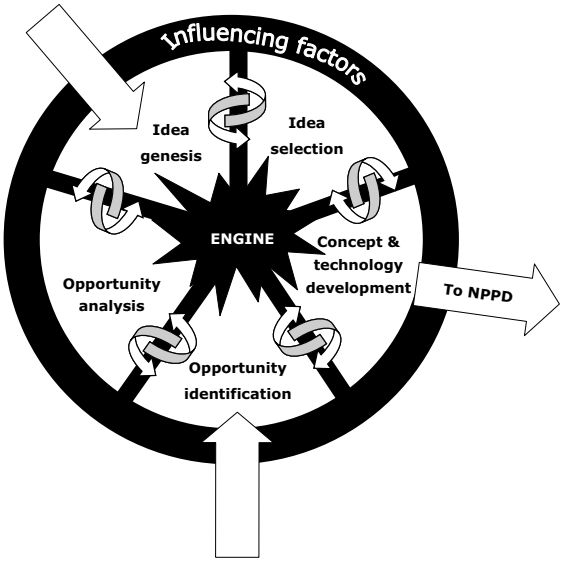

Figure 2-4: New concept development model (Koen et al. 2001)

The circular shape shows the flow, circulation, and iteration of ideas within the five core elements and the surrounding external influencing factors. A fundamental distinction is made between an opportunity and an idea:

Thus, the opportunity identification and analysis precedes an (business) idea because these stages include an ongoing process of several information enrichment stages like market studies or scientific experiments. A formal business plan or project proposal finally indicates the changeover to the new product and process development.

A proposal for a more process-oriented procedure is given from Boeddrich, (2004) (see Figure 2-5).

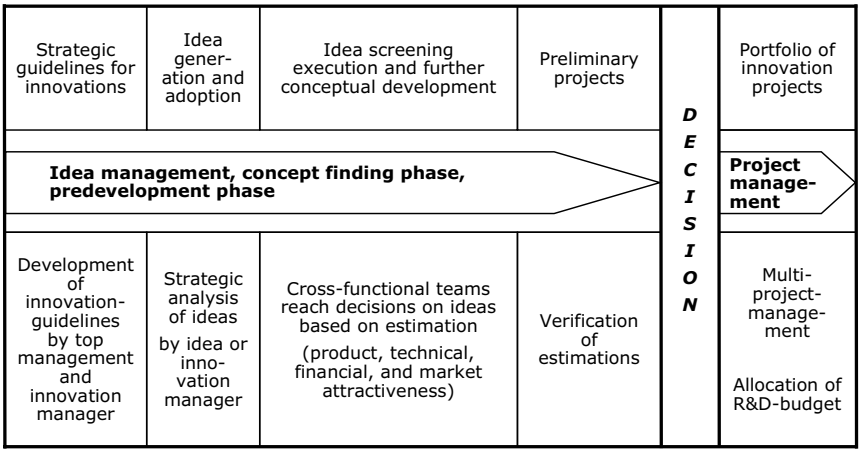

Figure 2-5: Front end model proposal (Boeddrich 2004)

In this framework, there is a specific differentiation between single process steps on the one hand and organizational responsibilities on the other hand. Boeddrich (2004) identified company-specific preconditions for the successful management of front end activities, confirmed by several other studies:

- definition of company-specific idea categories,
- commitment to company-specific evaluation methods and selection criteria – especially with regard to K. O. criteria for approved projects,
- commitment to the owner of the idea management process,
- commitment to individuals or organizational units that promote innovation within the company,
- definition of creative scopes for the company,
- influence of the top management,
- number of stages and gates in the tailor-made idea management,
- investigation of stakeholders in the structured front end and establishment of their participation.

A recent approach is from Sandmeier et al. (2004), who defined a very comprehensive process model and go explicitly into the topic market pull vs. technology push (see Figure 2-6).

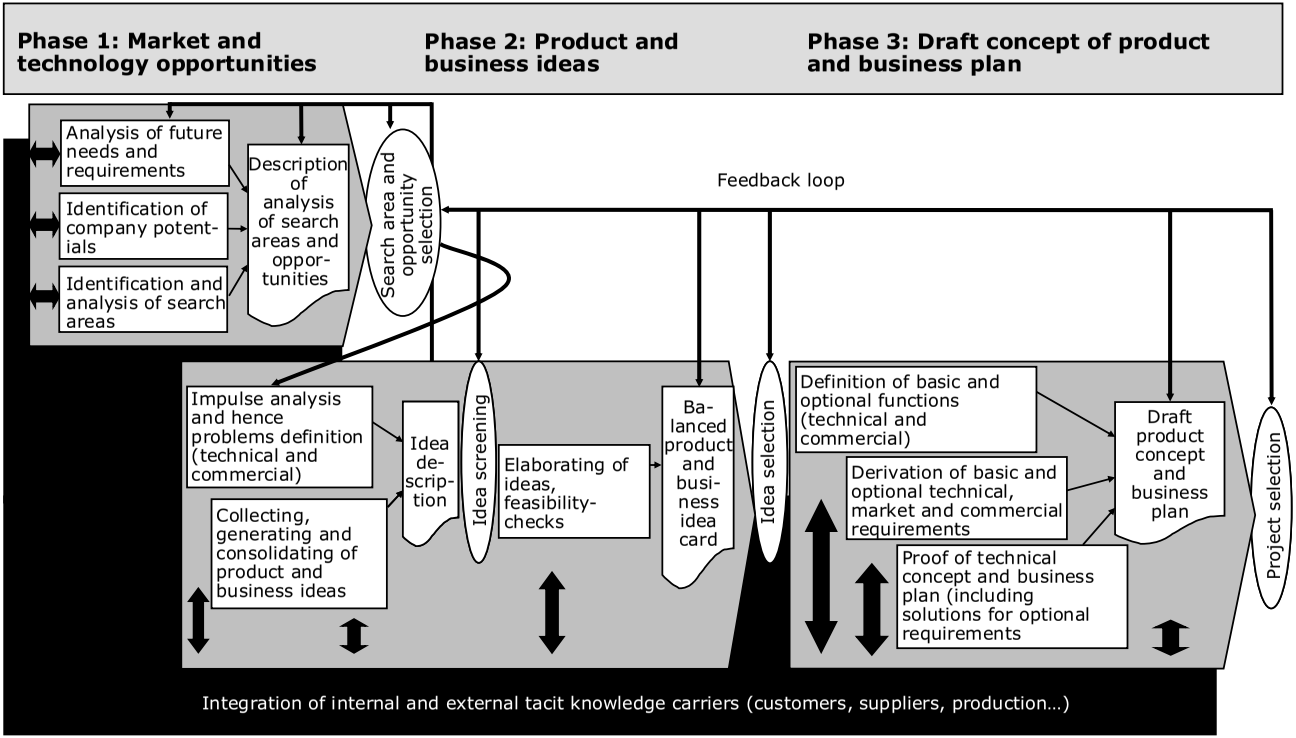

Figure 2-6: Integrated front end process model (Sandmeier et al. 2004)

Phase 1 focuses on the market and technology opportunities of a company. The central and iterative activities are the strategies and goals of an innovation. Finally, there are one to two opportunities and search fields for the next stage. The next phase deals with the actual idea generation and evaluation with several sub-processes in order to result in the creation of balanced business and product cards. The final phase transfers the generated ideas into business plans and product concepts, which will be devolved to the product development phase. Moreover, role-specific responsibilities are assigned depending on the innovation development progress.

In can be summarized that the described models vary in terms of perception, resources considerations and detailing. They have in common that they are all based on empirical research, especially case studies. Hence, even across different companies, industries and strategies of product and process development, the front end innovation challenges and threats seem to be very similar. Still, more interbranch-based research is needed for further considerations.

2.2.1.2 Market Pull vs. Technology Push

In general, there are two common ways for innovation impulses to differ (Boehme 1986; Brockhoff 1969; Bullinger 1994; Schoen 1967):

- 'market pull'/'demand pull'/'need pull'

The innovations' source is a currently inadequate satisfaction of customer needs, which results in new demand for problem solving ('invent-to-order' a product for a certain need). The impulse comes from individuals or groups who (are willing to) articulate their subjective demands.

- 'technology push'

The stimulus for new products and processes comes from (internal or external) research; the goal is to make commercial use of (new) know-how. The impulse is caused by the application push of a technical capability. Therefore, it does not matter if a certain demand already exists or not. In this context, Gerpott (2005) differs between high and low newness of the innovation and thus between radical innovations ('technology push') and incremental innovations ('market pull') (see Table 2-2).

Description/attribute	Technology push	Market pull
Technological uncertainty	High	Low
R&D expenses	High	Low
R&D duration	Long	Short
Sales market related uncertainty	High	Low
Time to market	Uncertain/unknown	Certain/known
R&D customer integration	Difficult	Easy
Kind of market research	Qualitative discovering	Quantitative verifying
Need for change of customer behavior	Extensive	Barely
Kind of innovation process	Trial and error'/learning	Structured milestones

Table 2-2: Differentiation between technology push and market pull (Gerpott 2005)

Therefore, technology push can be characterized as creative/destroying and with new/major improvements, market pull, however, as replacement or substitute (Walsh et al. 2002). Another view comes from Abernathy and Utterback (1978) stating that radical product and process innovation is subsequently followed by incremental innovations. This is in accordance with Pavitt (1984) who states that technology is particularly relevant for the early stages of the product life cycle and market factors especially for their further diffusion.

An R&D department is rated as a very important organizational component for innovation success (Rammer et al. 2005), as the R&D management abilities significantly influence new product development performance (Liu and Tsai 2007). However, a sole focus on technology push can lead to the so called 'lab in the woods approach', where the R&D department is organizational and regional undocked from the rest of the corporation to work without any daily routine on technological developments. This approach often results in 'reinventions of the wheel' and consequently in ineffective research. A strong concentration on market pull tends to 'face-lifting' of current products and services so that there is a high probability of competitive threats based on new or improved technologies

(Bleicher 1995). Another problem is the potential misinterpretation of the market or administrative problems as requirements of new technological solutions (McLoughlin and Harris 1997).

At the strategy formulation level, the deficiencies and shortcomings become even clearer (see Table 2-3).

Technology push	Market pull
Danger to start with what can be researched and evaluated easily	Risk to look only at needs that are easily identified but with minor potential
Threat of addressing the needs of the atypical user	Continue to change the definition of the 'opportunity'; 'miss the opportunity'
Problem of getting locked into one technical solution	Lack being a 'champion' or 'true believer'

Table 2-3: Summary of deficiencies and shortcomings of technology push and market pull (Burgelman and Sayles 2004)

Despite the different approaches, the distinction between technology- and market-induced is not always well-defined. Adoption depends on the diffusion trigger as well because it can be induced by the vendor through aggressive marketing and sales activities or be motivated by problems or deficiencies in the organizational search for solutions (Pennings 1987). Moreover, research results show that an overall, well formulated R&D strategy, combined with the definition of a formal process workflow, strongly influences the later R&D success (Voigt et al. 2007).

The chemical industry of the last century is a good example of market changes without influencing certain technologies or market needs. Until the early 1970s, innovations had been technology-driven only. After the oil crisis, the situation changed immediately: Customer and market orientation prevailed, 62% of new products were market-induced. The next change was in the late 1980s, neither triggered by technology nor markets: Environment protection laws forced companies to develop new technologies for products not needed until then, such as chemical filters (Quadbeck-Seeger and Bertleff 1995). Obviously, not all developments can be explained monocausal through specific market demands or new technologies. However, it can be stated that especially companies which

became market leader with a certain advanced technology 'tended to loose' their dominant market position by missing the changeover to new technologies (Pfeiffer et al. 1997). Still, distinctions can be made by periods in which either demand or technology played the most important role in the corporate innovation management (Ende and Dolfsma 2005). Moreover, there is certain proof that other key factors influence the product innovation adoption as well, for instance the entrepreneurial attributes of pro-activeness and risk-taking (Salavou and Lioukas 2003).

Thus, it is not surprising that there have not been any convincing theories of models and mechanisms for technology origins yet (Geschka 1995). Hence, demand side factors and technology side factors jointly determine the company's research success (Lee 2003; Kim and Lee 2005), and they have to be permanently adjusted to each other (Freeman 1974). Thus, successful products and services rely on the targeted combination of market pull and technology push activities (Hauschildt 2004), since the integration of push-pull factors generally contributes to more innovativeness of the company (Munro and Noori 1988). From an internal perspective, people from both market (e.g. sales, marketing, customer service) and technology-oriented divisions need to be strategically 'matched'. For this, staff from technical service, quality management or consulting, are suited for, because in this case they represent a bipartisan 'intersection' (Kobe 2003). From an external perspective, networking competence is identified as a fundamental success factor (Gemünden and Ritter 2001).

An example of successful implementation is the creation and use of multi-company collaborative networks, in which knowledge can be transferred and the members of the network attempt to continuously innovate (Chesbrough 2003).

2.2.2 Conceptual Linkage

As shown, there are strong interdependencies between technology push and market pull models, no simple black and white determinations enable or disable a certain approach. But particularly on corporate policy level, sustainable strategic procedures are required to efficiently manage the product and process innovation development. Therefore, a simplifying 'overall approach' is not practical and adequate. Instead, a pragmatic model is needed. For this reason, a conceptual framework for further considerations will be introduced.

In literature, there is a common sense that uncertainty is a crucial factor of management through discontinuous chapters in technological progress and ongoing new technology paradigms (Dosi 1982; Tushman and Anderson 1986; Freeman 1974), especially in the early phases of the innovation process (Verworn and Herstatt 2003). As R&D has diverse associated uncertainties (e.g. time horizons of the different projects, volatility in the amount of labor and capital allocated) (Dias and Bresciani 2006), Pearson (1990) proposes an innovation strategy dependant on various kinds of uncertainty. He distinguishes uncertainty regarding the technical approach ('means'), the market focus ('ends'), and the timing ('urgency'). So, depending on the level of means, ends, and urgency, other kinds of strategic choices are appropriate (see Figure 2-7).

Uncertainty regarding			Issues raised and implications for strategy
Means	**Ends**	**Urgency**	
Low	Low	Low	Fairly straight forward – maintaining motivation and providing resource is important.
Low	High	Low	Requires systematic market analysis – use idea generation techniques, enter markets sequentially.
Low	High	High	Prioritize and enter rapidly – use joint ventures and aquisitions, do not spread resources too widely.
Low	Low	High	Generate commitment – rugby team approach, give high priority and provide necessary resources.
High	Low	Low	Planned and sequential testing – use alternative approaches, consider doing more background research.
High	Low	High	Set up competitive projects – parallel technical activities, buy in technical skills, know when to stop, but don‘t give up too soon.
High	High	Low	Background, exploratory research – encourage ´free´ activity and `bootlegging`, be open to opportunities.
High	High	High	Multiple approaches – spend heavily on basic and exploratory research, try not to get caught in this area.

Figure 2-7: Different kinds of uncertainty and their consequences on strategy (Pearson 1990)

Burgelman and Sayles (2004) suggest three fundamental elements for an enduring linkage between technology push and market pull in order to define viable new business opportunities:

- 'Technology sources'

Research only works if the researcher's personal interests are adequately considered, combined with the existing corporate expertise and supplemented with the continuing entire overview of new technological developments. 'Bootleg research' is a way of pursuing an idea against all organizational odds, but if there is no applicable processing workflow afterwards, this kind of research should be avoided.

- 'Market demand'

Marketers must do a permanent search, especially in all areas of customer dissatisfactions. Moreover, ongoing evaluations regarding future potentials of new need satisfaction are crucial.

- 'Relevant problem'

Relevant problems are initial impulses from internal or external sources for innovativeness, like ideas and trends. These problems can either be 'given', or initially 'hidden' (Whitfield 1975). Other sources or origins for relevant issues are problems of the operating divisions and new opportunities created by external events.

Consequently, the managerial initiatives can be defined in three alternative patterns:

- 'Technology-competence-driven'

Scientists look for new technologies and scientific breakthroughs with accordant commercialization potential.

- 'Market-need-driven'

Marketing-oriented managers steer researchers referring to exciting and interesting markets with foreseeable high demand.

- 'Corporate-interest-driven'

Defined and professed 'interests' of the top management are obligatory. Interests are more than just strategic issues; furthermore, they involve operational subjects as well.

This is not as self-evident as it seems because the management often postulates goals and expectations which it does not support on its own afterwards. So no matter who seeks to be the proponent of a new idea, ultimately, it must be encouraged by the upper management, even if sen-

ior executives are not directly involved in the innovation processes but rather work behind the scenes to 'pull the strings' (Smith 2007). Especially new venture projects often fall out of the 'normal' corporate strategy. So no matter where the innovative impulse comes from, it must be accepted by the upper management. Hence, there is an ongoing need for integrating overall strategic and operative goals and roadmaps within the innovation management.

The corporate-interest-driven part is the most difficult one to implement because, in this case, innovation means the continuous consideration of the company's strategic and operational goals. Consequently, direct communication and efficient coordination across the whole organization is needed, which often leads to failures of technology transfer or new product introduction, e.g. all of which involve multiple interfaces (Farrukh and Probert 2005; Salomo et al. 2003). Hence, a successful aggregation between demand and potential sphere through precise internal communication is essential (see Figure 2-8).

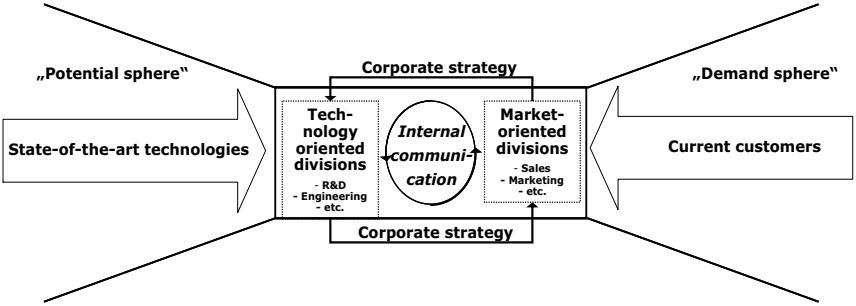

Figure 2-8: Coherence between technology and market sphere (Pfeiffer et al. 1997)

Internal communication is a critical point, insofar as the timing of information is a crucial element of the cooperation between technology and market and innovation in general (Mast 2005; Tushman 1982), however, this often results in high coordination efforts (Michel 1990). So, typical risks to detect innovations are based on the questions regarding the right information: what information?, when?, how processed?, from whom?, what time horizon?, and so on; to foster the communication between the two parties, a functional abstract procedure is necessary.

On this note, either a technological potential 'searches' for different needs or problems to be solved, or a specific need or problem 'searches' for diverse technological potentials (Pfeiffer et al. 1997).

Nevertheless, "innovation requires collective action or efforts to create shared understandings from disparate perspectives" (Dougherty 1992, p. 195). Moreover, innovativeness also depends on factors like business logic and environmental dynamics. If there are market turbulences combined with market-based business logic, customer and technology linking seems to be a discriminator between low and high innovativeness. Innovativeness under technology turbulences depends on the kind of business logic: market-based logic requires especially the commitment of employees, technology-based logic requires broad technology searching (Tuominen et al. 2004). For this, many 'old' techniques are still worthy of attention, but for a future-oriented exploration, approaches of multiple methods are required (Porter 2007). However, the transition process from technology to market orientation and vice versa requires a change in mindset on the part of the innovators (Ulijn et al. 2001). Still, there are examples of succeeding companies like Matsushita which sustainably combine market-oriented product development capabilities linked with difficult-to-imitate technological capabilities for a highly competitive market position (Kodama 2007).

Finally, the preceding advisements are summarized in Figure 2-9.

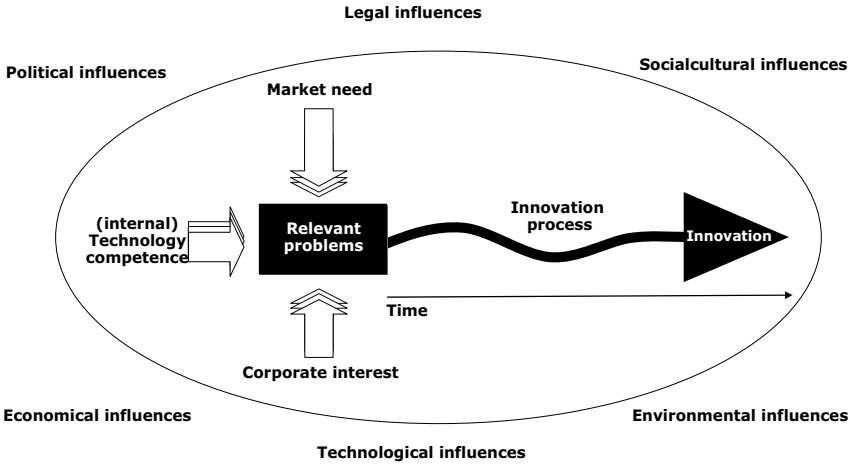

Figure 2-9: Triggers and key elements of corporate innovation management

Following Burgelman and Sayles (2004), initial impulses for innovations ('relevant problems') are triggered by corporate interest, technology competence, and certain market needs in our context. Timing issues affect all kinds of innovation strategies, no matter if the companies are technology-driven (e.g. in the case of patent expiration) or market-driven (e.g. a product line at the end of the certain life cycle). Hence, time resp. urgency is added as a basic variable as well. The (mostly non linear) innovation process begins with the idea generation, out of the relevant problem, and ends with the successful implementation, following Thom (1980). As the internal corporate innovation process is surrounded and influenced by external factors, which are crucial for the company's innovations (Lind 2002), they are implicated as well (Fahey and Narayanan, 1986):

- Political influences (government stability, taxation policy, social welfare, etc.)
- Sociocultural influences (income distribution, consumerism, education, etc.)
- Environmental influences (protection laws, waste disposal, location, etc.)
- Economical influences (inflation, income, business cycles, etc.)
- Technological influences (government spending on research, speed of technology transfer, rates of obsolence, etc.)
- Legal influences (employment law, product safety, business legislation, etc.)

Hence, the impulses for innovation can be initiated from external by certain problem perceptions or specific knowledge (Zaltman et al. 1973).

Finally, this conceptual framework shows the most relevant factors, but it still needs to be validated and further developed, especially how the single elements influence the innovation process and success in detail as well as the kind of interferences between the elements themselves.

2.3 Case Study

2.3.1 Method

The following case study is based on extensive analysis and evaluation of secondary data (corporate documentation analysis) and interviews with managers of different departments (R&D, marketing, sales, technology,

etc.) (Hamel et al. 1993; Yin 1981). Ten qualitative, guided expert interviews were conducted (Witzel 2000). Meetings between managers and researchers on a regular basis were organized to validate our findings and to recognize further issues for analysis.

For this purpose, one single case study was taken because the researched company can be seen as 'an extreme or unique case' (Yin 1994). The company was chosen because of its special market position and dependence on legislation as well as its unique organizational combination of technology and market. The target of the research is to get deeper insights into their innovation management and hence implications for the stated conceptual framework (Eisenhardt 1989; Maxwell 1996).

"Interviews are a highly efficient way to gather rich, empirical data, especially when the phenomenon of interest is highly episodic and infrequent" (Eisenhardt and Graebner 2007, p. 28). All interviews were semi-structured and designed appropriate to the research question. Further input was generated through regular expert meetings with other companies as well.

Identifying actors in organizations is critical and sometimes methodically difficult due to the rapid change of corporate knowledge, especially through structural shifts of the responsible individuals (Carlsson et al. 2002). Therefore, the company management was involved to identify appropriate interview partners. Following the 'snowball method' (Carlsson et al. 2002), more interview partners could be found to make sure that there is no biased pre-selection. Moreover, the participants were from different hierarchical levels, functional areas and company locations (Eisenhardt and Graebner 2007).

2.3.2 Researched Case

2.3.2.1 Background

Persistent innovation and fast change are the best attributes of the software industry, not only because of their dependence on the computer industry. Systems, computers, components – to retain the status quo, continuous endeavors are compulsory (Rubenstein 1989). Therefore, a software development and information technology service provider needs to be up-to-date on both counts. On the one hand, it has to offer software and services with which the customer can make use of the technological

status quo. On the other hand, it has to integrate functionality and support which only is the outcome of the customer's needs, independent of the current technology state of the art. That is why innovation management causes many difficulties, especially in service environments (McDermott et al. 2001).

2.3.2.2 General Company Information

The researched company was founded in Germany in the 1960s. Customers are tax accountants, attorneys, public accountants, chartered accountants as well as associated companies. Still, these customers can sell resp. bill the products and services to their end-customer as well.

The product portfolio includes software (e.g. accounting, audit, personnel management, etc.), services (e.g. IT-support, print and dispatch-service, etc.) and consulting (education, training, management consulting, etc.), offered all over Europe. In 2005, the company employed more than 5,390 people with annual sales of approx. 581 million Euros. The current market share in Germany is approx. 60-80%.

The company is technology-driven, mainly because of its origin in programming and coding specific software solutions and offering the corresponding service solutions. Because of the permanent growth for almost 40 years, organizational structures have not always kept up with the changing business and management requirements. Still, in the last years, the awareness has grown to make changes not only within the formal internal organization. The perception of innovation management has also changed to a more market-oriented one, not at least because of ongoing and increasing customer expectations and rapidly changing market conditions.

2.3.3 Case-Specific Characteristics

2.3.3.1 Corporate Innovation Management

In general, the company consequently differs between a 'trend' and an 'idea': A trend identifies 'something new' and distinguishes it from 'something existing', an idea is a proposal for an action, which either reacts to recent developments or proactively utilize it. Based on those assumptions, the management has defined a corporate innovation management process (see Figure 2-10).

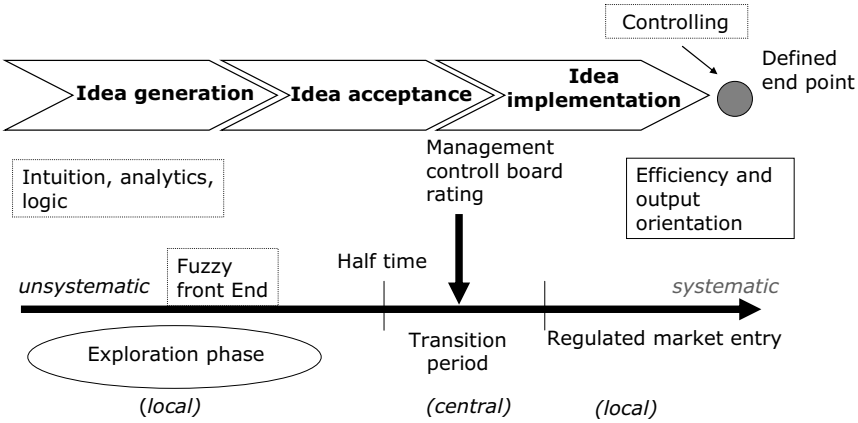

Figure 2-10: Overview of the corporate innovation management process

The main steps from idea generation to idea implementation are comparable to the stages shown by Thom (1980). The size of the company requires a division in decentralized and centralized activities. The awareness of different needs in particular phases can be seen by the intuition and logic spotlight at the beginning as well as the efficiency and output orientation at the end of the process. The management control board consists of top management representatives from all different divisions. A main focus lies on the permanent controlling of the whole innovation process by means of operating and financial figures.

2.3.3.2 Former Status of Technology and Marketing

The basic approach is to bring technology- and market-oriented knowledge together. The company already has existing departments which deal with those issues. The department of strategic technology monitoring has been positioned as a competence center, dealing with recent developments in all adequate and interesting technology fields for almost 30 years.

On the one hand, this department is supposed to look for technological improvements for existing products and services, on the other hand, it is expected to discover technologies for potential new products. There are certain responsibilities, e.g. for particular products or product groups, but in general, the staff is free to spend its time in its own responsibility.

For instance, the employees can participate in fairs, exhibitions and thematically fitting conferences or read newspapers and journals. Team events and meetings also take place on a regular basis to ensure the inter-department knowledge exchange.

In former times, departments did not directly interact with each other, unless somebody addressed another person. However, the exchange with other departments of the company had not been institutionalized yet.

The main task of the strategic product management department is to take care of the corporate product portfolios. The general coordination of marketing and sales activities illustrates another duty. They are supposed to conduct market research for existing products and also search for new promising markets. Inherently, they have a sophisticated understanding of customers and markets. Several instruments present the background for this, e.g. the product service integration which provides customer feedback and improvements for all existing products and services. However, the exchange with other departments of the company was still poor.

The environment observation is a cross-departmental function, especially between technology and marketing. The target is to gain information about recent developments in various dimensions, e.g. jurisprudence, competitors, economy, etc.

2.3.4 Case-Specific Integration of Market and Technology

The unique situation of the company – almost monopolist and strongly dependent on regulations – leads to a phenomenon called 'regulatory push'. A whole team of environment observation on the one hand continuously screens and evaluates new laws, amendments, political initiatives, and on the other hand, continuously estimates and classifies future actions, laws, and (political and legislative) changes. If these are only of minor importance, required adjustments in current products and services are directly executed (e.g. modifications in current software applications). Impulses for radically new products or services are transferred to the appropriate corporate innovation process (e.g. a new law which allows tax attorneys to found subsidiary companies). This process is triggered by trends and ideas, which are initiated by research, customers, law, etc. (see Figure 2-11).

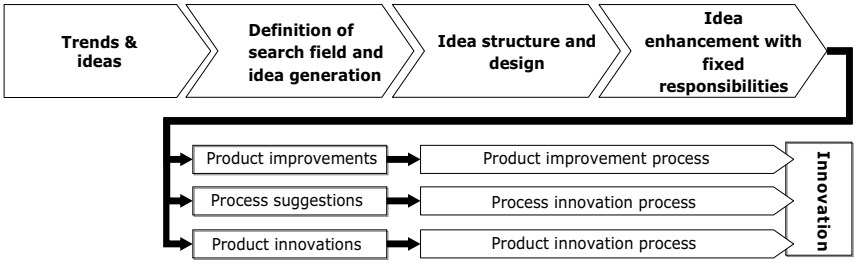

Figure 2-11: Overview of the corporate idea management process

Therefore, 'idea splitters' are identified by means of strategic technology and market monitoring. If this is applicable to the company's innovation search fields, these splitters get a definite structure and design for further enhancements.

Depending on the type and origin of the idea, specific processes are provided. Product improvements, for example, are going to the PIMO (Product Improvement Office), product innovations to the PINO (Product Innovation Office), etc. Consequently, people act like project managers to drive an idea to an innovation throughout the whole innovation process. The most important success factor in this context is the sustainable integration of the idea contributors. The next steps follow the internal guidelines of efficient project management with adequate milestones, progress planning, and controlling.

In order to gather 'idea splitters', both employees of the department of strategic technology monitoring, environment monitoring, and of the strategic product management department practice their described research, monitoring, and management, first of all autonomously. Meetings take place on a regular basis to discuss actual topics, trends, and opportunities. Then, in coordination with the upper management, stakeholder workshops and scenario groups are conducted.

2.3.4.1 Stakeholder Workshops

So-called 'stakeholder workshops' have the objective of bringing internal and external experts together. A special focus lies on the balanced mix of know-how from the fields of technology, market, and regulatory (see Figure 2-12). Against the background of over 5,000 employees and the corresponding departments, it is a challenge to not only bring the internal personnel together, but also integrate external parties on a regular basis.

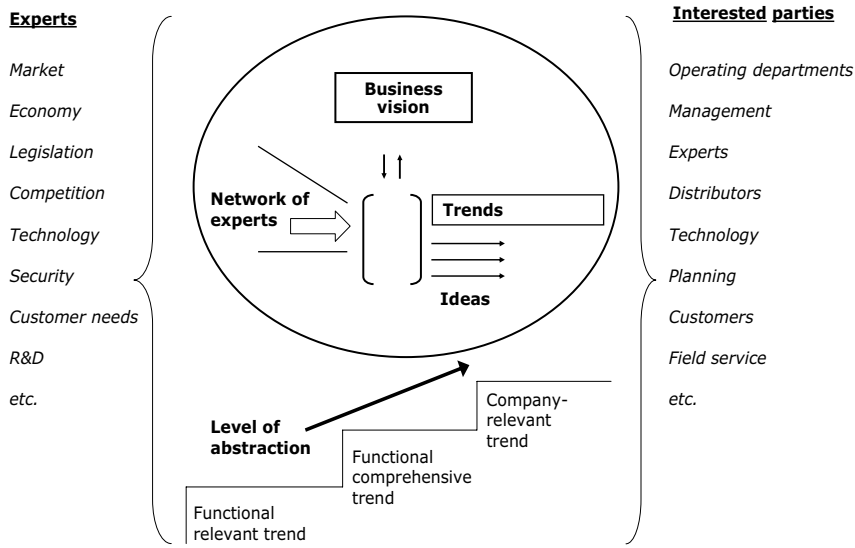

Figure 2-12: Concept of a stakeholder workshop

Within this concept, a workshop is opened to other external parties, distinguished between experts and interested parties. Experts can be chosen from 'friendly' organizations and companies like industry associations, law specialists, economy professionals, etc. Other interested parties can be either internal like corporate planning or field service or external like suppliers or distributors. Depending on the level of abstraction, trends and ideas can be identified and discussed. In the best case, company-relevant and therefore product- or process-relevant trends can be identified and retained for further developments. The most important outcome is the determination of specific search fields, derived from the identified trends, which are the precondition for the following constitution of foresight groups. Detailed product and process ideas may also result from these workshops. They are directly forwarded to the corporate innovation management system (see Figure 2-10).

2.3.4.2 Scenario Groups

To transfer the results from the stakeholder workshop into the company, further internal efforts are needed. The idea was to combine the scenario-technique with their product development, as suggested by Eisenberg and

Zettl (2005) with their approach of 'sustainable product development'. As a result, it was decided to establish so-called 'scenario groups' which consists of people from strategic technology monitoring, environment observation, and strategic product management. First of all, participants from the several departments are chosen, eight people at the most. Furthermore, additional external know-how is added where needed, e.g. for actual jurisprudence knowledge. In advance, some meetings are necessary to structure the meetings that usually take two days. From the marketing staff, business objectives, 5-year-forecasts and actual environment observations are called in. The technology monitoring contributes edited and conditioned technology developments and precise new technologies.

The goal is now to generate scenarios for the next five to ten years based on the trends recognized in the stakeholder workshops. So, a target-oriented discussion is possible because all participants already talk about specific search fields. The people from the technology side report from their recently identified technological potentials, the staff from the market and product side tells about new market needs and problems, also in the context of the existing product portfolio. Employees from environment observation bring in general trends. Depending on the search field, explorative scenarios or accrued scenarios are applicable. Explorative scenarios evolve different scenarios based on the current status quo (see Figure 2-13).

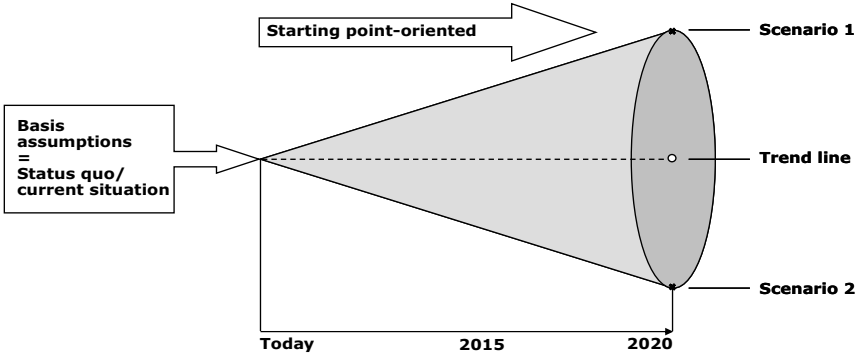

Figure 2-13: Explorative scenario planning concept (Gausemeier et al. 1995)

In contrast, accrued scenarios start from defined pictures of the future in order to develop scenarios how to get there through several stages of development (see Figure 2-14).

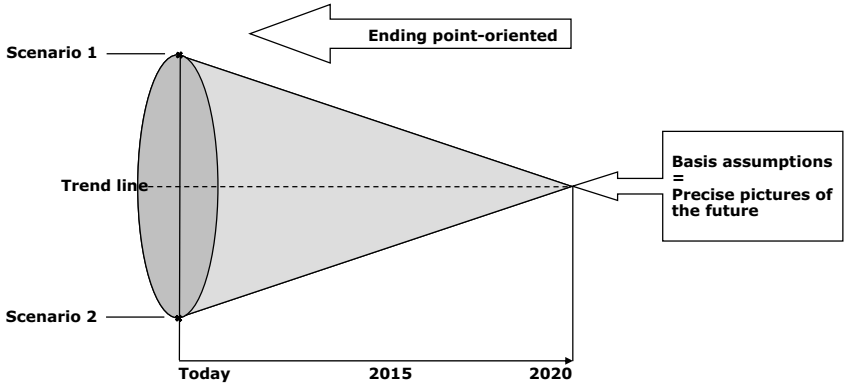

Figure 2-14: Accrued scenario planning concept (Gausemeier et al. 1995)

Thus, dependent on the results of the stakeholder workshop and irrespective of the kind of scenario, either way can be the proper instrument for strategic innovation planning. Based on these scenarios, currently offered products and services can be discussed. Furthermore, cases can be developed how these scenarios will affect them under different conditions. Moreover, ideas for future products and services can be generated.

2.3.4.3 Further Action

The results of the stakeholder workshops and scenario groups are appropriately recorded and transferred into the specific innovation process (e.g. into the product innovation or product improvement process, see Figure 2-11). All trends and ideas are extensively documented for further presentations and discussions with other employees and partners.

Obviously, the success of this approach depends on the integration of the 'right' people resp. experts at the 'right' time. For that purpose, applications are possible, but most of the participants are still selected by the workshop organizer because they are known as 'innovative people'. In this regard, a more transparent and traceable process is needed.

2.4 Discussion and Outlook

As stated, technology push and market pull cannot be declared as the right or the wrong way to sustainable innovations. It depends on assorted variables – like the specific industry, the company's history, etc. – which strategy suits best. Some companies are still on the right track by focusing on technology or market needs only. But there are several examples

that a one-sided innovation strategy does not work in the long term either.

Against the background of the case, bringing technology and market together is not only a matter of (inter-organizational) communication and detailed definition of strategic search fields. All sides of innovation sources are encouraged to give practical input, e.g. the marketing people by setting minimum criteria for project evaluations rather than defining general targets (Becker and Lillemark 2006; Mast 2005).

By conducting interdisciplinary teams with lasting integration of internal and external parties, the danger of unidirectional research as well as solely relying on market trends can be reduced. Moreover, the researched company invests many efforts in the idea generation and evaluation phase, which is also very cost-intensive. In this context, recent research indicates that the idea quality and the idea generation phase are important determinants of innovative capacities especially of large-scale companies (Koc and Ceylan 2007).

Within the framework of this chapter, a new innovation management framework was introduced based on considerations of recent research (e.g. Burgelman and Sayles 2004; Pearson 1990; Pfeiffer et al. 1997). Summarizing the described procedures of the company, a holistic picture of their innovation triggers can be drawn (see Figure 2-15).

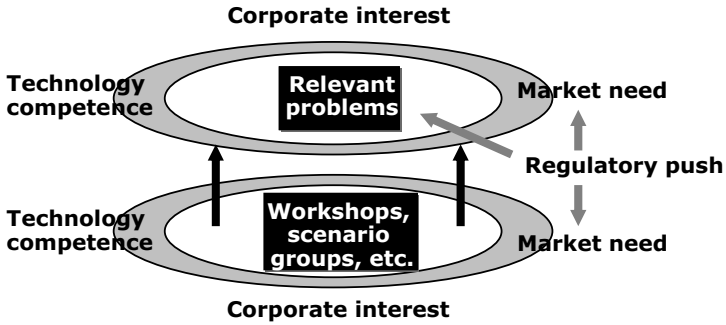

Figure 2-15: Case-specific sources for relevant problems

First of all, there is certain proof that the introduced framework is similar to the processes researched in the case. For example, incremental and radical product and process innovations are induced by market needs (strategic product management staff) and new technologies (strategic

technology monitoring department). Relevant problems are supported and controlled by the upper management as well (corporate interest). In addition, the company has well-defined innovation processes depending on the different types of innovations.

Still, there are several points which are not included into the model, such as the intervallic workshops for generating relevant problems. The influence of 'regulatory push' is relatively extraordinary as well.

The term regulatory push itself comes from the area of ecological economics, more precisely from eco-innovations (Renning 2000).[12] To date, no technology or innovation management literature could be identified which methodically deals with regulatory push in other area as ecology. Within this term, existing law, expected regulation, standards, political decisions, etc., can be summarized. The origin is not surprising, as ecologically caused resp. generated innovations are strongly dependant on environmental regulations (e.g. the mentioned example of the chemical industry in the last century). The regulatory push framework is complemented by other industry-, company-, economy- and cultural-specific features as these characteristics are leading to different starting conditions in terms of their innovation activities. Moreover, these features can explain the different intensity of the determinants and effects of innovations (Rehfeld et al. 2007). Within the case, the regulatory push influences the relevant problems indirectly through the market needs ('customers say they need a new tool because of a certain new law'), and directly, for example with opportunities for new business models or even business units.

These changes are obviously relevant for all companies, but in the case study in a special context, because their product and service portfolio is predominantly based on the consequences of legal issues. Therefore, the regulatory push impulses are elementary affecting the incremental product and service improvements, as well as new product development. In terms of market pull and technology push, these stimuli can be seen as main influencing factors of new or changing market needs. So especially the external political and legal influences are playing an important role for future relevant problems and changing market needs. Furthermore, rele-

[12] Whereas Renning uses the term regulatory push/pull only in context with ecological innovation.

vant problems can be directly triggered by technology push, market pull and/or corporate interest, as well as from altogether via workshops, scenario groups, etc.

Figure 2-16 shows the integration of the insights from the case into the adopted framework.

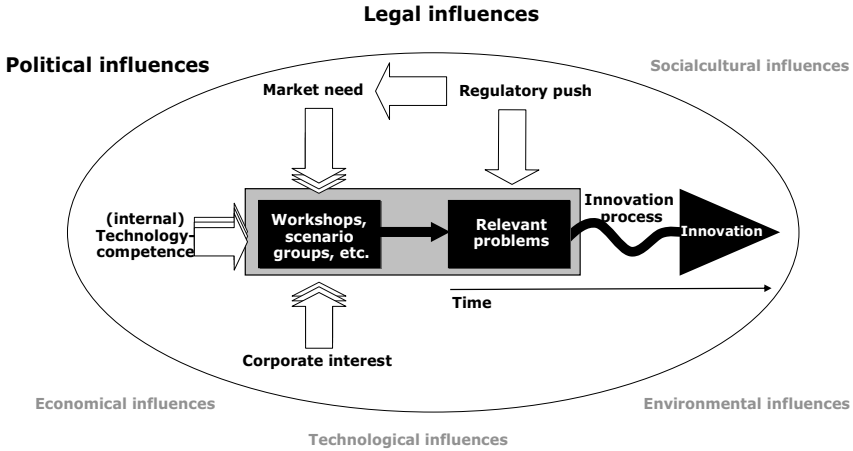

Figure 2-16: Extended framework of triggers and key elements for corporate innovation management

Obviously, this extended framework is not applicable for all branches or companies. However, it is valid for the German or even European software industry, especially in the context of companies in the environment of legal and regulatory issues, as their specific requirements are accordingly integrated.

Moreover, there is lots of research done in the area of case-specific management systems within the innovation management literature. Still, no comprehensive theory has been developed yet how to organize corporate innovation on an abstract level, combining the various research results.

Hence, a draft of an advanced idea tunnel as a front end innovation model based on the case study will be introduced (see Figure 2-17).

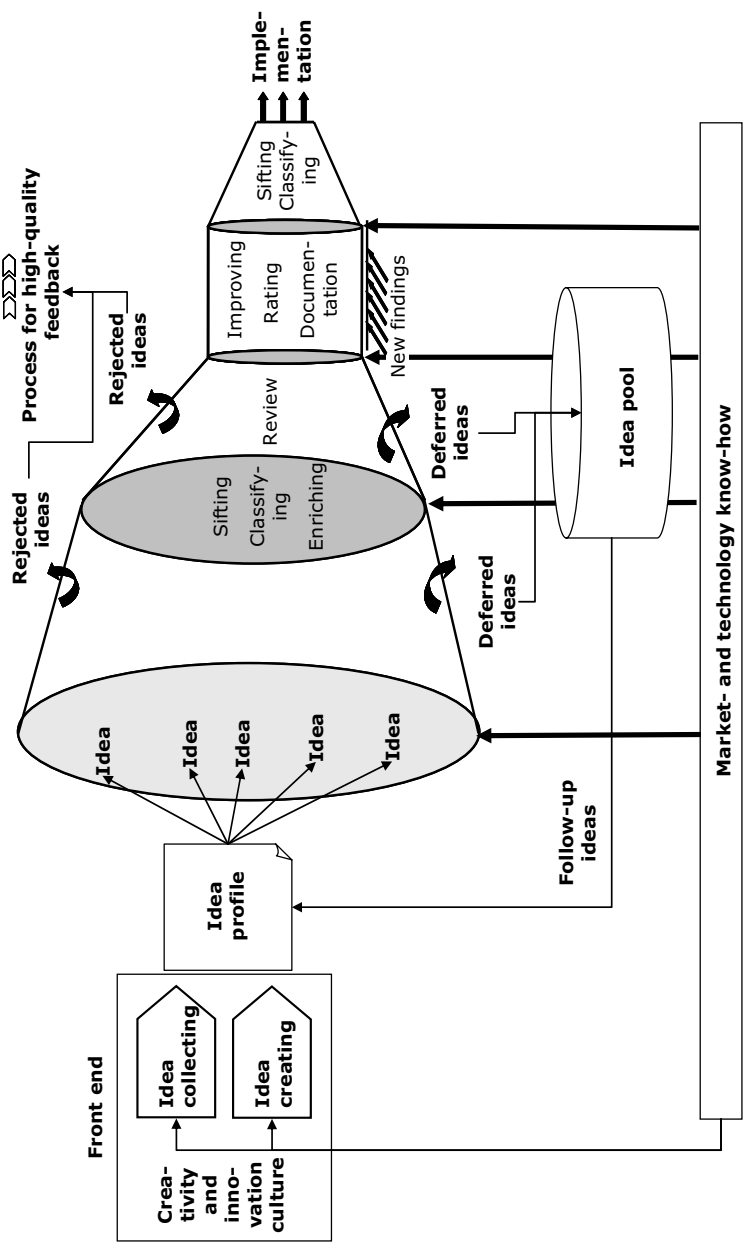

Figure 2-17: Advanced front end innovation approach

Based on the idea tunnel, several elements were added, e.g. a pool for saving ideas. This is necessary not to loose deferred ideas, which are for instance not appropriate to the current corporate strategy guidelines. Moreover, the front end is well defined as the phase of idea collection and idea creating, enhanced by the level of creativity and the innovation culture of the corporation. Another important point concerns rejected ideas. A detailed and comprehensive feedback is crucial twofold: first regarding the willingness of the involved person for future input, and second concerning the willingness of other people facing the internal and external effects of a disappointed and unsatisfied idea contributor.

Moreover, it is important to guarantee a permanent input of market and technology know-how, not only within the idea generation stage. In this regard, a recently introduced practical approach by Ihmels and Vienenkötter (2006) suggests to support both market pull and technology push by making use of a relational database.

Finally, this approach is in contrast to much other not solely aligned to product innovation, but all kinds of innovative ideas. Still, it is fundamental that there is a given process flow for each kind of innovation (Voigt and Brem 2006).

2.5 Limitations

"Theories and models are always simplifications. If they were as complex as reality, they would not be useful" (Siggelkow 2007, p. 21). Therefore, the extended framework must be seen against this background.

So even though the considerations for an integrated view of technology and market are already rather sophisticated in this company, compared to other well-known examples of big companies, the lasting success remains to be seen. As still the whole approach is 'work-in-progress', the solid scientifically prove will be examined to a later point of time. Moreover, results can be dependent on the software industry specifics. Hence, the fact that the research is based on a single case, conclusions must be seen against this background and can only be drawn within the introduced branch (Siggelkow 2007). By conducting multiple-case-research, more similarities and therefore regularities could be identified for further generalization. Finally, a sampling of extreme cases (e.g. very high and very low performing) could improve the observing and validation of contrasting patterns in the data as well (Eisenhardt and Graebner 2007).

Nevertheless, any transition towards a long-term innovation strategy is taking at least several years, because of the energy which is necessary even before such a transition can be triggered (Hope Hailey 2001). Technology managers may use the results as a conceptual mirror, especially regarding the influencing factors of relevant problems (corporate interests, technology-competence, market-need and regulatory push) and the use of interdisciplinary teams with people from inside and outside the company (Kobe 2003). Still, for companies working in the software industry, this framework can be used as a guideline or benchmark for their idea and innovation management. Especially the advanced front end innovation approach shows all critical components of a corporate idea and innovation management to consider.

Future research should focus on the exact integration of regulatory push within the innovation process and in the context of market pull and technology push. On the workshop level, further research is needed to get a deeper insight into the right mix of internal and external experts and the according selection procedures for the 'right' people.

3. Innovation Management in Emerging Technology Ventures – The Concept of an Integrated Idea Management[13]

3.1 Introduction

For several years, the factors encouraging and discouraging sustainable growth of technology-oriented companies have been widely discussed in theory and practice. Caused by the significant correlation between newness and failure, these companies must create and implement effective corporate structures and management from scratch (Wasserman 2006). Therefore, the critical point is not only a successful first product or product line, but how the whole company is structured for the long term. Hence, strategic and goal-oriented management of technology and innovation is essential for reducing the probability of failure. This is not as easy as it seems. Many emerging companies fail because they do not successfully manage these challenges (Voigt et al. 2003).

In this context, the established approaches and methodologies for innovation management are no longer sufficient. This is a result of the long-term focus on the tools and techniques for innovations in big and established companies, and not in start-ups and small and medium-sized companies.

Within the framework of this chapter, a model for idea management in emerging companies will be introduced and proved by empirical evidence. As a first step, however, some theoretical considerations are needed to create a common understanding of fundamental terms and processes.

3.2 Innovation and the Concept of an Integrated Idea Management

3.2.1 Terms and Definitions

The term 'innovation' is currently an ubiquitous buzzword that has been listed with at least 18 different definitions (Hauschildt 2004). Given that some innovations are gradual and continuous improvements, while others

[13] Original source of publication: Brem, A. and Voigt, K.-I. (2007) 'Innovation management in emerging technology ventures – the concept of an integrated idea management', Int. J. Technology, Policy and Management, Vol. 7, No. 3; available at: http://www.inderscience.com/ijtpm.

are highly discontinuous, the difficulties to exactly define the term innovation are considerable (Tyre and Orlikowski 1994). In this chapter, the term 'innovation' stands for the "initial introduction of an idea into a business" (Trommsdorf et al. 1987, p. 6). The organizational integration of innovation in the corporate structure takes place through innovation management, which is typically part of a company's upper management. By definition, this is about the "development, introduction and, as the case may be, implementation and enforcement of technical and social-technical initiatives of the management of the business" (Trommsdorff and Schneider 1990, p. 5). Therefore, innovation management comprises the decisions about innovation and the development of innovation processes (Hauschildt 2004).

While product innovation is undoubtedly important, it is only one of several dimensions of an organization's innovation agenda (Adams et al. 2006). Therefore, it is necessary to distinguish between (radical and marginal) product, process, and social innovations. Product innovation comprises innovations within marketable goods and services of the company-specific business. Process innovations trigger changes to the creation processes. Social innovations characterize innovations related to the social area. These definitions are not always defined in clear contrast to each other; the described areas may occasionally overlap (Thom and Etienne 2000).

"An idea is a cognitive impulse enabled by social experience" (Saatcioglu 2002, p. 1). In addition to external idea sources, such as universities, employees play a major role as internal 'suppliers' because they have the best knowledge of the products, services and the corresponding interrelated business processes. Therefore, ideation can be seen as the capability that supports people's adaptive and imaginative skills and as an essential faculty that propels everyday managerial action (Vandenbosch et al. 2006).

A suggestion system (also called suggestion scheme, idea capture system or classic idea management) is supposed to harness employee creativity. It is an instrument for business-wide advancement and improvement, helping with the creation of ideas and innovations (Conert and Schenk 2000; Spahl 1975). Brinkmann and Heidack (1984) define the suggestion system as follows: "In its ideal form, the suggestion system is to be seen

as a device for the advancement and utilization of the creativity of all persons involved in an organization" (p. 32).

Hence, idea management is seen in literature as a logical development of the suggestion system, with the aim of a systematic coordination, linked to strategic ideas, with other operational instruments of rationalization and innovation advancement (Thom 2003; Brinkmann and Heidack 1984; Conert and Schenk 2000; Winzer 2003; Bumann 1991). In a broader interpretation, Thom (2003) calls idea management a concept which combines various creativity-promoting methods into a comprehensive system. Hence, idea management can be conceptualized as an organizational process that structures members' acting and thinking toward stability and/or change. Nevertheless, it should be noted that there currently is not a generally accepted definition of idea management in innovation management literature (e.g. Winzer 2003).

As the idea management is closely related to other concepts enhancing the competitive position, it is not restricted to a specific number of instruments. In order to save the limited resources of a business, idea management should be designed such that complementary elements from other instruments can be used in concert (Frey et al. 1996). 'Wanting to, being able to and being entitled to' are referred to as important factors for an innovative suggestion system and therefore for modern idea management (Wildemann 1995). Every employee has the capacity for innovative ideas, but it depends on idea management to use this capacity (Saatcioglu 2002). Nevertheless, not every member of an organization can be considered to be an innovator (Miles and Snow 1978). In this context, there are several types of possible corporate innovators to be considered: incrementalists, consensus builders, searchers, debaters and assessors (Vandenbosch et al. 2006). They each have different focuses and functions which need to be addressed separately. For instance, the searcher wants to scan and initiate, the incrementalist prefers to maintain and direct; therefore, it makes sense to integrate the searcher within the idea generation process while the incrementalist works for the idea evaluation process. However, regarding the idea evaluation process, cross-functional criteria and traceable ratings are crucial for a broad acceptance within the organization (Lühring 2003).

Finally, idea management can be seen as a sub-process of innovation management with the goals of effective and efficient idea generation, evaluation, and selection. Hence, the key issue is the structured collection and generation of both internal and external ideas; as well as the logical evaluation and selection of those ones that offer the biggest potentials for the future corporate success.

3.2.2 Idea Management in the Innovation Process

The internal innovation process can be divided into three stages called idea generation, idea acceptance, and idea realization (Thom 1980) (see Table 3-1).

Idea generation	Idea acceptance	Idea realization
Determination of search fields	Testing ideas	Actual realization of the new idea
Finding ideas	Creation of realization plans	Sale of the new idea to the addressee
Idea suggestion	Decision to realize a plan	Acceptance control

Table 3-1: Stage model of the innovation process (Thom 1980)

The fundamental goal for idea management is to collect as many promising ideas as possible, which are subsequently considered and carefully selected. As Rose and Nicholl (1997) note, "the best way to get a good idea is to get a lot of ideas" (p. 198). The determination of the search field is critical to the whole innovation process. The exploration can only be successful if you know what you are searching for. By defining individual user needs and the current product value, search fields can be identified (Burgelman et al. 2004). The idea acceptance stage consists of several steps, which all ideas pass and where they are enriched (Cooper 2005). When an idea is finally selected, it is important to implement it in a resource-saving and efficiency-enhancing manner (Aeberhard and Schreier 2001). In comparison to the later stages of the innovation process, idea generation is less costly (Rochford 1991).

In this context, the term (fuzzy) front end is important since it overlaps with the introduced process phases. This phrase describes the earliest stages of new product development, even before its first official discussion. It includes all the time spent on the idea as well as the activities

strengthening it (Reid and Brentani 2004). In this sense, this step is similar to idea generation stage, but the front end mainly focuses on opportunity identification and analyzes it prior to actual idea management (Belliveau et al. 2004, Khurana and Rosenthal 2002). Herstatt and Verworn (2003) suggest a broader definition, as they interpret the front end as a field of actions from idea generation to concretion of a rough project for future products.

However, front end considerations focus almost solely on product development. Still, the effective management of the front end helps to result in a sustainable competitive advantage because it provides the basis for innovative ideas (Kim and Wilemon 2002).

Adequate organizational integration is vital for the management of innovation processes in order to successfully develop and carry out potential innovations (Trommsdorf et al. 1987). Knowledge transfer within the company is usually inefficient and disorganized, which makes its integration important (Argote 1999). Every innovation leads to changing circumstances within the affected company, which means that numerous barriers must be overcome in order to innovate (Cooper and Markus 1995). Hence, the task of managing ideas requires high levels of inter-functional coordination and integration (Adams et al. 2006). To counteract the natural defensiveness of involved individuals, it is necessary to keep employees ready to incorporate innovations in their work.

Companies can use a 'promoter' who actively and intensively communicates and speeds up the modification process (Witte 1973; Hauschildt 2004). Moreover, idea sources must have available adequate resources to test the idea (Bright 1964).

If businesses want to strengthen existing activities in order to better manage ideas and discover new business opportunities, they should structure and control the related processes. One option is to use the so-called idea tunnel (see Figure 3-1), which is based on the development funnel (Hayes et al. 1988).

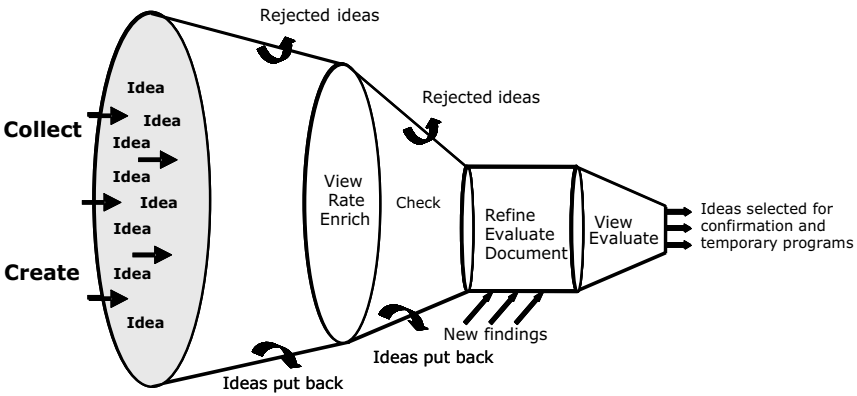

Figure 3-1: The structure of the idea tunnel (Deschamps et al. 1995)

Within innovation management, idea management identifies and selects suitable innovation fields (Hauschildt 2004). Therefore, idea management actually contributes to all sectors of internal innovations: product (for example by new product ideas), to procedure or process (like operational innovations in the manufacturing sector) as well as social (e.g. through ideas regarding staff training).

Idea management can now - as far as it is possible to integrate these into the present structures and processes of the company - be realized either internally or externally. This creates the opportunity of executing especially innovative and high-risk projects, for example through co-operations with other businesses or subsidiaries. In short, the innovation process, starting with finding ideas and evaluating them, triggers other product and process development steps and finally ends with the introduction of the product to the market. In this context, idea management can only be sustainable and successful in the long run, if the general instruments of control are in line with the innovation process (Thom and Etienne 2000). Consequently, idea management does not only face strategic tasks, but also permanent and sustainable political promotion of the innovation processes (Rothman et al. 1976).

In summary, the tasks and processes of internal innovation processes correlate with those of the idea management and vice versa. From that point of view, emerging companies have the opportunity of implementing last-

ing innovation management by systematically integrating idea management into the innovation process as early as possible.

3.3 Derivation and Model Approach of an Integrated Idea Management

The following model approach is based on two main considerations. On the one hand, within the scope of classic idea management, the alignment is planned only for employees and managers of the company. On the other hand, the tradition that innovation only comes from R&D is obsolete, as indicated by empirical research (e.g. Cebon and Newton 1999; Dodgson and Hinze 2000). Hence, Folkeringa et al. (2005) found that market research, an active external network for knowledge acquisition and strategic efforts into the improvement of internal processes, is positively correlated to growth, whereby especially the networking factor is essential for the later innovation success (Ritter 1998). These results indicate that the knowledge absorption and creation is relevant for successful innovation in growing companies. There are a few attempts to broaden this view, but they have not been put in concrete terms within the scope of a model so far (e.g. Birdi et al. 2003).

There are other approaches to idea management. In 1984, Brinkmann and Heidack introduced idea management that comprises "all ideas and innovations for the dynamics of an organization, which is subject to permanent change, for the development of the standard of performance and for the contentment of the members of the organization" (p. 85). However, the appearance of an innovative organization was not foreseen by Brinkmann and Heidack. In the context of trends within the idea management, Sander (2003) suggests that businesses have become idea factories. This was a combination of information and knowledge in which idea management was a creative inventory and reporting medium for the internal organizational processes. Even if he implies the inclusion of customers and suppliers in idea management, further examinations are missing. Geschka (2005) suggests integrating external experts, customers or end users into the idea management within the scope of creative workshops, thus confirming the tendency toward an integrated idea management although it lacks further development and subordinated comprehension within the innovation management.

"Now more than ever, competitive advantage comes from the ability to transform ideas into value - through process innovation, strategic insights and customized services. We are evolving towards a diverse yet unified global market, with customers, partners, and suppliers that work together across cultures and continents" (Gates 2005, n.p.). Clearly, it is not enough to incidentally look for ideas inside the company. An approach by Thom (1980) describes the environment of the company in the context of organizational conditions and variables of the innovation management and hence gives starting points for further considerations (see Figure 3-2).

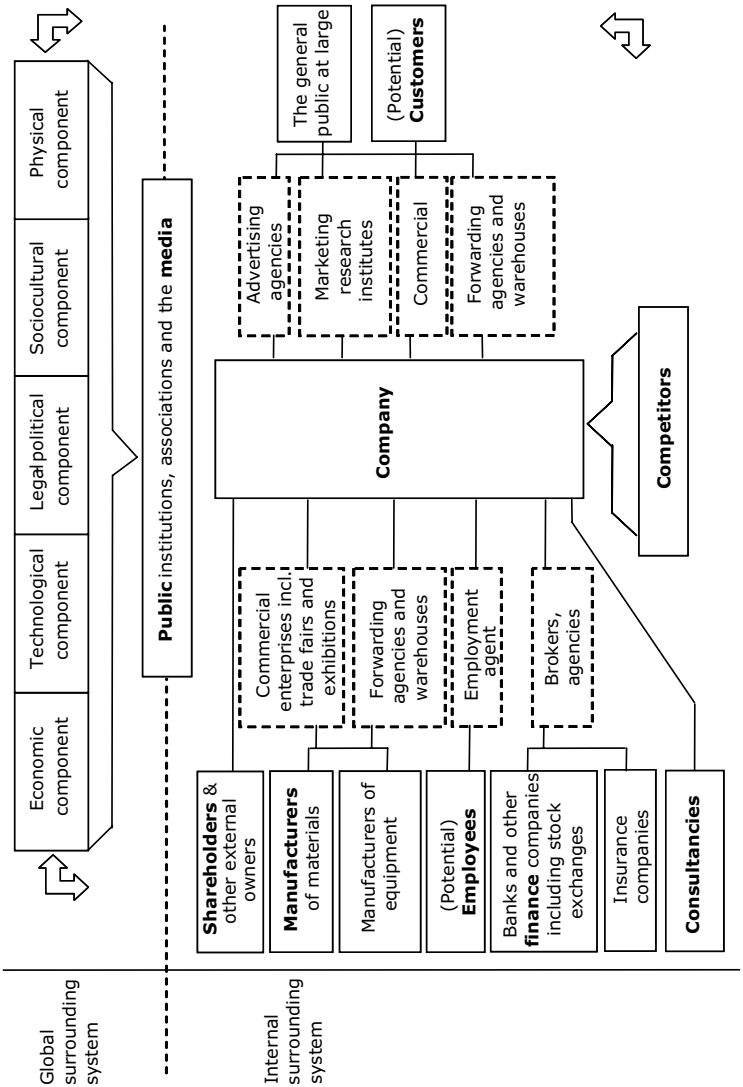

Figure 3-2: Elements of the internal environment (Thom 1980)

In line with the task-specific system, Thom (1980) thereby stresses single components and their potential influence on the company's attitude regarding innovation:

- Shareholders and other business owners are affected if, for instance, decisions about important innovations are made which require agreement.
- Suppliers and other manufacturers of preliminary products (e.g. material, equipment) determine the scope within which product innovations are possible.
- The ability for innovations is formed decisively by the quality of the staff or potential employees.
- Financial matters often create a bottleneck regarding the planning of innovations; therefore, financing institutes are important partners.
- Consulting companies (e.g. tax consultants, patent attorneys) clarify the situation in the environment, work actively as qualified promoters and support the introduction and improvement of innovation instruments.
- Competitors both on the buying and selling markets can play a decisive role in the selection of an innovation strategy depending on the specific market situation.
- (Potential) customers make decisions regarding product innovations through suggestions and acceptance.
- Opinion leaders and reference groups in the general public can boost innovations by interacting with the business (e.g. in form of public relations).
- Public institutions, associations, media and conferences can serve as platforms for the support of innovation plans.

The strong influence of interest groups regarding further development of an idea is obvious but was not used by Thom in this context. Therefore, the goal of this chapter is to combine the basic elements of the introduced internal environment with the approach of idea management to an integrated one. This model is important for emerging technology businesses because they are dependent on the development of unique target-oriented and cost-focused selling points through their products and processes.

This advancement is necessary because idea management, in its classical form, only introduces ideas with the objective of process innovations and

improvement within the company. It therefore concerns only the employees and the ideas are mainly operative ones and consequently rarely trigger radical innovations for new products and processes. Moreover, information flows into and within the company are considered to be very important in sparking ideas and developing innovative concepts (Adams et al. 2006)

Thus, the goal of this classical concept is to optimize existing processes systematically. Several newer methods are also geared towards the improvement of existing structures and processes, e.g. through instruments like Kaizen (Imai 1986).

The future integrated idea management shall hence serve as a coordinating and tracing system of ideas not only for process innovations, but also for radical product innovations from inside and outside the company, as the ability to identify, acquire, and utilize external knowledge can be critical to a company's success (Zahra and George 2002).

Within the scope of an integrated idea management, it is important to include all internal and external creative resources which enhance the innovative ability of the business. Here, the use of external experts' industry knowledge can serve this purpose as they do not only support the discussion of trends and possible changes with the business, but also help to analyze and forecast effects on products and processes (Wildemann 2003). Businesses are surely aware of the synergetic potentials of a cross-company exchange, but use it insufficiently due to missing exchange possibilities. Those that already engage in an external idea exchange consider it as extremely useful (Kahn 2006). In addition, such an exchange pays off: Businesses practicing an external exchange have higher savings and higher revenue, one third on average, and a higher realization rate of nearly 20% (Trommsdorff 2003). The model is illustrated in Figure 3-3.

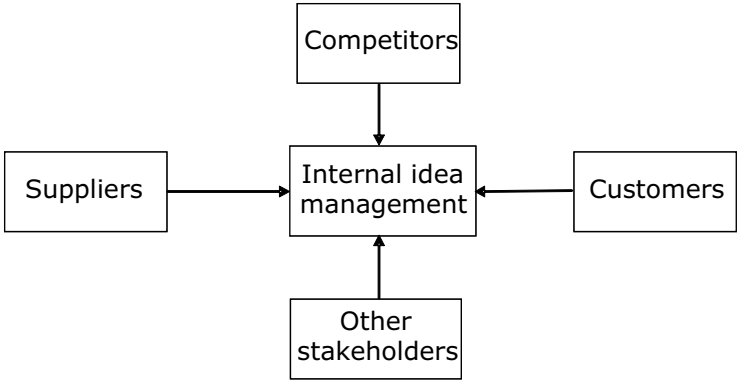

Figure 3-3: Five factors of the integrated idea management

The model is divided into the fields of conceptual design, organizational aspects as well as the adjustment of processes. For this purpose, the conceptual elements or protagonists are presented first.

Internal idea management assumes that the possible internal idea management instruments are exhausted as far as possible, e.g. employee suggestion system, Kaizen, quality circles, etc. This is necessary to enable integration of external groups. Consequently, a successful cooperation requires as many interfaces and starting points as possible, which have to be created by an internal idea management.

Integrated idea management itself serves as a coordinating and tracing platform which gathers all relevant ideas from inside and outside the company and makes sure that these ideas - dependent on the various kinds of the ideas - are appropriately used in the corporate innovation process. Hence, there is a need for determining the exact processes for these ideas, depending on the specific type of innovation they may result in (product, process or social innovation). For example, an idea for a new product needs multiple evaluation steps and criteria.

To build such a successful process design, specific expertise and experience is needed (Ridgman 1996). In addition, integrated idea management needs to constantly motivate internal and external idea sources for new ideas. The goal is that every 'idea source' acts like an entrepreneur (Drucker 1985).

However, this whole integrated idea management process is characterized by a high degree of complexity and must be efficiently organized in order

to work effectively in the long run. Depending on the size of the company, an organizational integration like an 'idea management department' or 'idea management coordinator' is needed to handle the instrument. The term 'integrated' itself aims at the fact that not only internal, but also external idea sources are now included in the innovation process.

In the following, different external idea sources will be introduced in detail.

Hardly anybody outside a company knows its products and processes better than its suppliers (Bessant 2003; Petersen et al. 2003; von Hippel 1995). Research finds that intensive integration of suppliers in the value creation process positively influences the success of the company, particularly in highly competitive industries (Wingert 1997). This is a result of the progressing reduction of the depth of value creation of manufacturers and increasing transfer of know-how towards the suppliers. The trend to unitize and to buy complete systems contributes to value creation (Eisenbarth 2003). In multi-level business-to-business relationships, the suppliers often have the best or only access and comprehensive knowledge about the end users (Groher 2003). Therefore, suppliers determine the scope of possible innovations. By embedding them into an integrated idea management, it is possible to collect and implement supplier ideas in a targeted and structured way. These can either be in the internal processes (e.g. improving the communication, product-specific optimizations such as packing, etc.), or more general (for example by using a different component of the supplier, introducing new technologies or specific consumer knowledge). A practical way for supplier integration is for example the use of guest engineers (Maylor 2001). The main risk for suppliers is the danger of releasing or using confidential expertise gleamed from other sources. Reciprocal trust is critical for this to work (Groher 2003). Instruments such as the continuous improvement model or collaborative engineering already involve the suppliers, but mostly on an operative level only.

These methods offer important strategic market and contact information enabling network access which is especially useful for growing businesses that are lacking essential experience within the industry. The knowledge of these networks often remains elusive for young businesses for various reasons (Strebel 2003).

For a long time, there has been the perception that the customers are successful contact partners and suppliers of ideas for business innovations (Geschka 1989; von Hippel 1986). When involving the customers, there is a range of alternatives for building cooperation: anywhere from passive interaction via the verbalization of needs to the active involvement in the innovation process where the customer develops a product idea to fulfill his own needs and then looks for a manufacturer to realize the product. The role the customer plays depends on the type of the product, on the product-oriented economical set-up, as well as the level of development of the innovation (Reichart 2002; Herstatt et al. 2003). It correspondingly applies to finding especially suited and committed customers who can be integrated in such a process, so-called 'lead users' (von Hippel 1976; Little 2004; Lüthje 2000). They fundamentally contribute to the innovation process because they "tend to adopt new products faster and more intensively than other users" (Schreier and Prügl 2006, p. 2).

New trends for successful customer integration include user toolkits (Jeppesen 2005), podcasts and blogs (e.g. Singh 2006) or user improvements (Tietz et al. 2005). A more traditional tool for using customer ideas in the designing, manufacturing, and costing processes of products, services, and parts comes in the form of quality function deployment (Akao 1990; Sher 2006). Still, the long-term success of such initiatives strongly depends on the organizational innovation culture and its corresponding characteristics (Sommerlatte 2006). This culture often falters when the original founders leave the company (Voigt and Brem 2006). Personnel turnover is a known problem in technology-focused industries and fast growing companies must consider how turnover affect their culture (Olson and Bakke 2001). The more passive ways to integrate customers include customer complaint analysis and elaborate market research. Empirical tests have found that successful innovative companies often do not only rely upon market research, but also include qualified experts with relevant knowledge from other markets in the search for innovations (Herstatt 2002; Landwehr 2005). Hence, the willingness to invest resources in an idea that might fail is the most important characteristic of a successful innovation culture (Lind 2002). The exact manner of involvement in integrated idea management depends on each situation. Since decisions are non-autonomous, potentially occurring interactions have to be considered.

Competitors determine the range of innovation activities on the procurement and sales market and are therefore particularly interesting when analyzing innovation strategy. Nevertheless, it is necessary to select the 'right' competitors in order to gain a strategic advantage (Porter 1985). Various positive effects can be used, e.g. concerning market development (Porter 1985). Benchmarking is a practical way to put that into practice (Balm 1992). While it is doubtlessly more difficult to use competitors as benchmarks (von Hippel 1995), there are signs that competitive thinking is often not as strong as assumed (Trommsdorff 2003). A detailed legal check on legitimacy should, however, happen in this context.

External stakeholders are 'opinion leaders and reference groups in the general public' as well as 'government institutions, associations, media, and congresses', as described by Thom (1980). These external business fractions are not only important to support innovation, they are also sources of innovations. They are included here because they do not belong to any of the other groups. For instance, legislation and patent databases can serve as sources for innovations which are not self-enforcing. In some cases, technology push and market pull can be supplemented with regulatory push (Rennings 2000).

Without focusing on a specific group, the question remains how companies can succeed in keeping integrated idea management active in the long-run. It is important to create a win-win situation for everybody involved. Supporting the individual's intrinsic motivation has the longest lasting effect (Stenmark 2000). This can be encouraged with a variety of techniques including public recognition of the people with the original idea and involving people as the idea is realized. However, it should not be assumed that all idea sources want to be recognized in the same fashion.

Hence, the final goal of integrated idea management is to gather as many ideas as possible in order to find the best ones. With this concept, integrated idea management is nearly identical to the idea of 'open innovation', whereby this only refers to the possibilities of integration of external parties (Docherty 2006).

3.4 Illustrative Evidence from an Exploratory Study

3.4.1 Method

The qualitative, empirical approach is based on Brewer and Hunter (1989). In order to realize the practical relevance of the presented model, qualitative guided interviews with nine experts were conducted using explorative analysis (Witzel 2000). Therefore, research results are qualitative. However, a wider significance is gained by a systematical selection of experts belonging to different industry sectors. Experts are defined as competent persons who are interviewed about their field of experience and views (Berekoven et al. 2001). It was necessary to conduct open-ended interviews supported with an interview guide. The interview procedure was structured such that questions regarding existing individual idea management at the business were asked before the questions about integrated idea management. This approach helped to establish accurate understanding about specific connections, for example between their current idea management and their potential to accept integrated idea management. Most questions were open ended and all interviews were taped, transcribed, and content-analyzed. Hence, narrowing the expert's answer possibilities was avoided (Böhler 2004). Since the business data is confidential, the reported results do not include identifiable information about any of the businesses.

The experts interviewed come from car manufacturers; subcontractors of the automotive industry; electronics; financial services; semiconductors; information technology; manufacturers of plastics; food and beverage; as well as personal transport. The sample solely comprises people responsible for company-specific idea management. The interviews took between 40 and 60 minutes and were carried out by phone.

3.4.2 Key Results

Six interviewees stated that they introduced or fundamentally revised their idea management about three years ago. Five respondents built up or revised their internal idea management internally, while others did it together with external partners. All interviewed companies have their own idea management department with the number of employees dealing solely with idea management varying widely; typically between one and twenty employees. About 38% of the ideas submitted in the context of these corporate units have been realized.

'Idea management' is typically operationalized in an operative manner where ideas mainly come from employees and rarely induce comprehensive innovations. For the majority of the businesses interviewed, the percentage of such operative ideas is between 80% and 90%. However, few have great profit potential. When questioned whether and how an expansion of the internal idea management would occur, all respondents named customers and suppliers as the primary partners to be sought. 'Friendly' businesses and stakeholders have been stated as idea input resources in a few cases, whereby the importance of a careful selection in these groups was always emphasized. One expert said that he regularly meets with employees from competing businesses. This is possible because they are not direct competitors as they have different customers. From these informal gatherings they collect both product and process ideas. Another interviewee stated that his company is in close contact with the local government to be up-to-date regarding current and future legal issues for his business unit. As a result, process improvements can be derived from such activities.

After presenting the concept of integrated idea management, interviewees were asked to give their first impression and the judgment of the success potential. Seven respondents supported the approach, while the remaining two participants rejected it. Surprisingly, some businesses considered the approach seminal and have already partly implemented it. Integrated idea management activities would predominantly be accomplished by functional areas and coordinated together with idea management, as a direct involvement of these activities is regarded as too complex and too elaborate. The interviewees who did not like the integrated idea management idea said that external persons had their own interests and pursue them separately and that, essentially, suppliers are not only interested in increasing sales, but also in supplying their own business with external know-how.

Those businesses that previously implemented some aspects of it spoke specifically of integrating customers and suppliers. All participants already use customer involvement systems, but only in an unstructured way. Most common are regular customer surveys. Most interactions typically take place in the company's marketing and sales or R&D departments. For example, employees from sales regularly meet key accounts and innovative people from other companies to talk about recent developments and

threats to their business, independent from their professional relationship. These meetings are informal and not centrally coordinated; therefore, while some ideas reach the right person within the company for further development, many others do not. Cooperation with suppliers takes place as well. Four interview partners mentioned regular workshops with external parties, together with employees from the purchasing department. Topics encourage collaboration in special functional areas as logistics, production as well as quality management. Obviously, these activities imply a less complex connection between both parties; most of them mention single and/or modular sourcing relationships.

However, these integration efforts typically do not take place through idea management, but rather via the corresponding functional areas such as sales or customer service and procurement. These results confirm the decentralization trends within corporate technology management (Rubenstein 1989).

The essential success factors are the organizational integration and the continuing motivation of all people concerned. Finally, it was inquired to what extent the respondents think the share of comprehensive strategic innovations would increase significantly with integrated idea management. These statements were answered altogether in the affirmative by the majority, but diverse critical points must be considered:

- The rearrangement is too complex and too costly.
- External groups do not know the companies internal and external status (e.g. resources situation).
- The general legal conditions are counted as inhibiting factors.
- The identification and integration of the first partner turns out to be difficult.
- Direct communication via other internal areas is often more efficient.
- It is a tedious process to build up loyalty and acknowledgement of the partners.
- 'And what do I get out of it?' mentality of external partners.
- Difficulties in getting over 'sector egoisms'.
- The relevance problem of certain ideas (How much ideas are needed to know they are really relevant?).

Further research is needed to determine if these are only smaller difficulties to be overcome or evidence of more fundamental problems prevent-

ing a high degree of integrated idea management. Despite the mentioned threats, it is evident that integrated idea management is currently going through an upheaval, which is demonstrated by the ongoing introduction and restructuring within most of the companies. Idea management could end the perception that the employee suggestion system is the sole method of acquiring new ideas; as it is in fact a part of integrated idea management. Still, one interviewee noted that 'we would do more if it was not so complex and sapping.'

One aspect not questioned was the importance of the company's innovation culture. Nevertheless, interviewees made it clear that it is highly relevant, particularly for personal motivation. One participant pointed out that 'if an idea gets through into a successful innovation, no one will notice. But if it fails, then you will be blamed for that. So finally, you have no chance to win something'. As long as the company's innovation culture gives negative incentives, it is unrealistic to expect above-average results.

3.5 Conclusion

This study shows that those businesses which have already built up intensive customer and/or supplier relationships in order to generate ideas usually do not encourage them with a centralized idea management system. On the contrary, individual functional areas like sales, procurement and production are involved in these processes, though mostly uncoordinated. Although most of the interviewed companies already integrate external partners into their idea management processes, they do not work efficiently as they lose ideas through the problems inherent with decentralized management.

The adequate integration of resources and know-how into the corporate idea and innovation management is missing. Directly linking the ideas to the process would make the innovation processes much more capable and ideas would no longer be lost. Consequently, idea management needs to be unhinged from day-to-day business and turned into a professional, integrated organizational unit - the specific realization depending upon the nature of the company.

Overall, the results described in the last paragraphs confirm the relevance of integrated idea management in practice.

Companies realize the potential for new or better products and processes by integrating a large number of idea contributors and a way to handle all the ideas.

Still, it is vital that the promising ideas are not only gathered and evaluated, but also further developed and realized.

There are different potentials for emerging technology ventures. Idea and innovation management is important from the initial stages of the establishment of a company, taking advantage of the fact that internal and external network structures are usually still manageable. Often, the personal contacts of the management and founders are crucial. The earlier integrated idea management is implemented, the greater the success rate for corporate innovations is. Moreover, there is no need to permanently pressure or reward involved parties because permanent changes to established routines are already a part of emerging ventures.

Hence, the task of integrated idea management is to systematically integrate the internal employee ideas with external ideas generated by customers, suppliers, competitors, and other stakeholders in a structured and lasting way. This is the best way to avoid high expenses associated with delayed idea integration. Young businesses depend on innovative ideas from multiple sources in order to develop new products and processes; something that is not only essential for the first product, but also for later product generations. A systematic process, integrated idea management, is necessary to select the most promising ideas.

A general comparison of idea management systems is difficult due to the different development of the systems at different companies, something we accounted for in our study. Within the evaluation of this model, it was shown that idea management is an elaborative and complex process. The varied and complex internal and external networks which can only be brought together with high financial and organizational expenses are the principal reasons. The organizational integration and further development are thus undoubtedly big challenges, especially for emerging businesses. However, these can be overcome with support and motivation for all people involved because the individual is still 'the heart of the matter' (Prahalad and Ramaswamy 2004).

Therefore, integrated idea management is a sophisticated and holistic approach. However, further research is needed to evaluate the practical im-

plementation of integrated idea management and its integration of external partners. There are already several possibilities of integrating these kinds of partners, but none specifically for emerging technology ventures (e.g. the lead user methodology). The single steps leading to integrated idea management must specifically be evaluated and determined for further development. To gain deeper insights into these fields, the authors have started several pilot projects to scientifically research these topics. Moreover, a regional 'idea best practice circle' with several technology ventures was introduced to gain deeper insights into the various idea management habits in practice. Surprisingly, the results show interesting parallelisms in their idea and innovation management practices, even though all companies are within totally different industries (Brem and Voigt 2007b).

4. Gender-Related Differences of Founding Intentions: The Role of the Micro-Social Environment, Education and Perceptions of Fostering and Inhibiting Factors

4.1 Introduction

According to the Global Entrepreneurship Monitor (Sternberg et al. 2005) and the Kreditanstalt für Wiederaufbau (KfW) Start-up Monitor 2005 (Hofmann et al. 2005) in Germany, fewer women than men are interested in founding their own company (only 29%), although women represent half of the employed population.

Over the last twenty years, academics and economic organizations have demonstrated a growing interest in women entrepreneurs, especially in the United States and Canada where the number of women-owned businesses has been rising. Female Entrepreneurship is now considered to be one of the sources of growth, employment, and innovation. In the United States, women-owned businesses are the fastest growing sector of new ventures overall (Becker-Blease and Sohl 2007). However, very little is known about women entrepreneurs (Orhan 2001).

In contradiction to previous research, which concentrates on women and men during their professional activity, this study concentrates on an earlier point in time and that is before the working life begins: in the pre-start-up phase. This means that situational factors, for example unemployment or poor career opportunities that could occur after the commencement of business activities have not been experienced yet and cannot influence the selection of the professional career (self-employment or not). For this reason, students were selected as a target group, as in most cases, students do not start their professional career during their studies. The micro-social environment (family background, friends, etc.), entrepreneurial education and specific cognitions (fostering and hindering perceptions) towards self-employment that influence the professional choice remain and are examined in this study.

Thus, the goal of this study is to cover a variety of influences on founding intention (family background, educational environment, and cognition) analyzed with regard to gender.

This kind of research is important as in Germany the founding intention is comparatively low, and especially in the area of entrepreneurship education there is still a need for further improvement (Opaschowski 2003).

4.2 Literature Overview and Hypothesis Derivation

4.2.1 General Overview

In the following, a comprehensive literature overview will be given (following Blumberg 2005).

The studies regarding gender-related differences can generally be assigned to two fundamental theories (Fischer et al. 1993). Liberal feminism as the first theory stems from the liberal political theory. Therein, it is argued that men and women are rationally equal and do not differ in their capabilities and have, thus, the same potential in general. Observable rational differences between male and female entrepreneurs in their achievements are, hence, the result of certain kinds of discrimination during the socialization. While men have the opportunity to realize their full potential, women are hindered to do so due to their socialization. Liberal feminism concludes that if women are treated equally to men, the differences will diminish and women will be more like men. Social feminism is the second theory that serves as an underlying base for research. Social feminism argues "that there are differences between males' and females' experiences from the earliest moments of life that result in fundamentally different ways of viewing the world" (Fischer et al. 1993, p. 154).

As a result of this, men and women develop different traits which are, however, not unequally effective to pursue a goal. In contrast to the liberal feminism, the social feminism is seen as the more appropriate theory to explain gender-related differences (Fischer et al. 1993) and will therefore serve within this chapter as a base.

In literature based on liberal feminism and on social feminism, there is no real consensus among scholars, whether small or large differences or differences at all exist. Empirical findings seem to be diverse and in many cases contradictory. However, the field of female entrepreneurship and in extension gender differences in the founding behavior and in the entrepreneurial behavior has attracted some attention in the last twenty years (Sandberg 2003; Mueller 2004; Verheul and Thurik 2001; Sexton and Bowman-Upton 1990; Birley 1989).

4.2.2 Male and Female Entrepreneurs

At the beginning, some well-known statements will be summarized for an introduction to the topic (Rosa et al. 1996; Verheul and Thurik 2001):

- Female businesses under-perform in number of employees, sales turnover, etc.
- Female business owners are less likely to own multiple businesses, less eager to plan expansion and tend to start smaller businesses with a smaller amount of start-up capital than men.
- The value of assets in female businesses is significantly lower than in male businesses.
- Men are more likely to want to grow their own business as far as possible, while female entrepreneurs prefer working part-time and in the service sector.
- In comparison to men, women are more risk-averse and spend less time on networking.

Thus, female and male entrepreneurs differ with respect to their personal and business profile: They start and run businesses in different sectors, develop different products, pursue different goals and structure their businesses in a different fashion (Brush 1992; Fischer et al. 1993; Chaganti and Parasuraman 1996; Carter et al. 1997; Verheul 2003). Despite the mentioned economic importance of female entrepreneurs, their number still lags behind that of male entrepreneurs. According to Reynolds et al. (2002), men are about twice as likely to be involved in entrepreneurial activity as women, and Minniti et al. (2005) show that in all countries participating in the Global Entrepreneurship Monitor in 2004, men are more active in entrepreneurship than women (Verheul et al. 2006).

Hence, men are more likely to be self-employed than women (Dolton and Makepeace 1990). Entrepreneurial women are less likely then male entrepreneurs to be motivated by financial success and advancement, but by family and lifestyle (DeMartino and Barbato 2003). Other studies emphasize the importance of independence, self-accomplishment and quality of life (Orhan 2001; Bennett and Dann 2000; Bradley and Boles 2003). Especially, the need for independence plays an important role (Carter and Cannon 1988). According to Ufuk and Oezgen (2001), the three most important factors influencing women in becoming entrepreneurs are: meeting the family needs, initiating social relations, and self-fulfillment. How-

ever, female business owners are more likely to face work-family conflicts than their male counterparts (Jennings and McDougald 2007).

While financial gain is a strong motivation for males in general (Wilson et al. 2004) it is less for women (Bradley and Boles 2003). Similar conclusions are made by Ljunggren and Kolvereid (1996), who found that women perceive themselves as possessing higher entrepreneurial abilities than men do. However, there is some evidence that women are less successful in these issues (Johnson and Storey 1993) or at least often not taken as seriously as men are (Koper 1993). Moreover, there is still a noteworthy gap in payment of men and women in general (Blau and Kahn 2007).

Besides the gender gap that is existent in venture creation and ownership activity, clear differences between the two genders exist as far as the founding setting is concerned. The fear of failure is more dominant among women as it is among men (Sternberg et al. 2004). Moreover, women are more likely to stress personal expectations while men are more likely to stress economic expectations during the start-up process of a company (Ljunggren and Kolvereid 1996).

Facing their personal situation, the probability of self-employment generally rises with age and number of children (Dolton and Makepeace 1990). Furthermore, there is some evidence that women entrepreneurs tend to be older than their male counterparts (Johnson and Storey 1993; Bennett and Dann 2000). But, as Kolvereid (1996b) argues, family background, gender, and self-employment experience only indirectly influence intentions to become self-employed through their effect on attitude, subjective norm, and perceived behavioral control.

4.2.3 Business Foundation Intentions

An issue that should be stated is that most of the literature mentioned before focuses on differences or similarities between the two genders after the commencement of the business activities and that is during the start-up or the later phases of the corporate development. The pre-start-up phase seems to be neglected or at least it has not attracted the attention that it should have.

There are several models that deal with the related corporate life cycle. These models vary from two stages (Dodge et al. 1994) to ten stages

(Adizes 1999). It is quite surprising that most of the models begin with the start-up phase and go on to the early development phase, but very few include the pre-start-up phase as a stage of the corporate development. However, it is in that particular phase that factors like personal intentions, motivation, and family background, etc. play the most important role in the employment status choice. The employment status choice has been defined by Katz (1992) as "the vocational decision process in terms of the individual's decision to enter an occupation as a wage or salaried individual or a self-employed one" (p. 30).

Whereas research on entrepreneurship has been fostering the past years, there is a limited number of studies that focus on entrepreneurial intention among students. Wang and Wong (2004) concentrated on the level and the determinants of interest in entrepreneurship among university students in Singapore and have found among others that whereas students evaluated their business knowledge as poor, their interest to start up a company is high. Scott and Twomey (1988) focused on university students' career aspiration in three countries, namely the USA, the U.K and Ireland, and found that the U.S sample aspiring to self-employment was low (25%) in comparison to the U.K. with 41% and Ireland with 34%. In a 1996 survey of 372 Norwegian business graduates, Kolvereid (1996a) found that 38% preferred self-employment. Lüthje and Franke (2003) report that from a sample of 2,193 engineering students, 44% indicate that they would rather probably and 11% that they would very probably run their own company after completing their studies. From the interviewed students, only 3% were already self-employed.

According to Kourilsky and Walstad (1998), females are significantly less likely than males (62%-72%) to want to start their own business. Building on this and on the fact that there is indeed a gender gap in business ownership with more men being self employed than females, the first hypothesis is derived.

H1: The level of entrepreneurial intention is related to gender, males' intention is higher.

4.2.4 Influence of the Family Background

Sing and DeNoble (2003) found that personality, gender and having a close self-employed relative altogether have a strong positive relation to

attitude on self-employment. In this context, Chen (1998) states that the number of entrepreneurial friends and relatives and the number of management courses were positively related to entrepreneurial decision and that male students expressed stronger intention toward becoming an entrepreneur than female students did. In this study it was also researched that entrepreneurial self-efficacy, which according to Boyd and Vozikis (1994) refers to the strength of an individual's belief that he or she is capable of successfully performing the roles and tasks of an entrepreneur, was positively related to the intention to set up a business. Besides that, Backes-Gellner et al. (2002) emphasize the perception of institutional ramifications as an important influence factor of foundation intentions.

In 1984, Klandt could show that the micro-social environment directly effects the founding activity. This variable includes the family environment, i.e. where the person grew up as well as the family which he/she founded. Referring to Klandt (1984a), the father's profession has an effect on the occupational decision of the son and the daughter, while the mother's influence is limited to the daughter. Thus, the father's profession seems to have a more universal influence. This study includes both the father's and the mother's self-employment as a further predictor of the personal goals and success perceptions of students.

Hence, there is some evidence that children of entrepreneurs are more likely to found a company than others (Scott and Twomey 1988; Wang and Wong 2004). For example, a study from Benett and Dann (2000) indicates that almost half of the researched entrepreneurs had self-employed parents.

The present study investigates whether males with self-employed parents are more likely to be interested in founding their own business than females with the same family background. Going a step further it is differentiated between the influence of the father and the mother on the children's intention to become self-employed.

H2: Males with self-employed parents are more likely to be interested in founding their own business than females with the same family background.

4.2.5 Influence of the Educational Environment

Lee and Wong (2003) found that there is a positive relationship between entrepreneurship education and the intention to start a business. This was also found and confirmed by the study of Voigt et al. (2006d) and Souitaris et al. (2007). In general, positive prior experience affects the perceptions of the desirability of starting a business (Peterman and Kennedy 2003). A critical factor for successful entrepreneurship education is to include charismatic instructors who can communicate their enthusiasm for entrepreneurship through non-verbal expressiveness because this will inspire students, which leads to a higher level of entrepreneurial intention. So, the greater the inspiration from an entrepreneurship program is, the higher the students 'post-program' increase in attitude towards subjective norm and the intention to become self-employed (Souitaris et al. 2007). Moreover, Swinney et al. (2006) state that the firm performance highly correlates with the level of education of the founder.

Whereas entrepreneurial courses in higher education have been offered in the USA since 1947 and there have been chairs as early as the mid-60s, the first chair of entrepreneurship in Germany was not established until 1997 at the European Business School (Klandt 2006). Fortunately, the situation in Germany is improving, as in 2006, there are about 60 professors specialized in the field (Klandt 2006). Moreover, there is an increasing number of so-called 'study cooperations', which mostly do not have an own entrepreneurship chair, but offer a selective variety of entrepreneurial courses (Voigt et al. 2006d).

This evolution could be a step that would lead to a transition from an education that only prepares students to become employees or managers of large companies to an education that also prepares students or at least gives the knowledge of how to become self-employed.

Therefore the influence of the field of study, the chosen major, the entrepreneurial education on the founding intention will be investigated under the assumption that men possess a higher interest in becoming self-employed.

H3a: Males whose field of study is business administration have a higher interest in becoming self-employed than females.

H3b: Males who chose entrepreneurship as their major have a higher interest in becoming self-employed than females.

H3c: Males that attended courses in entrepreneurship have a higher interest in becoming self-employed than females.

4.2.6 Perceived Inhibiting and Fostering Factors towards the Founding Intention

In literature, a plethora of studies can be found that analyzes the perception of inhibiting and fostering factors of students (Möller and Buttler 1998; Görisch et al. 2002; Scheiner et al. 2007; etc.). Möller and Buttler (1998) researched that the important founding reservations were lacking start-up finance and the high degree of risk. Especially students with a low intention to start an own business saw those reasons as hindering factors. Furthermore, 'too much work and too little spare time' was named as an important hindering factor. The main distinction between students with a low interest in starting an own business and those who showed a medium to high interest was the missing business idea. Concerning the fostering factors, independence and a better opportunity for self-realization were named as reasons to start an own business. Within the financial motives, the opportunity for profit was not as important as the financial reward for one's own initiative. Hence, it can be assumed that mainly inhibiting factors influence the founding intention. The results of Scheiner et al. (2007) also indicated that especially inhibiting factors seem to have the main impact on the founding intention.

Within the study of Görisch et al. (2002) only inhibiting factors were analyzed. The main important inhibiting factor was lacking start-up finance. Students with an interest in founding a business and those who would prefer an employment status differ in the motive of high personal risk as the latter perceived this factor as the second most problematic while for the former it played a minor role.

All studies have in common that fostering and inhibiting factors were not analyzed in regard to the influence of gender. However, bearing in mind the basic assumption of the social feminism that women differ fundamentally from men due to their socialization, it is necessary to analyze how gender affects the influence of inhibiting and fostering factors on the founding intention. Therefore, the influence of inhibiting and fostering fac-

tors on the founding intention through the gender lens will be investigated.

H4a: Inhibiting factors towards founding a company influence founding intention negatively. Gender differences in the perception of the factors are expected.

H4b: Fostering factors towards founding a company influence founding intention positively. Gender differences in the perception of the factors are expected.

4.3 Methodology

4.3.1 Research Methodology

The research process consisted of a four-step procedure which is oriented on an approach suggested by Kinnear and Taylor (1991). First, the identification and concretion of the research objective was done. Second, a written standardized questionnaire was prepared. Closed-ended questions were chosen so that the respondents had to choose between the reply alternatives given (Schnell et al. 1995). Furthermore, the questionnaire was designed in a manner to fulfill necessary requirements regarding clarity, clearness, and simplicity of the questions. Therefore, the structure of the questions was oriented on a procedure suggested by Zikmund (1982) and Proctor (2000), which sees general and easy questions at the beginning and sensitive or rather difficult questions at end of the questionnaire. Third, test interviews were conducted to improve the questionnaire, using the debriefing method and the protocol method (Proctor 2000). Test respondents were students from the business faculty as well as senior research assistants from marketing and statistical chairs at the university. To ensure that also exchange students would be able to answer the questions, also non-German-native-speakers were members of the test group. The forth step was the data collection.

4.3.2 Operationalization of the Variables

4.3.2.1 Intention

In order to measure entrepreneurial intention, the validated scale by Klandt (1984) was applied. The question used was 'Have you personally ever thought about founding your own business?'. Possible answers varied

from 1 (= no, not yet), 2 (= yes, occasionally), 3 (= yes, relatively concrete) to 4 (= yes, I have made the decision to become self-employed).

4.3.2.2 Family Background

To measure the family background of the participants a scale of Möller and Buttler (1998) was applied. 'Manual, skilled or semi-skilled worker', 'Salaried professional etc.', 'Government employee', 'Entrepreneur', 'Freelancer or other self-employed' as well as 'Other(s)' were given as answer alternatives.

4.3.2.3 Fostering and Inhibiting Factors

To measure the perception of fostering and inhibiting factors, the scale of Möller and Buttler (1998) was applied. Concerning the fostering factors, the question was used 'Please indicate which statement would best describe your feelings about starting a business' or respectively for the inhibiting factors 'Please indicate which statement would best describe your feelings about NOT starting a business'. Answer alternatives varied from 5 (= totally agree), 4 (= slightly agree), 3 (= neither…nor); 2 (= slightly disagree) to 1 (= totally disagree).

4.4 Data Collection and Sample Characteristics

The survey was conducted in winter 2006 at the Business School of the University of Erlangen-Nuremberg. The project was initiated and coordinated by the University of Erlangen-Nuremberg in Nuremberg (Germany) and the European Business School in Oestrich-Winkel (Germany). The questionnaire was handed out to the students.

The sample of this study comprised 553 students from the Business School of Nuremberg. The proportion of men and women was even. The average student was 23 years old, was in the fifth semester, single and has not attended entrepreneurship lectures. Furthermore, the majority of almost 70% (67.5% male students and 68.9% female students) has chosen business administration as the major field of study. Out of these, 44 students (28 male and 16 female) decided to focus on the business start-up and entrepreneurship program of the University of Erlangen-Nuremberg. Looking at the family background, almost 26% of the male students had a self-employed father and 12% a self-employed mother. In total, the female students more often showed an entrepreneurial family

background, as almost 30% had a self-employed father and 16% a self-employed mother.

4.5 Results

The results will be presented in two parts: First, some descriptive findings will be exposed and then, the focus will be on the findings from the hypothesis testing.

4.5.1 Descriptive Findings

The descriptives show that within this sample the founding intention is quite low as more than half of the students, both male and female, only occasionally thought about founding a business (see Table 4-1). If the mean score for the whole sample is taken into consideration (AM:1.1, SD:1.01) then it is showed that there was almost no intention from the side of the student to become self-employed.

Founding intentions	Percentage	
	Male	Female
No, not yet	17.8	28.9
Yes, occasionally	55.8	57.0
Yes, relatively concrete	16.9	8.6
Yes, I have decided to become self-employed	9.5	5.5
Total	100.0	100.0

Table 4-1: Have you personally ever thought about founding your own business?

Table 4-2 presents the mean and standard deviation results as far as the inhibiting variables are concerned. In all cases, female students perceived the inhibiting variables as more intimidating (preventing them from founding) than male students did.

Male		Inhibiting variables	Female	
AM	**SD**		**AM**	**SD**
2.65	1.29	Missing business knowledge	2.98	1.39
3.58	1.35	Missing concrete business idea	3.69	1.37
3.65	1.22	Missing seed capital	3.81	1.26
3.52	1.20	Insufficient practical experience	3.77	1.21
2.59	1.47	General missing interest	2.97	1.54
2.80	1.21	Missing founding partner/team	3.07	1.29
3.25	1.27	Missing business network	3.48	1.22
3.26	1.20	Missing market knowledge	3.42	1.25
3.02	1.09	Missing market transparency	3.18	1.16
2.10	1.30	Spouse or partner disapproves of the idea	2.13	1.26
3.66	1.71	High financial risk	3.90	1.09
2.84	1.15	Low income	3.06	1.18
2.90	1.81	Too much work for too little money	3.10	1.29
3.17	1.20	Too much work and too little spare time	3.24	1.31
2.88	1.08	Bad economic climate	3.20	1.23
2.42	1.19	Bound to the own company	2.72	1.31
3.39	1.32	Risk of failure	3.63	1.25
2.19	1.08	Missing social appreciation	2.36	1.21

Table 4-2: Please indicate which statement would best describe your feelings about not starting a business (from 5= totally agree to 1= totally disagree)

In Table 4-3, the mean and standard deviation results for the fostering variables are presented. In almost all cases, female students perceived the fostering variables as more important for their founding intention than male students did.

Male		Fostering variables	Female	
AM	SD		AM	SD
3.85	1.86	Self-realization	4.11	0.93
4.06	1.11	Higher independency	4.11	0.92
3.29	1.21	Put studies into action	3.44	1.10
4.09	0.97	Higher autonomy of decision	4.13	0.88
2.85	1.73	Good economic climate	3.09	1.90
4.15	0.95	Realize idea/ pursue own business idea	4.26	0.84
3.54	1.07	Gain experience	3.73	1.03
3.95	1.01	Bear responsibility	3.87	1.00
3.14	1.19	Higher prestige/social status	3.07	1.09
3.66	1.16	Higher income	3.63	1.04
3.84	1.06	Potential profit	3.69	1.03
2.53	1.53	Continue family business	2.87	1.20
2.67	1.26	Motivation by friends and family	3.10	1.29

Table 4-3: Please indicate which statement would best describe your feelings about starting a business (from 5= totally agree to 1= totally disagree)

4.5.2 Hypotheses Testing

Hypothesis 1 stated that the level of entrepreneurial intention is related to gender and that males' intention is expected to be higher. The mean value regarding the founding intention of male students is 1.28 (SD 1.063) and 0.96 (SD 0.932) for female students. The t test (95%) showed significant differences in the founding intention between the genders (see Table 4-4). Therefore, hypothesis 1 is confirmed by the analysis of the data and this result is in accordance with recent research.

	t	df	p
Intention	3.531	496	.000

N= 498, t= t value, df= degrees of freedom,
p= significance at the 5% level

Table 4-4: t test, gender differences in the founding intention

The second hypothesis, namely, that males with self-employed parents are more likely to be interested in founding their own business than females with the same family background was only partially confirmed by the data. A t test was conducted separately for the influence of the father's and the mother's self-employment on the founding intention of the

children. Regarding the influence of the father (see Table 4-5), significant differences in the mean intention were found between male and female students (with males showing higher intention AM= 1.56 vs. AM= 1.12). However, the same does not apply for the influence of the mother. No significant differences (see Table 4-6) could be found in the mean intention of males and females. Hence, the family background plays indeed a role in the formation of the entrepreneurial intention of the male and female students, but the father's influence is stronger than the mother's.

	t	df	p
Intention	1.981	116	.049

N= 118, t= t value, df= degrees of freedom,
p= significance at the 5% level

Table 4-5: t test, gender differences, influence of father's self-employment on founding intention

	t	df	p
Intention	-0.323	66	.748

N= 68, t= t value, df= degrees of freedom,
p= significance at the 5% level

Table 4-6: t test, gender differences, influence of mother's self-employment on founding intention

As far as the influence of the education is concerned, not all hypotheses are accepted. Hypothesis 3a on the field of study and entrepreneurial intention among males and females is accepted by the t test analysis. Males whose field of study is business administration have a higher interest in becoming self-employed than females (AM: 1.39 for male students vs. 1.02 for female students) and the difference is statistically significant (see Table 4-7). In testing hypothesis 3b, the conducted t test (see Table 4-8) surprisingly showed no significant differences in the founding intentions of males and females that have chosen entrepreneurship as a major. Thus, this hypothesis is rejected by the data of this study. Once more surprisingly, the conducted t test (see Table 4-9) showed no significant differences in the founding intentions of males and females who had attended courses in entrepreneurship. Male students however seem to have a slightly higher intention to become self-employed than female students after they attended courses in entrepreneurship (AM: 1.45 for male stu-

dents vs. 1.33 for female students). Hence, this hypothesis cannot be confirmed in this study either.

	t	df	p
Intention	3.240	334	.001

N= 336, t= t value, df= degrees of freedom,
p= significance at the 5% level

Table 4-7: t test, gender differences, influence of field of study on founding intention

	t	df	p
Intention	1.878	36	.68

N= 38, t= t value, df= degrees of freedom,
p= significance at the 5% level

Table 4-8: t test, gender differences, influence of major on founding intention

	t	df	p
Intention	-0.656	105	.514

N= 104, t= t value, df= degrees of freedom,
p= significance at the 5% level

Table 4-9: t test, gender differences, influence of courses in entrepreneurship on founding intention

As already stated previously, various fostering and inhibiting variables towards entrepreneurship were taken into consideration for this study. A confirmatory factor analysis (varimax rotation, main component analysis) reduced the 18 different inhibiting variables to four factors (see Appendix A and B): lacking pre start-up know-how, financial and failure risks, lacking interest and ideas, and social hindrances. The four factors together explain a total of 57.57% of the variance. The first factor includes items like little market knowledge, no partner, and no practical experience and explains 35.19% of the variance. The financial and failure risk factor includes the fear of large financial risk, too much work and the fear of failure (9.18% of the variance). The third factor includes no interest and no ideas (7.87% of the variance). Finally, social hindrances are no family support and no prestige (5.33% of the variance).

The correlation analysis (see Table 4-10) for the whole sample (both male and female students) shows that there is a negative relationship between

all inhibiting factors and the founding intention. In other words, the stronger the inhibiting factors are perceived, the lower becomes the intention to become self-employed. The correlation between intention and the social hindrance factor is quite low (-.092), but still negative and significant at the 5% significance level. These results confirm the first part of the hypothesis 4a.

		Lacking know-how	Financial and failure risk	Lacking interest	Social hindrances
Intention	**Correlation according to pearson**	-.164(**)	-.217(**)	-.214(**)	-.092(*)
	Significance (2-sided)	.000	.000	.000	.043
	N	483	480	482	480

** The correlation is significant at the level 0.01 (2-sided).
* The correlation is significant at the level 0.05 (2-sided).

Table 4-10: Correlation analysis, intention and hindering factors

To test whether differences in the perception of the hindering factors between the two gender exist, two separate regression analyses for the male and female sample were conducted. As independent variables the four inhibiting factors have been used, with the founding intention as a dependent variable. For the male sample, only the lacking interest factor was significant (beta value= -0.162) and all the factors explain 5.3% of the variance in intention. The regression analysis for the women sample shows that the financial risk factor is the only significant influence (beta value= -0.225). Here, almost 8% of intention variance is explained (R^2).

In the case of the fostering variables, a confirmatory factor analysis (with four factors, varimax rotation, and main component analysis) has been conducted once more (see Appendix C and D). The 13 fostering factors were reduced to four factors: independence, status, external factors, and experience, which explain 66.89% of the variance. The independence factor includes striving for independence and freedom in decision making and explains 34.77% of the variance. The status factor includes items like higher prestige, higher income (14.07% of the variance). External factors are motivation by family and friends as well as good market conditions (11.02% of the variance). Finally, the experience factor consists of the

variables of gathering one's own experiences and putting knowledge into practice.

The correlation analysis (see Table 4-11) for the whole sample (both male and female students) shows that there is a positive relationship between three fostering factors and the founding intention. This means that the stronger the fostering factors are perceived the higher becomes the intention to become self-employed. The correlation between intention and external factors is not significant. These results partially confirm the first part of the hypothesis 4b.

		Independence	Status	External	Experience
Intention	**Correlation according to pearson**	.248(**)	.117(*)	.086	.180(**)
	Significance (2-sided)	.000	.010	.059	.000
	N	484	483	483	484

** The correlation is significant at the level 0.01 (2-sided).
* The correlation is significant at the level 0.05 (2-sided).

Table 4-11: Correlation analysis, intention and fostering factors

Once more, two separate regression analyses have been conducted for the female and the male sample to test whether differences in the perception of the hindering factors between the two genders exist. Regarding the male group, all the factors explain approximately 9% of the variance, whereas only the independence factor is significant (beta value= 0.245). As far as women are concerned, all the fostering factors explain around 6% of the variance of the founding intention. Again, only the independence factor is significant (beta value= 0.163).

4.6 Discussion and Conclusion

The comparison in the founding intention between males and females showed significant differences. This result confirms the conventional wisdom that the entrepreneurial intention of males is higher than that of females (e.g. Kourilsky and Walstad 1998; Wang and Wong 2004; Möller and Buttler 1998). Therefore, it is not only the founding activity which is higher among men, but also the founding intention.

In our sample, the family background only partially showed a significant influence on founding intention, however, with the father's influence only resulting in significant differences in the founding intention of male and female students. So, our second hypothesis is only partially supported.

Also, our third hypothesis (H3a, H3b, H3c) which deals with study-related factors could only partly be proved by this sample. When only looking at the field of study, males were more interested in founding their own business than women. Our findings tend to indicate that there could be a positive relationship between general business administration education and the intention to start a business. Surprisingly, entrepreneurship as a major and courses in entrepreneurship did not bring significant differences in the founding intention of the two genders. Perhaps this is because the sample especially for the students with entrepreneurship as a major is quite low.

Hypothesis 4a assumed that inhibiting factors towards founding a company influence founding intention negatively. This part of the hypothesis is supported by our data. The second part of the hypothesis was only partially confirmed. The lacking interest factor was found significant only for men. The financial and failure risk was found significant only for women. Hence, females perceive the establishment of a new company as more risky (especially financial risk) than men. This is in accordance with the results of recent literature (e.g. Johnson and Storey 1993; Scheiner et al. 2007; Ljunggren and Kolvereid 1996b; Sternberg et al. 2004).

Hypothesis 4b stated that fostering factors towards founding a company influence founding intention positively. This part of the hypothesis is accepted. When making the gender comparison for both groups, only the independence factor is significant. Thus, the results are surprising, as men are generally supposed to be strongly focused on financial gain (Wilson et al. 2004; Bradley and Boles 2003). However, our results show that men and women differ according to inhibiting factors, but not regarding to fostering factors. Therefore, the gender gap regarding the perception of a potential venture creation can only partly be supported.

4.7 Implications for Entrepreneurship Research and Practice

The research on German students with a focus on gender differences as far as founding a company is concerned should help in understanding the emergence of differences in the German founding landscape and in deduc-

ing recommendations for action. Furthermore, this research should help us to understand gender-related differences in founding intentions due to the perception of various fostering and inhibiting factors.

As people before entering into the working life were examined, influences of the working life can be controlled partially (not to 100%). As the measurement already takes place at an early point in time (during the studies), it can be intervened in time in order to finally strengthen the interest of founding a company and also the founding activity of women.

The results of our study could also have important implications for the academic field. The result that a student's intention to become self-employed is very low should serve a starting point for academics to rebuild entrepreneurship education. Adjusting the support activities and the lecture contents in a way that awakes the entrepreneurial interest for both male and female students is of great importance. In addition, it seems that mostly women lack information about financial support when planning to found a business. This could be included in lectures, too.

4.8 Limitations and Further Research

The selection of a single country has the obvious limitation of the generalizability of the results across populations and geographical settings. Furthermore, the limitation in generalizability also arises from the fact that the research took place in a specific time period, giving us a snapshot of the situation at a particular point in time. The results found may not be applicable if the circumstances change. In addition, the survey was conducted at only one university, which could affect the explanatory content.

Of course, intention can predict activity, but it is not activity itself. In a further step, a longitudinal study (Bryman and Bell 2007) could enable a further look to whether a student's intention to become self-employed has been realized and if not why. If, on the other hand, an intention has become reality, it is important to see the quality (in terms of turn over, number of employees, self realization of the founder, etc.) of the start-ups founded by former students.

There are already certain efforts to enhance generalizability by conducting a multi-country comparison of entrepreneurship education (Scheiner et al. 2007). Nevertheless, further research should include the comparison of various different states and countries, however, always under special con-

sideration of country- and educational-specific differences as these factors vary very strongly. Moreover, further research shall include longitudinal studies for implications about long-term differences and changes.

5. Pioneer vs. Follower: The Time-to-Market Dilemma – Results from an Empirical Study

5.1 Theoretical Background

Empirical findings regarding the relationship between innovation and market structure are scanty (Mansfield 1984; Pohlmeier 1992). However, in fast moving industries with short product life cycles, time-to-market can be seen as a key source of competitive advantage. Hence, time-to-market issues are a broadly discussed topic, especially in the context of product development (Voigt et al. 2007).

Therefore, the main goal is to compress the development time within different dimensions: integration of customer needs, engineering capabilities for integrated product design, and development of cross-functional teams and promotion of continuous learning (Datar et al. 1997). Hence, a corporate culture toward a 'learning organization' is essential for the long-term success (Sadler 1995).

As with other strategic decisions, the entry timing does not solely depend on market conditions, but mainly on the organizational characteristics (Wally and Fong 2000; Brem 2007). Focusing on new products, a main decision to make is whether the company wants to be the market pioneer or a later entrant, Schmalensee (1982) defines a pioneer as "being the first entrant in some sorts of markets" (p. 349). During and after product development, the management must decide the 'right' time for the market entry and work on an entry strategy (Lilien and Yoon 1990).

In order to constitute sources of competitive advantage and product market contingencies, Kerin et al. propose a framework of first mover advantages in comparison to later entrants (see Figure 5-1).

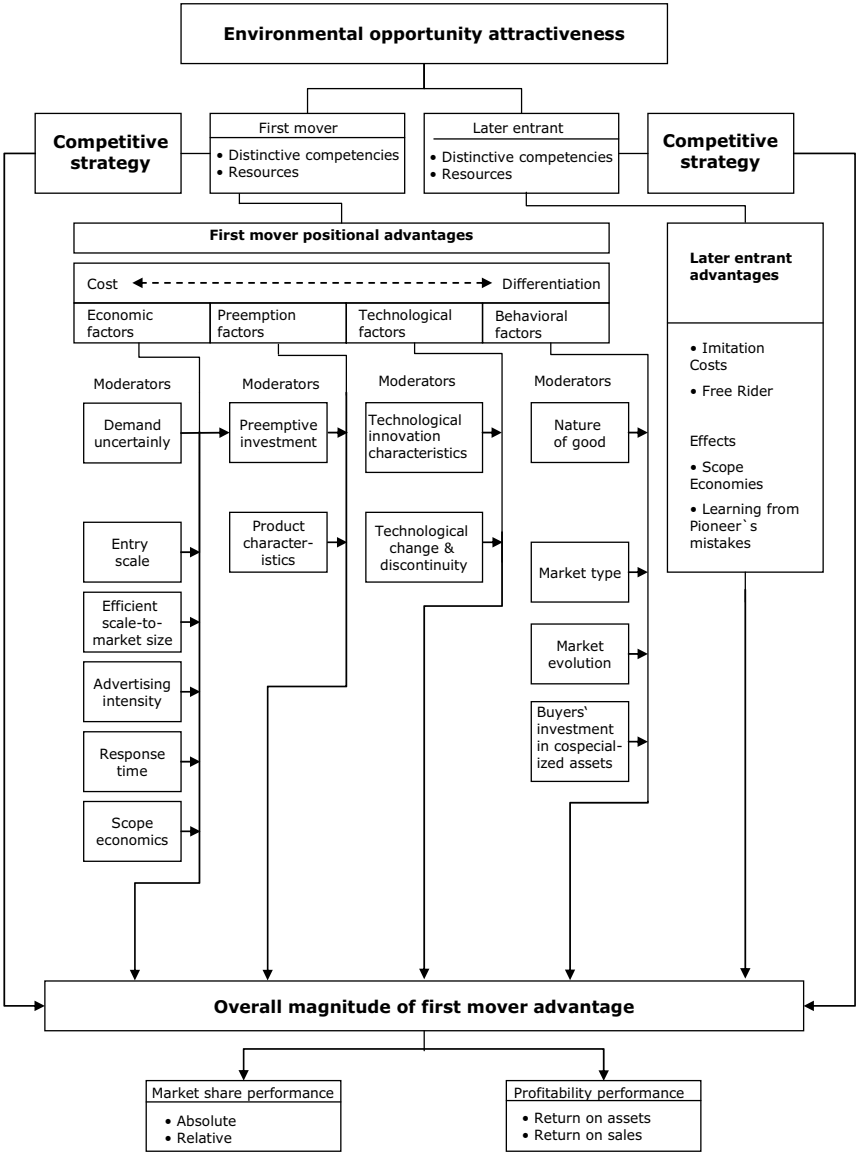

Figure 5-1: First mover advantage conceptual framework (Kerin et al. 1992)

This framework includes all parts of the time-to-market decision, explicitly for the pioneer and the follower as well as some arguments from the ex-

plained empirical insights. Essential factors out of this approach will be used later in this work.

Moreover, the correlations of the single elements are shown. This framework will be the theoretical background for further considerations, where the focus lies on pioneer vs. follower reflections.

In the context of time-to-market decisions, Lint and Pennings distinguish between two different kinds of strategic choices. If there are first mover advantages, a company with excellent R&D competencies will prefer to be the market pioneer because they can rapidly establish generally accepted technology standards. Other companies with excellent competencies in marketing and manufacturing will follow a wait-and-see approach in timing the market entry because of their available marketing power and possibility of gaining sustainable cost advantages (Lint and Pennings 1999) and higher profits (Gal-Or 1985). A way to achieve that is for instance a comprehensive branding strategy (Shankar et al. 1998). However, divergent hierarchies of marketing, R&D and production/ manufacturing are influencing the innovation and timing process indirectly, which often leads to unforeseeable risks and problems (Lühring 2003).

Golder and Tellis (1993) define a product pioneer as the first company to develop a new product category and a market pioneer as the first company to sell in a new product category. In this context, Ishioka et al. (2005), for instance, suggest a pioneer strategy for organizations which have a high level of product variety and low level of product similarity. However, there is no single rule to choose the right time-to-market strategy. Moreover, the arguments for being a pioneer or later entrant must be measured and applied in each specific situation and have to be reviewed for every new decision-making situation.

5.1.1 Pioneer vs. Follower Strategy

Almost 25% of German companies state that they pursue a pioneering strategy (Rammer et al. 2005). Hence, the factor 'time' and the corresponding timing decisions are an integrative part of corporate strategy (Voigt 1998). Based on that, the decision of a market entry can prove difficult due to the potential problems of premature entry or risks of missed opportunities. A pioneer has the advantage of building reputation and using experience curve effects, but he has to face big risks regarding prod-

uct and market development combined with high costs (Lilien and Yoon 1990). In this context, Teece (1986) suggests a first-to-market strategy if the key inventive novelty can be accordingly protected, the offensive innovation constitutes the dominant design, and if the innovator has access to the complementary assets needed to make and sell the products.

Popular indicators to measure first mover advantages are market share and the rate of company survival (e.g. Frynas et al. 2006; Tellis and Golder 1996). In general, research shows a strong transient relationship between the order of market entry and market share (Coeurderoy and Durand 2004; Dillon et al. 1979; Robinson and Fornell 1985; Robinson 1988; Mitchell 1991; Brown and Lattin 1994; Szymanski et al. 1995; Kerin et al. 1996). In particular, there are many empirical papers about first-mover advantages (e.g. Lieberman and Montgomery 1998). The perception that managerial resources or skills may be an explanation for the positive association between market entry and market share cannot be supported (Murthi et al. 1996). Fershtman et al. analogically argue that the order of entry has no relevance to market share in the long run (Fershtman et al. 1990).

The brand and the brand strategy of a company can be seen as the vital part of the pioneer advantage (Alpert and Kamins 1995; Kardes et al. 1993; Kerin et al. 1996). However, being first within the market is not always a long-term advantage; it is not sufficient to endure a long-term market leadership. Pioneers often fail and most current market leaders were not always pioneers (Tellis and Golder 1996). Further evidence highlights that the order of market entry is not related to long-term survival, so there is no guarantee for the pioneers' success (Kalyanaram et al. 1995; Golder and Tellis 1993; Sandberg 2001).

First movers can gain the advantage of their demand structures or their cost functions in comparison to later entrants. Later entrants, however, can find a way to overcome the first mover's initial cost advantage. Furthermore, there are hierarchical problems in large bureaucratic companies: the 'not-invented-here' bias and the fact that a company in its mature phase tends to be governed by the interests of its managers, who are not always congruent with the welfare of the company (Mueller 1997). Moreover, senior managers tend to block ideas from younger managers (Wills and Yearsley 1967). In addition, pioneer benefits consistently de-

cline with the industry age (Patterson 1993) and the order of entry advantage dissipates over time (Brown and Lattin 1994; Huff and Robinson 1994).

An exploratory study of Lilien and Yoon shows that the success for the first and second follower is lower than for the third and fourth, and again, lower for all subsequent entrants (Lilien and Yoon 1990). Urban et al. argue that the entry order is inversely related to its market share. Therefore, later entrants have a significant disadvantage. For that reason, later entrants should plan with lower market shares than the pioneer if the same product is offered (Urban et al. 1986). Moreover, smaller companies are more likely to be a pioneer (Lowe and Atkins 1994). Performance benefits of early followers can be achieved by a strategy of innovative marketing differentiation and a consistent cost leader (Durand and Coeurderoy 2001; Shankar et al. 1999), and the ability to learn from the pioneer (Cottrell and Sick 2002). Therefore, emerging market conditions can work for or against the pioneer (Nakata and Sivakumar 1997).

Nevertheless, all results must be seen against the background of a significant correlation between certain research methods and the findings of first mover advantages (Vanderwerf and Mahon 1997) as well as the missing implementation of non-market oriented factors such as political mechanisms (Frynas et al. 2006) or the varying pace of market and technology evolution (Suarez and Lanzolla 2005).

Even by investigating an industry with low barriers to entry, the pioneer and early mover advantages – at least in price – appear highly sustainable and resistant to subsequent entrants (Makadok 1998).

However, the greatest market share will be for the most innovative companies who are first to market and have a long lead time towards later followers (Huff and Robinson 1994), and which can continuous shorten their product development processes (Voigt 1998).

Finally, the market entry timing can be visualized through the product life cycle model (see Figure 5-2).

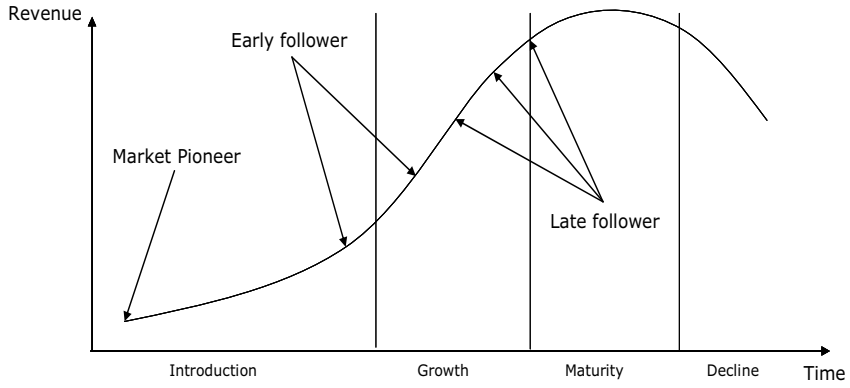

Figure 5-2: Market pioneer, early follower and late follower within the product life cycle

This view of each single role within the life cycle is important for our further understanding of pioneer and follower. In another comprehensive and more detailed view, there are nine combined timing strategies to consider (see Figure 5-3).

		R&D timing		
		R&D pioneer	Modifier	Imitator
Market entry timing	Market pioneer	Innovation leader	Modifying overtaker	Imitating overtaker
	Early follower	Sleeper	Early improver	Early imitator
	Late follower	Observer	Late improver	Risk minimizer

Figure 5-3: Strategic options and roles depending on R&D as well as market entry timing (Buchholz 1998)

5.1.2 Time-to-Market in the Automotive Industry

In highly competitive global markets, time-to-market is becoming a critical factor in determining success (Datar et al. 1997). These global mar-

kets are characterized by three mega-trends: shorter product life cycles in general, quicker product obsolescence combined with truncated life cycles, and more rapid introductions of new products in the market (Carrillo and Franza 2006). These challenges also describe the ramifications of the global automotive industry market.

In addition to that, there is a sector-specific high and still increasing level of outsourcing activities towards suppliers – most of the manufacturing costs of a new car are from externally purchased material accounts (Scannell et al. 2000). For years, these suppliers have been facing a consolidation process that results in a fewer number of global suppliers with increased specialization. So, there is a growing need for innovation and adding value to their products, especially for small and medium-sized companies – facing the parallel continuous need for cost improvement (MacNeill and Chanaron 2005).

The automotive supplier industry has a very high importance for the German economy, with 329,300 employees working in the industry. The total revenue in 2004 was over 65 billion Euros, almost ten percent more than in the previous year, and 42% of all sales were exports. (VDA 2005).

In such an innovative and competitive environment, it is interesting to see what strategic choices these companies have, especially with regard to the time-to-market dilemma introduced above. This will be shown within the following empirical analysis.

5.2 Research Methodology

5.2.1 Modelling

The research process consisted of a four-step procedure oriented on an approach suggested by Kinnear and Taylor (1991). First, the research objective was identified and concretized. Second, a standardized online questionnaire was prepared to ensure that all participants have the same questions in the same order and with the same wording (Schnell et al. 1995). Verbal scale rating answers and closed questions were provided so that the respondents had to choose between the alternative replies (Schnell et al. 1995). Furthermore, the questionnaire was designed such that it fulfills the necessary requirements regarding clarity and simplicity of the questions (Bryman and Bell 2007).

Therefore, the structure of the questions was based on a procedure suggested by Zikmund (1982) and Proctor (2000) which sees general and easy questions at the beginning and sensitive or rather difficult questions at end of the questionnaire to provide an easier structure as the respondent can get a general idea of the questionnaire's content (Churchill 1991). The questionnaire consisted of 30 questions. The selection of the topics covered and the formulation of questions were based on literature research concerning similar surveys and analysis in this field of study.

Within this survey, the respondents had to answer questions relating to one newly developed product that had to fulfill several criteria: A new product was defined as either a brand new product or a further developed product with new technical features. Did more than one product meet the necessary requirements, the respondents were asked to select the product that was either extraordinarily successful or unsuccessful (Cooper 1979; Perilleux 1987). Furthermore, the product had to be introduced into the market within the last five years, as argued by Kirschbaum (1995), the usual product life cycle amounts to five years.

In addition, by narrowing the period of time on five years, it could be ensured that the participants have the necessary information at their disposal to appropriately answer the questions. Third, test interviews were conducted, using the debriefing method (Proctor 2000), to improve the questionnaire. The survey was conducted from September to October 2005.

5.2.2 Collection of Sample

The survey sample comprised 300 companies from the automobile supplier industry in Germany. The automobile supplier industry was chosen, as companies in this sector are especially confronted with the time-to-market problem and the main part of the R&D activities are carried out by the supplier. In 2000, the suppliers had a share of 60% of the total R&D activities (VDA 2005). In this context, it is estimated that by 2010, 80% of R&D activities will be transferred to the suppliers.

The contact data mainly come from the Association of the German Automobile Industry (Verband Deutscher Automobilindustrie VDA) and the database 'Bayern International'. Furthermore, companies were added which were ranked in the 'Top 100 Automotive Suppliers' (Automobil Produktion 2004). This procedure followed the cut-off-approach. In addition, an arti-

cle was published in an online automobile supplier forum which included the link to the online questionnaire. Each company was contacted by e-mail to explain the ramifications of the survey and provide the link to the online questionnaire. After two weeks, a reminder e-mail was sent.

From the 300 identified companies, 64 participated and could be used for this study which is a response rate of 21%.

5.2.3 Hypotheses

Based on the literature research, 15 hypotheses will be used to examine the relationship between product success, strategies chosen, and situation determinants.

Two hypotheses are related to the R&D strategy and to the market entry strategy. In both cases, a positive correlation will be assumed. Hence, a company is more successful the faster the product is developed or the faster the product is on the market.

- *R&D timing strategy (H1): A positive correlation between the R&D timing strategy and the product success is assumed. Hence, a pioneer will be more successful than a follower.*

- *Market entry strategy (H2): A positive correlation of the market entry strategy and the product success is assumed. Thus, a pioneer will be more successful than a follower.*

Regarding situation determinants, three subgroups can be seen.

The first subgroup illustrates the synergy variable, with four hypotheses to be distinguished which are related to the production program, to product synergies, to market insights, and to the customer base.

- *Production program (H3): If the new product is a further development of an existing product, there is a positive correlation between production program and product success.*

- *Production synergies (H4): If synergies can be realized in the production program, there is a positive correlation between product success and the production program.*

- *Market synergies (H5): If a company has specific market experience and knowledge at its disposal, there is a positive correlation between product success and market insights.*

- *Customer base (H6): If a company already has an existing database of relevant customers at its disposal, there is a positive correlation between the customer base and the product success.*

The second subgroup comprises product and technology variables, including the degree of innovation, the complexity of new products, patent protection, and the time needed for the development.

- *Degree of innovation (H7): A negative correlation between degree of innovation and product success is assumed due to market adaptation. The higher the degree of innovation is, the lower the success will be.*

- *Complexity (H8): A negative correlation between the degree of complexity and product success is assumed. The more complex a new product is, the less successful the product will be.*

- *Patent protection (H9): The existence of a patent has a positive influence on the product success.*

- *Time needed for development (H10): A negative correlation between development time and product success is assumed. The longer the development time is, the more unlikely it is for product success.*

The third subgroup is related to the market structure. Therefore, market growth, the competitive situation, the access to distribution channels and the diffusion progression are pooled in this subgroup.

- *Market growth (H11): A positive correlation between market growth and product success is assumed, as the sales potential for all companies within the market is higher.*

- *Competitive situation (H12): A negative correlation between industry competition and product success is assumed. The higher the competition within a market is, the lower the success of the new product will be.*

- *Access to distribution channels (H13): A negative correlation between access to distribution channels and product success is assumed if the access is hindered.*

- *Diffusion progression (H14): A positive correlation between a fast diffusion progression and product success is assumed.*

5.2.4 Operationalization of the Variables

Following the variables, success, strategy, and situation determinants will be operationalized.

5.2.4.1 Operationalization of Success

Within this study, the method of self-evaluation concerning the success of products was used in the questionnaire. Hence, the respondents had to evaluate their products either as successful or unsuccessful. This approach had already been applied by Cooper (1979) and Perilleux (1987).

A dichotomic variable was defined where successful products are evaluated as 1 and unsuccessful products as 0. The measurement refers to a five-point rating scale.

The subjective assessment of the respondents was compared with objective success criteria. Therefore, it was necessary to divide success into economic and technical success. Economic success consists of revenue, profit, market share, and the coverage of development and market introduction cost through return on sales, whereas technical success is related to liability, high maintenance need as well as customer complaints. A factor analysis confirms this distinction (see Table 5-1).

Success criteria	Economic success	Technical success
Revenue	0.876	-0.067
Profit	0.833	0.036
Market share	0.835	-0.071
Coverage of development and introduction costs	0.806	0.169
Customer complaints	-0.070	0.900
Liability and high maintenance need	0.100	0.900

Cronbach's alpha for economic success is 85.5%
Cronbach's alpha for technical success is 77.5%
Extraction method: principal component analyis
Rotation method: varimax with kaiser normalization

Table 5-1: Factor matrix of success criteria

Therefore, the reliability is very high according to Nunnally (1978). Using the mean value for all success criteria, new variables were created: 'product exceeds expectations', 'product meets expectations' and 'product falls below expectations'.

5.2.4.2 Operationalization of Strategy

Due to the fact that a clear allocation of a company to a specific strategy often leads to problems, a special set of criteria was chosen to identify the strategic position of the surveyed companies.

In general and within the context of the invention or rather R&D timing strategy, the three groups of pioneers, modifiers, and imitators can be separated, whereas modifiers and imitators are different sub-types of the followers. For the distinction between pioneer and follower, three questions had to be answered by the participants in the questionnaire. The requirement for a pioneer is that the product has to be based on a new technology. A modifier, however, uses an existing modified and improved technology for his product, whereas an imitator uses the existing technology without any adjustments.

Furthermore, the source of the technology was analyzed. As the pioneer aims at becoming the market leader, he continues with in-house devel-

opment, the allocation of R&D to external partners, and joint R&D activities with strategic partners. A modifier tries to reduce the technological gap between his competitors by continuing with in-house development, the purchase of technological concepts or licenses. An imitator merely buys either licenses or technology concepts. A company was only assessed as a pioneer if all requirements were met. Otherwise, depending on the requirements met, the company was classified as a modifier or an imitator. The development pioneer received the variable value '1', the imitator '2' and the modifier '3'. For an exclusive analysis of a pioneer and a follower, a dichotomic variable was additionally defined, wherein the pioneer received the value '1' and the follower the value '0'.

Apart from the R&D timing strategies, companies were also classified in the field of market entry strategy. The company which has introduced a new product into the market first was classified as a pioneer. Companies were then subdivided into either early or late followers. Early followers introduce their product within two years after the pioneer and up to this point, no more than five competitors have entered the market. The circumstances at market entry of late followers are characterized by having more than five existing competitors and/or whether the product introduction takes place between two and five years after the pioneer.

The distinction is oriented on a study of Perilleux (1987). The new defined variable for the market entry strategy has the value '1' for the pioneer, '2' for the early follower and '3' for the late follower. In addition, a dichotomic variable was defined with '1' for pioneer and '0' for follower.

5.2.4.3 Operationalization of the Situation Determinants

The situation determinants were measured by means of a five-point rating scale. An exception are the 'customer structure' situation determinants, which were measured with three values, and the 'production program' and 'patent protection', which were measured with the two values 'yes' or 'no'.

5.2.5 Sample Description and Descriptive Findings

The companies surveyed will now be characterized according to the timing strategy, annual revenues and product success.

Concerning the R&D timing strategy, 25 companies classified themselves as being a pioneer while 39 stated that they were a modifier. No company defined itself as being an imitator which could be due to the negative im-

age an imitation strategy has. In the market entry strategy area, 32 companies answered being a pioneer or a follower. 21 of the latter said that it was a deliberate and planned decision. Between R&D timing strategy and market entry strategy, a small positive correlation of 0.224 could be identified with an error probability of p= 0.075. Hence, it can be said that a pioneer in the R&D area also tends to be a pioneer in the market entry area.

Regarding the annual revenues, the majority of the companies (48%) have an annual revenue of more than 500 million Euros. 25% are medium-sized companies with an annual revenue of between 100 and 500 million Euros. 27% could be classified as small-sized companies with an annual revenue of less than 100 million Euros (see Figure 5-4).

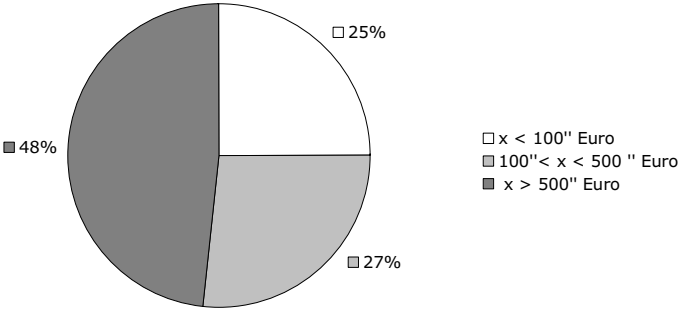

Figure 5-4: Companies according to revenue segments (N= 64)

Within this sample, internationally operating companies represented the majority, as only 26% of the companies stated that the main part of their revenue was achieved within the domestic German market.

Figure 5-5 illustrates the companies according to their number of employees. More than half of the companies have over 1,000 employees.

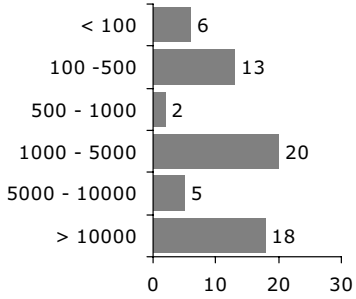

Figure 5-5: Companies according to
the number of their employees (N= 64)

Regarding the products analyzed, only a minority was in the declining phase (see Figure 5-6).

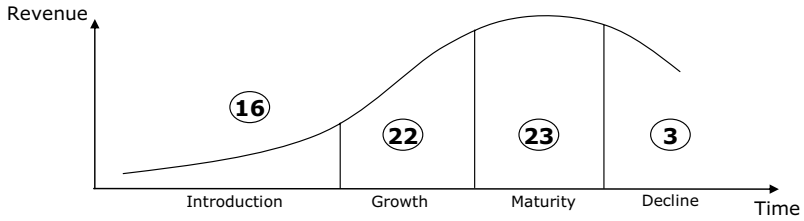

Figure 5-6: Products in the product life cycle (N= 64)

From 64 products, 46 were assessed by the respondents as successful and 18 as unsuccessful. 83% of the unsuccessful products did not meet the economic expectations whereas 61% exceeded the technical expectations. However, 41% of the successful products exceeded the economic expectations and only 37% met the technical expectations. 26% of the successful products even fell below the technical expectations. Hence, the comparison of subjective assessment with objective criteria shows that the economic success is the deciding factor for the new product assessment (see Table 5-2 and Table 5-3).

Success criteria	Successful	Unsuccessful
Product exceeds expectations	19	1
Product meets expectations	15	2
Product falls below expectations	12	15
Total	46	18

Table 5-2: Results regarding economic success

Success criteria	Successful	Unsuccessful
Product exceeds expectations	17	11
Product meets expectations	17	6
Product falls below expectations	12	1
Total	46	18

Table 5-3: Results regarding technical success

5.2.6 Influence of Strategy on the Product Success

First, the influence of the chosen strategy on the success will be analyzed. It will only be distinguished between pioneer and follower in the R&D timing strategy and in the market entry strategy. Hence, a company can be assigned to one of four strategic positions:

- R&D and market entry pioneer
- R&D and market entry follower
- R&D pioneer and market entry follower
- R&D follower and market entry pioneer

The distribution into the strategic options for both the companies with the successful products (46) as well with the unsuccessful products (18) is illustrated in Figure 5-7.

		R&D timing			
		R&D pioneer	Modifier	Imitator	
Market entry timing	Market pioneer	**16** 11/5	**16** 12/4	0	**32** 23/9
	Early follower	**5** 4/1	**13** 10/3	0	**18** 14/4
	Late follower	**4** 1/3	**10** 8/2	0	**14** 9/5
		25 16/9	**10** 30/9	0	**14** 46/18

Figure 5-7: Distribution of successful products to strategic combinations

The first number represents all products in sum, the following numbers the quantity of successful and unsuccessful products.

For the successful products, no correlation could be identified as the probability of error in all strategic combinations was higher than 5%. Hence, it can be argued that there is no single strategy which guarantees success; instead, all strategic positions can serve as a basis for future achievements.

Regarding the dependence of product success, strategy chosen and situation determinants, some descriptive findings are shown in Figure 5-8.

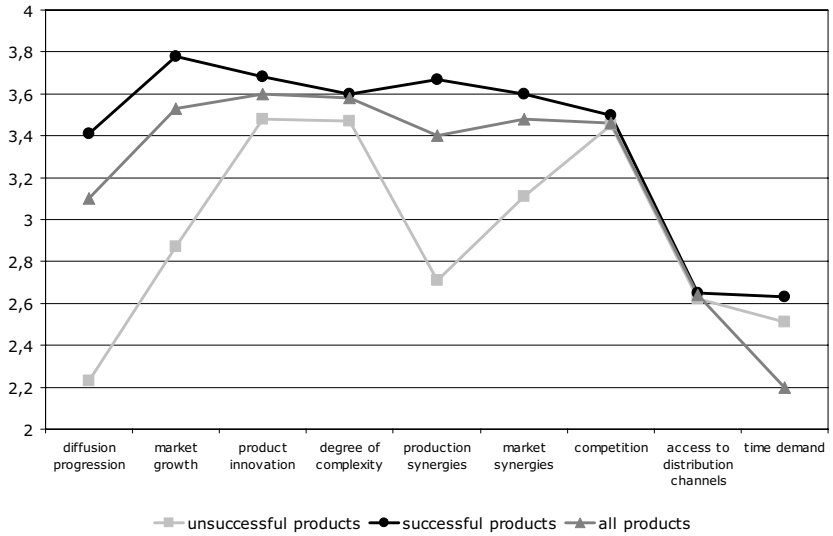

Figure 5-8: Dependence of product success, strategy chosen, and situation determinants

In the context of customer structure, only a marginal difference could be found between successful and unsuccessful products. The products were mainly sold to customers from the existing customer base.

When it comes to production program, slightly more successful (55%) than unsuccessful (50%) products were further developments of existing products.

Finally, more successful (63%) than unsuccessful (50%) products had a patent protection.

5.2.7 Influence of Situation Determinants on the Product Success

Second, the situation determinants will be related to the product success. Therefore, a data correlation test and a chi-square test were used.Table 5-4 illustrates the results of the analysis. Only the hypotheses 4 and 14 possess a significant positive correlation with the product success. For hypotheses 6 and 10, no tests could be carried out, as the requirements for a statistical analysis were not met.

Hypothesis	Correlation between...	Empirical results	Level of signifi-cance/correlation
H1:	R&D timing strategy and success	No correlation	p=0.269
H2:	Market entry strategy and success	No correlation	p=0.785
H3:	Production program & success	No correlation	p=0.644
H4:	Production synergies and success	Positive correlation, highly significant	p=0.005 corr=0.350
H5:	Market synergies and success	No correlation	p=0.114
H6:	Customer structure and success	Requirements not fulfilled	No test
H7:	Degree of innovation and success	No correlation	p=0.709
H8:	Degree of complexity and success	No correlation	p=0.299
H9:	Patent protection and success	No correlation	p=0.347
H10:	Development time and success	No correlation	p=0.718
H11:	Market growth and success	Requirements not fulfilled	No test
H12:	Competition and success	No correlation	p=0.699
H13:	Access to distribution channels and success	No correlation	p=0.823
H14:	Diffusion progression and success	Positive correlation, highly significant	p=0.003 corr=0.369

Table 5-4: Empirical results (cross tabulation and chi-square test)

5.2.8 Influence of Situation Determinants and Strategy on the Product Success

Third, the binary logistic regression model will be used to analyze the influence of the situation determinants and the timing strategy on the product success. Four models serve as a basis to illustrate the results.

5.2.8.1 Model 1

In the first model, all twelve situation determinants will be related to the product success (see Table 5-5).

Significant correlation can only be identified between the constant and the product success (p= 0.022), what can be neglected, and between the diffusion progression and the success (p= 0.027). Furthermore, market growth and success tend to have a small correlation (p= 0.052). By adding the situation determinants, the -2LL value is reduced and results in a significant improvement of the model. The variance according to Nagelkerke which is explained by the binary logistic regression accounts for 53.1% what can be interpreted as a very high positive value (Backhaus et al. 2003). In total, 85.9% of the products can be accurately classified either as successful or unsuccessful.

5.2.8.2 Model 2

In model 2, the strategies pursued will be added to the situation determinants. The analysis separates the timing strategy with regard to R&D and market entry.

5.2.8.3 Model 2a

Apart from the situations determinants, model 2a examines the influence of the R&D strategy on the product success. By adding the strategy, variable model 1 cannot be improved and the -2LL value changes only slightly. No correlation can be found between strategy and product success (p= 0.901).

5.2.8.4 Model 2b

Within this model, the influence of the market entry strategy and the situation determinants on the product success are examined. The results resemble those of the R&D strategy as no correlation between the market entry strategy and the product success can be identified (p= 0.742). The -

2LL value also only changes to a certain extent and there is no significant improvement to the original model.

5.2.8.5 Results of Model 1 and Model 2

In model 1 and 2, the binary logistic regression shows a correlation between the diffusion progression and the product success, which is supported by hypothesis 13. However, the cross tabulation and the chi-square test identified a correlation between production synergies and success, which cannot be confirmed by the binary logistic regression.

Nevertheless, the binary logistic regression does identify a correlation between market growth and success. The involvement of the R&D strategy and the market entry strategy cannot improve the ability to explain the success of new products. Despite the extension of model 1, 85.9% of the products can be accurately classified either as successful or unsuccessful. Hence, the hypothesis is confirmed that strategy has no influence on the success.

Dependent Variable: Success (dichotomic)	Model 1			Model 2a: R&D			Model 2b: Market entry		
	B	s. e.	Exp (B)	B	s. e.	Exp (B)	B	s. e.	Exp (B)
Constant	-12.668 *	5.528	0.000	-12.810 *	5.651	0.000	-13.198 *	5.763	0.000
Situation determinants									
Diffusion progression	1.000 *	0.453	2.717	1.017 *	0.474	2.764	1.031 *	0.469	2.805
Market growth	1.043 t	0.537	2.838	1.039 t	0.540	2.827	1.011 t	0.547	2.749
Innovation degree	0.502	0.425	1.652	0.487	0.442	1.628	0.477	0.433	1.611
Product complexity	-0.087	0.431	0.917	-0.072	0.444	0.930	-0.069	0.432	0.934
Production synergies	0.303	0.422	1.354	0.312	0.428	1.366	0.334	0.433	1.396
Market insights	-0.059	0.441	0.943	-0.066	0.446	0.936	-0.077	0.446	0.926
Competition	-0.008	0.330	0.992	-0.003	0.334	0.997	0.035	0.355	1.035
Access to distribution channels	0.606	0.458	1.833	0.620	0.471	1.859	0.644	0.476	1.904
Customer base	0.465	0.839	1.592	0.449	0.849	1.567	0.508	0.843	1.662
Time need for development	0.924	0.735	2.519	0.920	0.735	2.510	0.896	0.735	2.449
Dependence to production program	0.949	0.869	2.584	0.995	0.946	2.703	0.946	0.872	2.574
Patent protection	-0.980	0.902	0.375	-0.989	0.905	0.372	-0.931	0.913	0.394
Strategy									
a) R&D strategy	-	-	-	0.120	0.970	1.128	-	-	-
b) Market entry strategy	-	-	-	-	-	-	0.312	0.947	1.367
- 2LL	46.530			46.515			46.420		
Chi² (df)	29.518 (12)			29.534 (13)			29.628 (13)		
R² (Nagelkerke)	0.531			0.532			0.533		
Significance (overall model)	0.003			0.005			0.005		
N	64			64			64		

t 0.10-level of significance ** 0.01- level of significance *** 0.001-level of significance B – Regression coefficient

* 0.05-level of significance s. e. – Standard error

Table 5-5: Models with all situation determinants

5.2.8.6 Model 3 with Significant Situation Determinants

In model 3, only those situation determinants will be used for the analysis that had a significant correlation to the product success. The distinction between R&D timing strategy and market entry strategy will be maintained. The results of the binary logistic regression are illustrated in Table 5-6.

5.2.8.7 Model 3a

In contrast to the R&D timing strategy, the constant (p= 0.008), the diffusion progression (p= 0.029), and the market growth (p= 0.017) have a significant influence on the success. The explained variance share according to Nagelkerke is 39.3%. The -2LL value is improved in contrast to the first model. 81.3% of the products can be accurately classified as successful or unsuccessful.

5.2.8.8 Model 3b

The constant (p= 0.005), the diffusion progression (p= 0.018), and the market growth (p= 0.017) have a significant influence on the product success. No correlation could be found concerning the market entry strategy (p= 0.747). Related to the initial model, the –2LL value is improved and the explained variance share accounts for 39.2%. Model 3b correctly allocates 78.1% of the products to the categories 'successful' and 'unsuccessful'.

5.2.8.9 Results from Model 3

The results are similar to the results of previous models. However, the correlation tendency concerning the market changed to a significant correlation. Overall, the level of significance increased. The R&D timing strategy and the market entry strategy had again no certifiable influence on the product success, which corresponds with the previous findings.

Dependent variable: Success (dichotomic)	Model 3a: R&D				Model 3b: Market entry			
	B		s e.	Exp (B)	B		s. e.	Exp (B)
Constant	-4.642	**	1.750	0.010	-4.935	**	1.744	0.007
Situation determinants								
Diffusion progression	0.692	*	0.316	1.998	0.739	*	0.311	2.093
Market growth	1.105	*	0.461	3.018	1.085	*	0.456	2.961
Strategie								
a) R&D strategy	-0.264		0.690	0.768	-		-	-
b) Market entry strategy	-		-	-	0.220		0.680	1.246
- 2LL	55.654				55.694			
Chi² (df)	20.395	(3)			20.354	(3)		
R² (Nagelkerke)	0.393				0.392			
Significance (overall model)	0.000				0.000			
N	64				64			

t 0.10-level of significance ** 0.01- level of significance B – Regression coefficient

* 0.05- level of significance *** 0.001- level of significance s. e. – Standard error

Table 5-6: Model 3 with significant situation determinants

5.2.8.10 Model 4

Model 4 represents an extension of model 3 as interaction effects are added to the analysis. The interaction or rather moderation is the effect of an independent variable on the dependent variable under the influence of another independent variable (Preacher 2005). By means of the moderation, it is possible to examine whether the diffusion progression or the market growth in combination with a timing strategy have an influence on the product success. Again in this model, the separation of R&D timing strategy and market entry strategy will be sustained. Table 5-7 shows the results of the analysis.

5.2.8.11 Model 4a

The invention strategy moderates the diffusion progression and the market growth. A significant influence on the product success is shown by the constant (p= 0.039), the market growth (p= 0.022), and the diffusion progression moderated by the invention strategy (p= 0.038). Non-significant results are visible in the diffusion progression (p= 0.818), the R&D timing strategy (p= 0.942) and the moderated market growth (p= 0.282). The model can correctly allocate 84.4% of the products to the 'successful' and 'unsuccessful' categories.

5.2.8.12 Model 4b

Within this variation, the situation determinants will be examined with the market entry strategy. The same variables show a significant influence as in model 4a: the constant (p= 0.041), the market growth (p= 0.027) and the diffusion progression moderated by strategy. The other variables possess no certifiable influence on the product success. The share of products correctly assigned to success and failure is 82.2%.

5.2.8.13 Results from Model 4

Similar to model 3, the constant and the market growth have a significant influence on the product success. In contrast to previous results, the diffusion progression shows no significant influence. The significance of the moderated diffusion progression is new. This finding indicates an influence of a fast diffusion progression combined with pioneer strategy on the product success. Hence, it could be argued that only the first mover is

able to benefit from the fast diffusion progression. By adding the moderating variable, in contrast to model 3, the significance could be improved.

Dependent variable: Success (dichotomic)	Model 4a: R&D			Model 4b: Market entry		
	B	s. e.	Exp (B)	B	s. e.	Exp (B)
Constant	-7.284 *	3.531	0.001	-6.923 *	3.395	0.001
Situation determinants						
Diffusion progression	-0.092	0.402	0.912	-0.059	0.415	0.943
Market growth	2.648 *	1.154	14.128	2.436 *	1.102	11.426
Strategy						
a) R&D strategy	-0.407	5.575	0.666	-	-	-
b) Market entry strategy	-	-	-	0.290	4.939	1.337
Interaction effects (method: inclusion)						
Strategy x diffusion progression	1.954 *	0.944	7.054	1.889 *	0.851	6.614
Strategy x Market entry	-1.526	1.419	0.217	-1.545	1.341	0.213
- 2LL	47.286			47.257		
Chi² (df)	28.763 (5)			28.792 (5)		
R² (Nagelkerke)	0.521			0.521		
Significance (overall model)	0.000			0.000		
N	64			64		

t 0.10-level of significance ** 0.01-level of significance B – Regression coefficient
* 0.05-level of significance *** 0.001-level of significance s.e. – Standard error

Table 5-7: Empirical results of model 4

5.3 Limitations of the Study

The results found cannot be generalized, as the sample does not fulfill the necessary requirements as regards size and composition. In spite of this limitation, this study illustrates a first step to reveal causal relationships within the automobile supplier industry. As this industry is very important for the German economy on the one hand and a comparatively small market regarding the number of companies on the other hand, the sample size, response rate, and results are nevertheless a good basis for further research. Moreover, there has not been any research in this area yet.

Another limitation is the small share of unsuccessful products within the survey sample as argued by Baker (1979), with the share of unsuccessful new products being more than 90%. A reason for this limitation could be due to the restrictive behavior experienced when communications fail.

A general problem originates in the ramification of the automobile supplier industry. The freedom of decision-making can be limited due to guidelines of the original equipment manufacturers (OEMs). Therefore, future research has to include the technology strategy of the OEMs as well.

5.4 Conclusion

In general, the choice of a specific strategy has no influence on the product success. This finding confirms the results of other surveys and analyses which found that the ramifications have to be taken into consideration. Wolfrum (1991) argues that the choice for or against the pioneer status has to be made under the consideration of the prevailing circumstances. Fritz and Oelsnitz (2000) also come to the conclusion that the timing decision cannot be made when neglecting the existing framework provided.

Furthermore, only slight differences between the results of the R&D timing strategy and the market entry strategy could be found. Hence, it could be argued that the separation of both strategies can be abolished. Nevertheless, further research is still necessary to answer this question due to the limited sample size of 64 companies, the majority of which have simultaneously either chosen the pioneer or follower strategy for R&D and market entry. Only 25 companies had mixed strategies.

Within this analysis, the influence of three situation determinants could be identified. The correlation of product synergies and product success, however, could only be found within the cross-tabulation analysis. The binary

logistic regression identified that market growth is significantly related to success. Hence, it can be assumed that it is easier for companies to sell their products within a growing market. Both analysis methods proved a correlation of the diffusion progression and the product success. Thus, companies can benefit from a fast diffusion progression because products can be sold faster and revenue can be generated earlier. However, this progression closely interacts with individual characteristics of organizations (Abrahamson 1991).

The analysis with the moderate variables illustrates an important result. In this context, the diffusion progression in combination with the pioneer strategy is correlated with success if the R&D strategy is part of the market entry strategy. An explanation could be that only one company can benefit from the diffusion advantages.

6. Serial Entrepreneurs in the Business Foundation Process – Insights from a Case-Driven Explorative Study

6.1 Theoretical Framework

First of all, the most important terms and definitions will be introduced. Moreover, the theoretical background of the traits theory will be explained shortly.

6.1.1 Entrepreneurship

Entrepreneurship describes a highly complex, multidimensional phenomenon for which a plethora of definitions can be found (Ripsas 1997; Dowling 2002; Wickham 2004). Despite this fact, there is no real consensus among scholars of how to define entrepreneurship (Fallgatter 2002; Gartner 1989; Kirchhoff 1994; Stevenson et al. 1999; etc.). For example, Gartner (1989) defines entrepreneurship as the "creation of a new organization" (p. 62), whereas Stevenson et al. (1999) see it as "the pursuit of opportunity without regard to resources currently controlled" (p. 5). Within this chapter, entrepreneurship will be understood as a process, in which business opportunities are recognized and ideas are realized by founding a new business for the purpose of gain or growth under the conditions of uncertainty and risk (Dollinger 2003).

6.1.2 Serial Entrepreneurs

Similar to entrepreneurship, different and often only vague definitions exist for the term entrepreneur (Gartner 1989; Bygrave 1997). Wickham (2004), for example, takes an organizational perspective in stating that "the entrepreneur is recognized as the person who undertakes the task of bringing together the different elements of the organization […] and giving them a separate legal identity" (p. 9).

Kuratko and Hodgetts (1998), however, using a person-related perspective, define an entrepreneur as someone who is highly committed, uniquely optimistic, creative and possesses a sound judgment. Taking the definition of entrepreneurship and the different entrepreneur definitions provided into consideration, an entrepreneur is characterized within this chapter as: an individual who recognizes a business opportunity and

founds his/her own business to realize the business idea in order to create value (Bygrave and Hofer 1991).

As entrepreneurs, however, are no homogeneous group, different criteria are used to categorize them, for example according to personality, status, behavior (Barrick and Mount 1991; Mugler 1998; Pichler et al. 2000), foundation incentive (Freiling 2006) and the number of founded businesses (e.g. Taplin 2004; Ucbasaran et al. 2001). The number of founded businesses is used for this study because the characteristics and specifications of entrepreneurs with several new venture creations will be analyzed. In addition, entrepreneurs can be further divided into nascent, serial and novice entrepreneurs (see Figure 6-1).

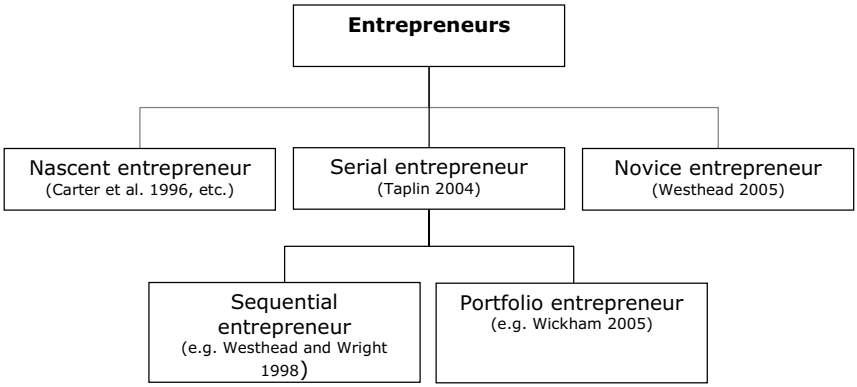

Figure 6-1: Typology of entrepreneurs (Freiling 2006)

Nascent entrepreneurs plan to found a new business and have already started with the realization (Wickham 2004; Taplin 2004; Carter et al. 1996). Novice entrepreneurs, however, have already founded one company (Taplin 2004; Westhead et al. 2005). Serial-entrepreneurs are defined as individuals who have already established more than one venture (Harris 2005; Taplin 2004) and can be further distinguished into sequential and portfolio entrepreneurs (Wickham 2004; Westhead and Wrigth 1998, Taplin 2004). In comparison to portfolio entrepreneurs, sequential entrepreneurs only own one business at a time, while portfolio entrepreneurs own and run at least two business at the same time.

To analyze the characteristics and specifics of serial entrepreneurs within the business foundation process, the aspects that will serve as a basis for

the analysis have to be described. Socio-demographic characteristics and traits were chosen for this purpose, as in general, these factors can be seen as the main elements describing and influencing the company's performance and success (Voigt and Brem 2006).

6.1.3 Socio-Demographical Characteristics

Jacobsen (2006) points out that the validity of socio-demographic characteristics is generally limited. Nevertheless, they are appropriate to describe serial entrepreneurs in a more precise way. Therefore, socio-demographical characteristics will be analyzed. In recent studies, age and gender have been identified as having an impact on the business foundation (Jacobsen 2006; Klandt 1984). Religious denomination and nationality are also often used in this context, but will not be considered further. Their correlation with the foundation is controversially discussed in entrepreneurship literature and could not be proved. Nationality as another socio-demographic characteristic will be neglected within this study as all serial entrepreneurs are German. As another possible socio-demographic characteristic, family status will be addressed within the environment-related factors.

According to Jacobsen (2006), Delmar and Davidsson (2000) and Klandt (1984), the founding activity is highest between the ages of 25 and 40 years. This is in concordance with the theory of Liles (1974) who states that with increasing age, self-confidence, working experience and competencies, the willingness to start one's own business is positively influenced. Simultaneously, the foundation of one's own business is perceived as even more risky, because in an employee status, the salary increases over time, and therefore it enables the employee to support his family.

The majority of business foundations are realized by men (Jacobsen 2006; GEM, 2003). In Germany, for example, 77% of the entrepreneurs are male. In the USA and Sweden the percentage is only slightly lower with 67%. Several reasons could be responsible for the misbalance between male and female entrepreneurs. First, despite the emancipation success of the last decades, the traditional role allocation is still prevalent. Second, an existing patriarch world of work could detain women from founding their own business (Delmar and Davidsson 2000).

Furthermore, it could be argued that women do not want to belong to the male-dominated group of entrepreneurs or are likewise not accepted by men (Jacobsen 2006). Another reason could be that economic goals are less attractive for women to achieve than for man (Voigt and Brem 2005a) and they tend to be less willing to take a risk.

The work of Jacobsen (2006) indicates that it is not only necessary to focus on personal traits, but also on important factors like human capital and environmental aspects to be able to analyze the business foundation behavior. Therefore, both aspects were included in this study.

In general, human capital can be gained either by an apprenticeship, school, study or work experience. As Klandt (1984) points out, there is no unique opinion as to whether entrepreneurs possess a low or high level of education.

The majority of entrepreneurs have either finished an apprenticeship, A-level or their studies. Hence, they have achieved a higher level of education than the average citizen. In most empirical studies, no correlation between business foundation activity and level of education could be proved (Jacobsen 2006). However, Swinney et al. (2006) found that the firm performance highly correlates with the education of the founder.

Work experience portrays the second important factor, as businesses are mainly founded in areas where entrepreneurs were able to gather knowledge and experience (Klandt 1999; Jacobsen 2006). Thus, the entrepreneur has specific market and industry knowledge and has insights in operational procedures. Empirical studies regarding the correlation between work experience and business foundation found that entrepreneurs were in paid employment for 15 years on average before they started their own business (Klandt 1984). Furthermore, management skills also have a positive effect on the success and survival probability of new ventures (Scheiner et al. 2006).

6.1.4 Trait Theory

The trait theory represents a common approach in entrepreneurship research. Rauch and Frese (2006) state the importance of personality variables when examining effects on the founding process. Although the relationship is often small or moderate in size, it still exists (Ciavarella et al. 2004). The core idea of the trait theory is the function of personality traits

as preconditions that facilitate the entrepreneur's actions (Brem et al. 2007). Applied to entrepreneurship at the beginning of the founding process, there is only the entrepreneur him/herself or the entrepreneurial team, who influences the first steps of creation and development within the venture.

Gartner (1988) questions the trait approach and suggests using the 'behavioral approach' instead. According to this approach, the personal traits should not be focused on, but the activities of an entrepreneur within the business foundation process and their personality attributes.

However, the trait theory will be used within this chapter because it allows identifying specific characteristics of entrepreneurs within the business foundation process. This is different to other studies which have proved a correlation between business foundation activities and specific traits.

Within this theory, a plethora of different traits were analyzed (e.g. striving for power, striving for independence, amphiboly tolerance, autonomy etc.) (Bygrave 1997; Kloss et al. 2007; Braukmann 2001).

For the purpose of this study, the attributes; 'need for achievement', 'risk-taking propensity' and 'locus of control' were used because they illustrate the most important and researched traits.

'Need for achievement' describes the determination of an individual to achieve self-defined aims (McClelland 1966). Those aims are accomplished by personal effort and decisions and by the autonomous and sufficient solution of occurring problems (Dollinger 2003; Freiling 2006; Fallgatter 2002; Frank et al. 1999). People with a high level of 'need for achievement' try to prove their skills towards others and strive for an acknowledgement for their achievement (Klandt 1999). Regarding the business foundation process it is assumed that serial entrepreneurs possess a high level of 'need for achievement' (Freiling 2006). This assumption was proved by the empirical studies of Hornaday and Aboud (1971) and Klandt (1984, 1990). The research of Dollinger (2003), however, shows that 'need for achievement' has no high significant influence on the foundation activities.

'Risk propensity' illustrates the second personal trait and consists of four different dimensions (Klandt 1984). The first dimension is the financial risk. The entrepreneur has to invest in his new venture, which can impli-

cate his whole assets. The fact that the career as an employee cannot be advanced describes another risk for an entrepreneur. The family risk indicates the third risk, which can occur due to two main reasons. The first reason is that entrepreneurs have long working hours and therefore have a limited amount of spare time, resulting in less time for the family. Secondly, the business foundation could represent the lifework of the business founder and a failure could negatively effect the family situation or cause psychological problems (Voigt and Brem 2006).

Although a kind of consensus can be found in the literature, in that entrepreneurs do not distinguish themselves from others and that they also have a moderate level of risk propensity (Klandt 1984; Brockhaus 1980; Dollinger 2003), no studies have analyzed the risk propensity of serial entrepreneurs yet.

The personal trait 'locus of control' describes to what extent an important situation is perceived as influencial by a person (Freiling 2006; Fallgatter 2002). It can be further categorized into internal and external locus of control. An 'internal locus of control' is characterized by the belief that a situation or incident is either the result of and/or can be directly influenced by one's own effort and decisions. Thus, people with a high internal locus of control show a distinct self-confidence (Freiling 2006; Fallgatter 2002).

Comparably, if a situation or an incident is seen as not influenced by one's own actions but by luck and coincidence it belongs to the external locus of control. For the background of business founding activities it can be assumed that entrepreneurs have a high internal locus of control (Freiling 2006). This assumption was also proved in the empirical study of Fallgatter (2002). However, recent empirical studies showed that entrepreneurs have a middle position on the continuum of the 'locus of control' (e.g. Dollinger 2003). Hence, they are convinced of being able to have as much influence as luck and coincidence (Freiling 2006).

6.1.5 Environment-Related Factors

Entrepreneurial team, existing network and family portray the most important environment-related factors in the business foundation process. Therefore, they were included in the analysis.

In the past few years, the business foundation of entrepreneurial teams has experienced an increase in importance, especially in the high-tech sector (Kamm et al. 1990; Saßmannshausen 2001). According to Kamm et al. (1990) and Klandt and Tröger (2001), an entrepreneurial team is defined by two or more individuals who found a business together in which they have invested their own equity and aim for the same goals. Within the team, criteria like consensus on standards, values, goals, and even balance of power should be given as well as complementary skills (Klandt and Tröger 2001). Figure 6-1 shows the major advantages and disadvantages of the business foundation in an entrepreneurial team.

Advantages	Disadvantages
• Comprehensive skills and competencies	• Longer decision making
• Shared risk	• Higher costs of coordination
• Higher degree of motivation	• Lower influence on the management decisions
• Bigger network	• Different goals

Figure 6-2: Advantages and disadvantages of entrepreneurial teams (Kamm et al., 1990; Klandt and Tröger 2001)

Schmude (2002) argues that if the entrepreneur has access to an adequate network, the advantages of a foundation in an entrepreneurial team can be achieved. According to Aldrich et al. (1997) a network comprises all individuals that are linked with each other in one way or another and creates access to resources that would not be accessible otherwise. The positive effect of such networks could be statistically proved (Kodithuwakku and Rosa, 2002; Rammer et al. 2005). Moreover, Ritter (1998) discovered that these network competences are one of the main trigger for the later innovation success.

A highly influential factor concerning the business foundation decision is the family that can also be seen as a social network. The studies of Dyer (1994), Delmar and Davidsson (2000), and Klandt and Tröger (2001) came to the conclusion that children of entrepreneurs are more likely to also become entrepreneurs. Not only the family of origin but also the spouse or partner as well as the children effect the business start-up deci-

sion. They can either foster the foundation by supporting the decision and providing strength and support or they can be seen as a hindrance (Klandt 1984).

6.1.6 Business Foundation Processes

To analyze the characteristics and specifics of serial entrepreneurs, it is necessary to choose an appropriate model of the business foundation process. Similar to the terms entrepreneurship and entrepreneur, a multitude of different models concerning the business foundation process can be found (e.g. Dietz 1989; Unterkofler 1989; Wenz 1993; Gartner 1985; Gibb 1987; Landwehr 2005; etc.). Timmon's and Spinelli's business foundation process identifies three initial factors that have an effect on the business foundation and are interdependent: opportunity, entrepreneur/ team, and resources. The process is always initiated by the opportunity, but does not follow a specific procedure (see Figure 6-3).

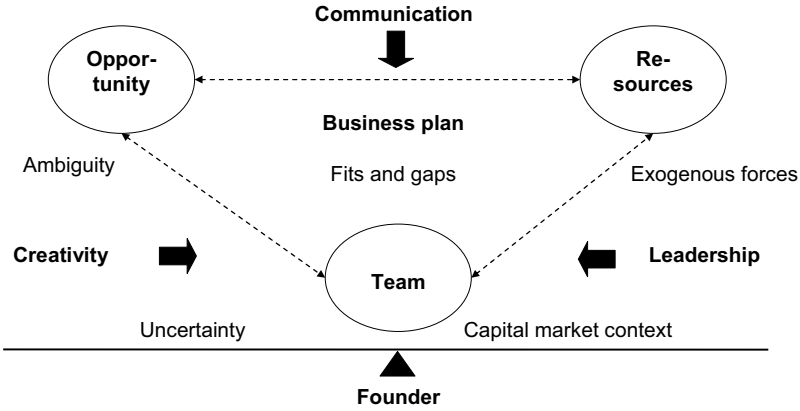

Figure 6-3: Business foundation concept (Timmons and Spinelli 2004)

For the purpose of this study, a process-orientated model of business foundation was chosen, which allows to subdivide the process into separate sections of which the specific tasks can then be analyzed. Inherent problems of these models are that the business foundation process does not always follow the ideal procedure through each phase and that it is often unclear when the business foundation was initiated and when it ended (Landwehr 2005). Freiling (2006) suggests that the foundation

process is first completed when the company has established itself on the market.

The process-orientated model can be further subdivided into those models that include feedback loops and others that follow a linear procedure.

Bhave (in Freiling 2006) suggests that a linear model with integrated feedback loops should be used. Similar to Timmons and Spinelli (2004), the process begins by recognizing a business opportunity which is based on internal and external effects. Bhave aggregates a sequence of events into the three main stages; opportunity stage, technology setup and organization creation stage along with the exchange stage (see Figure 6-4). The whole process is also oriented on the market and its customers.

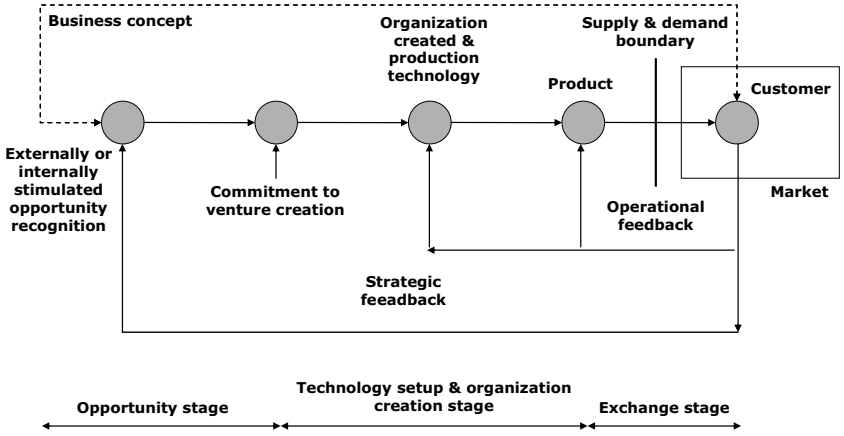

Figure 6-4: Business foundation concept (Freiling 2006)

Linear, process-oriented business foundation processes seem to be more appropriate for this study because of their simplicity, allowing for a more schematic and clear analysis of the process with the inherent activities of the entrepreneur. Zacharias (2001) and Szyperski and Nathusius (1977), however, criticize this kind of concept. In practice, it can be observed that phases overlap, are skipped and the process itself can be stopped at some point. Figure 6-5 shows four different linear concepts.

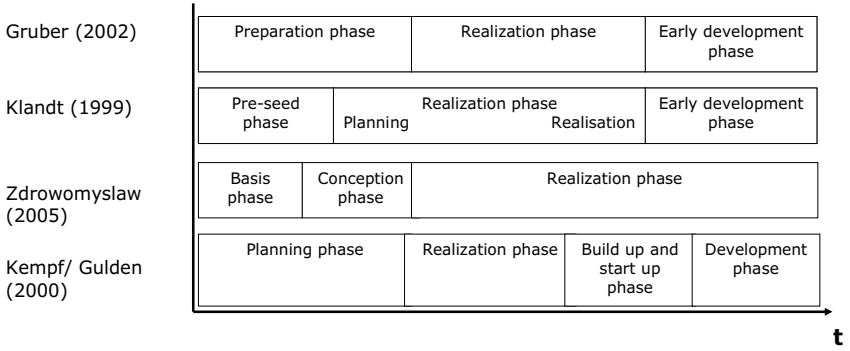

Figure 6-5: Linear business foundation processes (Freiling 2006)

The difference between the models in number of phases and their sizes could be explained by industry-specific characteristics (Dowling 2002). While companies in the internet industry have a short start-up phase, biotechnological companies take a longer time. However, the phases have a similar structure: preparation, realization, and development.

For the purpose of this study, the model of Klandt (1999) will be used as it covers the main parts in a concise way by emphasizing the realization phase. Klandt's (1999) business foundation process consists of three main phases:

- pre-seed phase,
- realization phase, and
- early development phase.

The 'pre-seed phase' has an average length of eleven months (Wenz 1993). Inherent activities consist of: the recognition of a market opportunity, the development and evaluation of the business idea, and the preparation of a rough concept. The decision to found a business marks the end of this phase (Zacharias 2001).

The 'realization phase' is the second phase and is separated into the subphases of 'planning' and 'realization'. The rough concept of the pre-seed phase serves as a basis for further analyses, plans, and decisions. The market, environment, and competition analysis are the most important analyses needed in this phase. Furthermore, legal status, location, and human resources need to be chosen and the business plan has to be written (Zdrowomyslaw 2005; Albert 1994; Harms and Kraus, 2005;

Schmude 2002; Voigt et al. 2006b). At the end of the planning phase at the latest, the 'point of no return' has been achieved, from which the business intention cannot be easily aborted anymore (Klandt 2006). The planning activities are realized within the realization phase.

Hence, employees have to be recruited, additional capital has to be raised and an office has to be rented. A main critical success factor is the financing of the business foundation, and the later long-term securing of liquidity (Wittenberg 2006). The corresponding organizational design strongly depends on the different roles and motivations of people within the process (Maidique 1980).

The early development phase does not receive much attention within the entrepreneurship research. However, this phase can be characterized by four specific factors. This phase begins with the creation of goods and services which are put on the market for the first time. Thus, revenue is generated, but according to Szperski and Nathusius (1977), it does not grow very fast. Finally, the business course is mainly carried out without a division of labor, employees gradually start specializing within a particular field of function (Schefczyk and Pankotsch 2003).

Characteristics of entrepreneurs in the business foundation process will be analyzed and the growth phase and the exit stage from the broader business life-cycle model will be included within this chapter. However, according to Wenz (1993), the primary business foundation is completed during the growth phase. This growth phase is still of interest for the purpose of this study because the new venture has not reached its established state yet (Züchner 2005). The decision to sell the business depends on whether or not serial entrepreneurs are interested in the activities that have to be carried out within established companies. Such situations are similar to technology make-or-buy decisions, therefore they can be solved through similar methods (Brem 2007). Figure 6-6 shows the business foundation process within the general business life cycle model.

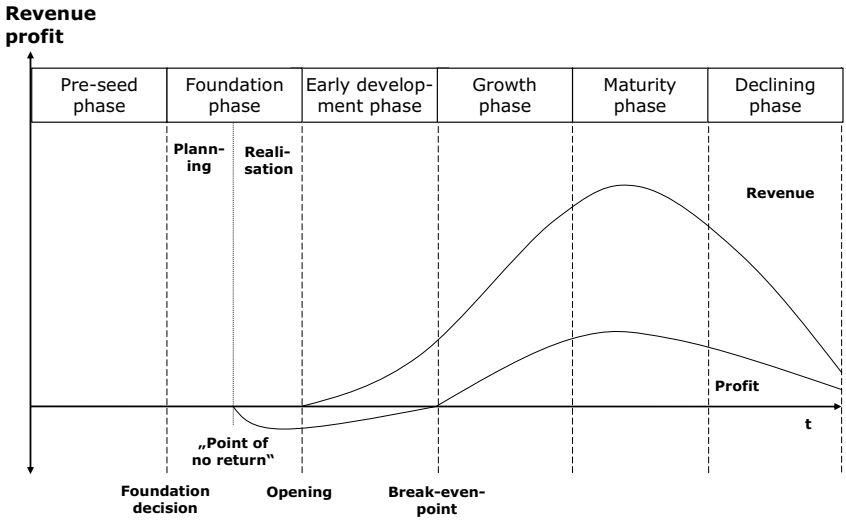

Figure 6-6: Extended business life cycle model (Volkmann 2001; Albert 1994; Szyperski and Nathusius 1977; Zacharias 2001)

6.2 Research Design

6.2.1 Modelling

Qualitative primary data was used for this chapter, for which experts were interviewed to gather the necessary information. Experts are defined in this context as competent persons who are interviewed about their experience and views concerning the investigated topic (Berekoven et al. 2001; Bryman and Bell 2007). It is often the case that the expert him/herself is the object of the research project (Bogner and Menz 2002).

In general, three kinds of data collection can be distinguished (Bogner and Menz 2002). The explorative interview is used to gain insights in new or indistinct topics and to be able to structure a given problem. The systemized interview aims at collecting complete data, for which an interview guideline is also used and experts have an advisory role. A theory-generating interview represents the third group, where comparable statements of experts are used to form a theory by generalizing the given statements.

For this study, the explorative interview has been chosen because the phenomenon of serial entrepreneurs is a relatively new object of investi-

gation and only a few studies have already been conducted. Therefore, it was necessary to conduct the interview in a relatively open way, for which a guideline was used. This guideline was designed such that the necessary requirements could be fulfilled (Bryman and Bell 2007). In this respect, it outlined the process along general lines (Berekhoven et al. 2001) without interrupting the course of conversation. Mainly, open-ended questions were used to avoid narrowing the experts' possible answers (Böhler 2004). Closed questions were only used if the question could be answered with 'yes' or 'no' (Hungenberg 2002). The guideline consisted of five parts. The first part covered socio-demographics, skills, and personal traits. Subsequently, general questions about the founded businesses were asked (e.g. number of businesses founded, percentage of businesses in ownership, percentage of failure and sales, etc.). The third part focused on the ramifications of the business foundation like goals and motives as well as the existence and importance of a business network. In the fourth part, the foundation process of each company was analyzed and compared with each other. The growth and maturity phase were also part of the investigation. A diagram of an ideal foundation process was used as a prompt to ease the understanding of the question (see Figure 6-7).

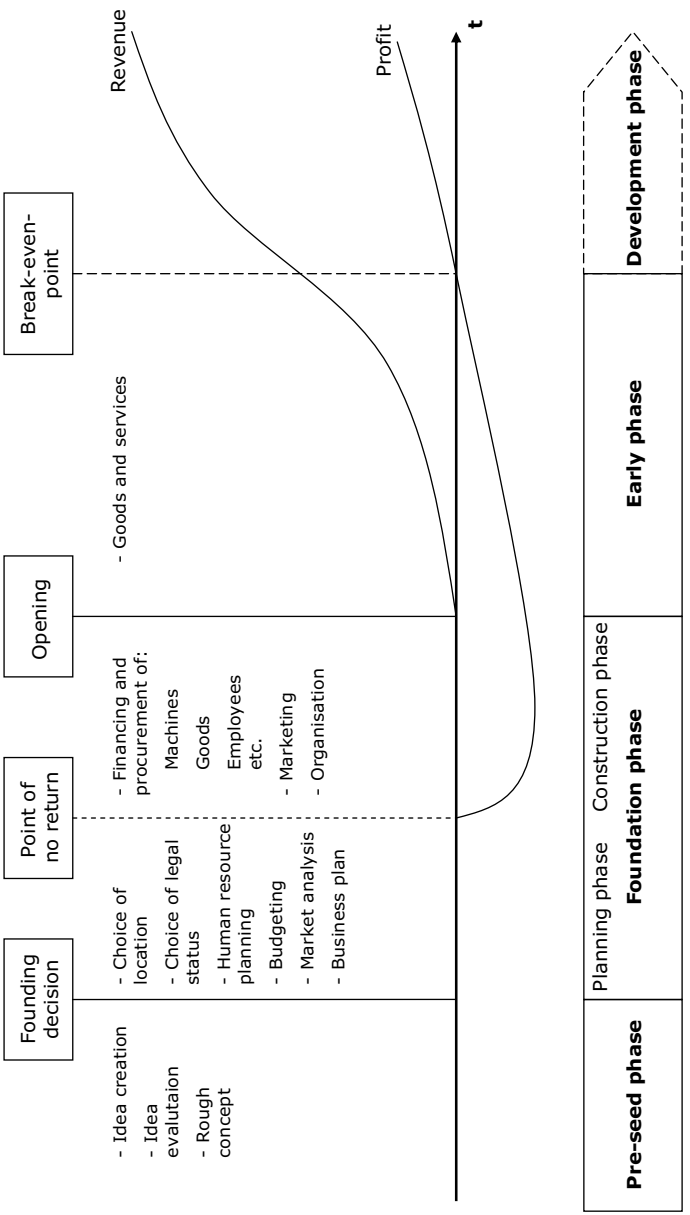

Figure 6-7: Business foundation life cycle (Zacharias 2001; Klandt 1999)

To complete the interview guideline, questions concerning the foundation management (e.g. use of a business plan, choice of location etc.) were asked. The framework of the explorative study is illustrated in Figure 6-8.

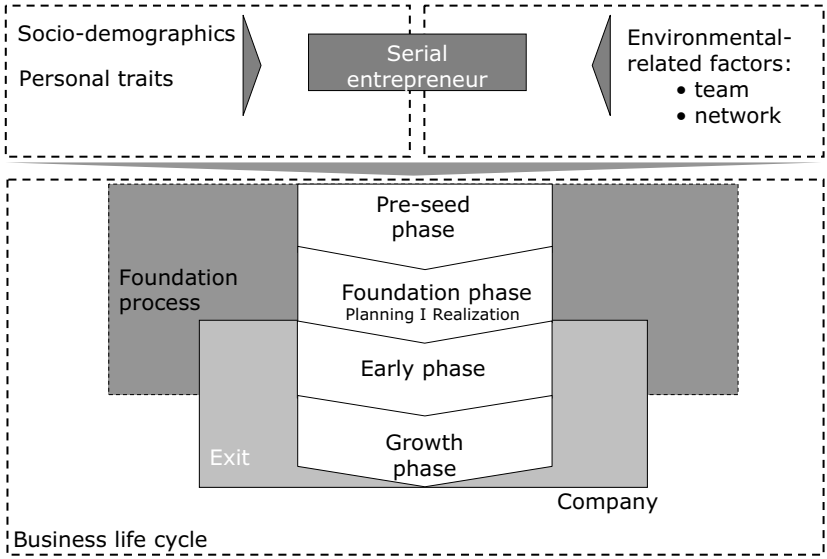

Figure 6-8: Frame of the explorative study

6.2.2 Sample

Before the interviews could be conducted, the relevant experts had to be identified, meeting the given requirements of a serial entrepreneur according to Taplin (2004): having founded at least one business and having started at least the foundation of a second one. It was irrelevant if they were still the owner of the currently founded business or businesses. Subsequently, ten serial entrepreneurs were contacted of which seven participated in this study. The study was carried out between september and november 2006 and the majority of the interviews were conducted on site in the companies of the entrepreneurs. Two experts were interviewed by phone. The interview took 45 minutes on average.

The interviewees were all male and had founded an average of two companies, which mostly operate in the high-tech sector. Two interviewees indicated that they had not founded two of their companies, but bought them from other founders. One person reported that he inherited one of his companies. However, the serial entrepreneurs can be categorized as

portfolio entrepreneurs in accordance with Westhead and Wright (1998), Wickham (2004) and Taplin (2004). The entrepreneurs were between 26 and 60 years old. Table 6-1 portrays the general characteristics, which will be discussed in the following.

Expert / Attribute	1	2	3	4	5	6	7
No. of founded businesses	2	1	3	2	4	2	3
No. of businesses in the foundation process	1	3	-	-	-	-	1
Current companies	2	-	-	2	3	1	2
Current age	37	26	43	55	39	60	40
Age at 1st foundation	32	22	24	30	28	26	26
Highest achieved level of education	Study	Study	PhD	2x Study	PhD	Apprent-iceship	Study
Working experience	10 years	none	none	4 years	none	4 years	3 years
Gender	M	M	M	M	M	M	M

Table 6-1: General characteristics of the sample

6.3 Empirical Results

6.3.1 Personal Characteristics

The findings of this study are in concordance with corresponding literature, which states that the majority of foundations are conducted between the age of 25 and 40 years (Jacobsen 2006; Delmar and Davidsson 2000; Klandt 1984). Within this chapter, the first business was founded with 27 years on average. Due to the fact that all experts were male, no implications of gender dependence can be made.

Remarkable is the high level of education of the serial entrepreneurs. All interviewees have at least completed an apprenticeship. Two have even

achieved a PhD degree. These findings are in contrast to the characteristics of any other entrepreneurs, as no proven correlation between educational levels and business foundation activities could be identified (Jacobsen 2006). The interviewed serial entrepreneurs do however confirm that entrepreneurs have a higher level of education than an average citizen (Klandt 1984).

Also, with regards to work experience, a concordance of the conducted study and empirical research (e.g. Scheiner et al. 2006) could be found. Within this sample, work experience tends to have a positive influence on the venture success because all but three entrepreneurs have an average of five years of work experience (see Table 6-1).

6.3.2 Personal Traits

In the context of personal traits, three characteristics were examined: 'need for achievement', 'risk-taking propensity' and 'locus of control' (Freiling 2006; McClelland 1966; Klandt 1984; Fallgatter 2002; Gartner 1985; Rauch and Frese 1998). Only risk-taking propensity was directly addressed whereas the other criteria were indirectly drawn of the specific context (Klandt 1984). Table 6-2 illustrates the results of the conducted interviews.

Expert / Trait	1	2	3	4	5	6	7
Need for achievement	Medium	Medium	Medium	High	Medium	Medium	Medium
Risk-taking propensity	High	High	High	High	High	High/low	Medium
Locus of control	Medium	Medium	Medium	High	High	High	High

Table 6-2: Results regarding entrepreneurial traits

Surprisingly, the need for achievement was almost completely rated as medium. Most of them take a more passive attitude, rating the importance of fortune and fortuity as rather high. Only one interviewee had a strong wish for success and money as well as the wish for challenges and performance. So, the results from Freiling (2006) cannot be further supported, they rather correspond with the findings of Dollinger (2003).

Only one of seven people evaluated his risk-taking propensity as not high. Consequently, it can be stated that a key feature of serial entrepreneurs is a high risk-taking propensity. This contradicts the results from general research that indicate a moderate level (Klandt 1984; Brockhaus 1980; Dollinger 2003).

The influence of important situations is valued medium to high; most of the entrepreneurs do not rely on external help. This is consistent with the results of Dollinger (2003) who states that entrepreneurs tend to have a middle position on the continuum of the locus of control.

6.3.3 Environment-Related Factors

Beyond the characteristics of the single founders, the private environment is an interesting research field. Whether and how these factors characterize a serial entrepreneur can be seen in Table 6-3.

Expert / Attribute	1	2	3	4	5	6	7
Team foundation	Always	Always	Sometimes	Sometimes	Always	Never	Always
Relevance of network	High	Medium	Medium	Medium	High	Low	High
Entrepreneurial family	No	No	No	No	No	Yes	No
Family status	Single	Single	Divorced	Married	Divorced	Married	Married

Table 6-3: Results regarding environment-related factors

Four business founders started their companies as part of a team that consisted of between two and seven people. The main reasons stated for the business foundation to be carried out in an entrepreneurial team were: lacking specific knowledge, financial considerations, and huge amount of work. Negative side effects mentioned were problems of ownership and potential frictions in the team's future.

The estimation of networks is heterogeneous. In three cases, the support of getting in touch with prospective customers and assistance with human resource issues was mentioned as positive effects of networking. Kodithu-

wakku and Rosa (2002) already statistically proved this significance. Nevertheless, the serial entrepreneurs stated that the high expense of time needed to cultivate these contacts was what detained them from using this instrument on a larger scale.

The influence of family status and the importance of the entrepreneurial background within the family have no deeper impact on the serial entrepreneurs' characteristics. Yet, three founders said that their decision for autonomy was positively influenced by their families. Mirrored with the results of former studies, no significant tendencies can be stated.

6.3.4 Business Foundation Process

In this step, particular correlations between the standardized business foundation process of Klandt (1999) and the foundation process of the researched cases will be shown. Table 6-4 displays an overview of the results regarding each introduced phase.

Expert / Attribute	1	2	3	4	5	6	7
Idea source	Job	Accident-ally, abroad	Accident-ally, abroad, environ-ment	Job	Accident-ally, abroad, job	Accident-ally, environ-ment, job	Environ-ment
Business idea	Niche	New regions, modified products	New regions, innovative and imitative products	Inno-vative and imitative products	Inno-vative products, new regions	Imitative products	Inno-vative products
Decision to found	Since appren-ticeship	Since study	Always	Always	Since PhD	Always	Always
Idea evaluation	No	Yes	Yes	No	Yes	No	Yes
Basic concept	Yes	Yes	No	No	No	No	Yes
Market/ competition analysis	Yes	Yes	Yes	No	Yes	No	Yes
Environ-mental analysis	Yes	No	No	No	No	No	No
Choice of location	Not im-portant	Partly important	Not important	Partly important	Less important	Partly important	Not important
Human resource planning	Partly/ later relevant	Relevant	Partly/ earlier relevant	Later relevant	Relevant	Partly/ later relevant	Later relevant
Recruit-ment	Later relevant	Partly relevant	Relevant	Relevant	Relevant	Relevant	Later relevant
Marketing	less relevant	Relevant	Relevant	Relevant	Relevant	Relevant	Later relevant
Business plan	Always done	Always done	Partly done	Always done	Always done	Partly done	Always done

Table 6-4: Results regarding the several phases

Most interviewees recognized the opportunity by accident or through an idea from abroad. The current and former employment also plays an important role in discovering potential business ideas. This is in accordance with former research (Voigt and Brem 2005a).

With regards to the identification and advancement of the first and later business ideas, no regularities could be found.

Most of the ideas were based on innovative products in new regions; however, two founders completely followed the imitation strategy. Interestingly, no facilitation techniques were used. On the contrary, these tools are even rated as counterproductive.

Almost all entrepreneurs made their decision to found companies a long time ago – some even for their whole life – and without a precise business idea. This strongly proves their intense intrinsic motivation.

For most entrepreneurs, the idea evaluation is a structured process with specific decision criteria. Three founders did not use any conceptual evaluation, they solely trusted their business instincts and foundation experience. They however still sought professional advice from external experts. Subsequently, three founders prepared a general and detailed business concept, what concurrently stands for the end of the pre-seed phase. Some interviewees supplemented the fact that the pre-seed phase in general does not reflect the real foundation process. This may also be an explanation for the ongoing discordance in literature.

Moreover, almost all founders conducted detailed market and competition research, which overlaps with certain pre-seed activities. Further environmental research was not conducted maybe because the entrepreneurs mostly founded businesses again in the same industry or within a similar business model. Regarding the legal form of the companies, it was mostly incorporated companies. This can be traced back to the fact that most companies are within the high-tech sector.

The location choice was not seen as a very strategic one because their goods and services were mostly independent of the companies' location. This is partly in contradiction with recent research, which indicates that the location decision is one of the main stimuli of successful growth and long-term start-up success (Voigt et al. 2006b).

Human resources planning had no deep impact within the realization phase due to the fact that the founding was carried out in teams. Hence, the founders already met the needs of staffing within the pre-seed phase. The most important planning instrument is without any doubt the business plan. This is in accordance with recent literature as well (e.g. Wittenberg 2006). All entrepreneurs used a business plan for the foundation process, mainly for internal strategic planning reasons.

Finally, all foundations are based on equity financing and sometimes partially on public funding. Only in one case, business angels play an important role within the financing concept.

The last phase of the business foundation process is the early development phase, with marketing playing a vital role, as personnel and financial issues are already covered within the realization phase. All founders quoted that marketing played a role, five even said it had an important effect on the company's success.

However, it has to be ascertained that marketing mostly means classical advertising efforts, but also attracting customers and enlarging the customer base. As regards financing, two companies stated that they also made use of external financing in this phase. Though, it is not always easy to clearly identify which internal or external financing resources were used, as there are several hybrid intermediate stages, e.g. through mezzanine financing (Voigt et al. 2006a).

In general, six out of seven founders state that the pre-seed phase or respectively the first day of business is the most important point in the company's development. In addition, the day of selling the company is declared very elementary. No company of all founded companies failed, which speaks in favor of the serial entrepreneurs. The reasons for an exit were lacking successors, problems with partners and that the size of the companies was no longer manageable. As regards the timing of the exits, no regularities could be found.

Only two interviewees were unhappy at the time of sale, especially because of the employees. All others saw the sale more as a pleasure because of the sales revenues and the decrease in responsibilities. These reasons suppressed the sadness of selling their 'babies'. Moreover, most of the founders already had new business ideas and therefore, the necessary motivation to realize them.

After having been asked about the intention of founding more companies in future, all participants gave an affirmative answer.

Interviewees mentioned the following as the most important success factors in founding a company:

- always having enough money
- legal problems
- calmness in solving problems
- having a motivated team
- recruiting the 'right' people

6.4 Comparison of Results with Recent Literature

As indicated, the presented results refer to the special type of portfolio entrepreneurs. As a next step, these results will be compared with the findings concerning portfolio, novice, sequential, and nascent entrepreneurs drawn from literature (see Table 6-5).

Types / Attributes	Portfolio (Experts)	Portfolio (Literature)	Sequential (Literature)	Novice (Literature)	Nascent (Literature)
University degree	+	-	-	-	-
Market research	+	-	-	-	
Business plan	+	-	-	-	
Pre-seed phase most interesting	+	-	-	-	
Planning of future foundations	+	-	-	-	
Foundation seen as a challenge	+	+	-	-	-
Intention for business ideas	+	+	-	-	
Marketing competence	+	+	-	-	
Age at 1st business foundation	+	+	+	-	
Entrepreneurial parents	+	-	+	+	+
Eagerness for independence	+	+	+	+	
Predominantly male	+	+	+	+	+

Table 6-5: Comparison with recent research results

13 analyzed attributes will be used for this purpose, which are illustrated in the left column of the table. Subsequently, the main differences will be presented. In contrast to entrepreneurship literature, the majority of serial entrepreneurs in this study had a university degree. Regional differences in educational systems, especially in an international context, could explain this difference (Westhead et al. 2005; Delmar and Davidsson 2000). Moreover, it is investigated in several studies that there is no significant correlation between a business foundation activity and the level of education (Jacobsen 2006).

All portfolio entrepreneurs within the study conducted market research. In other studies it was found that it is mainly portfolio entrepreneurs and, to a lower extent, novice entrepreneurs who conduct market research (Alsos and Kolvereid 1998). The same is true for writing business plans. However, these results cannot be backed by the study of Alsos and Kolvereid (1998), for instance. Within this research, only every second entrepreneur had his own business plan, and surprisingly, for portfolio entrepreneurs it was less common. This share has most probably grown over time, but in this case, the rate is still rather extraordinary.

Almost all founders in our case chose the legal form of an incorporated company. This result is not in concordance with other research findings, which can be due to the fact that almost all companies in question are within the high-tech sector with a specifically high failure risk. However, most sequential and novice entrepreneurs chose private companies, incorporations are no real alternative (Westhead et al. 2005).

Regarding the interest in the pre-seed phase and the plans for future foundations, the case entrepreneurs significantly differ from other entrepreneurs. In literature, it is particularly portfolio entrepreneurs who do not appreciate the pre-seed phase (Westhead et al. 2005) and the sequential and novice founders do not support the desire for further new start-ups.

The remaining factors are mostly coincident, whereas some factors have other proportionalities. For example, advertising efforts are made by all portfolio entrepreneurs, but just from every second sequential and novice entrepreneur (Alsos and Kolvereid 1998).

The parents of most of the entrepreneurs were not entrepreneurs themselves. Certain evidence can only be found in the case of portfolio entre-

preneurs for a correlation in literature (Westhead et al. 2005; Delmar and Davidsson 2000).

No differences concerning eagerness for independence and the gender of the entrepreneurs could be identified between the study and literature findings (Westhead et al. 2005; Westhead and Wright 1998; Delmar and Davidsson 2000).

6.5 Limitations of the Study

The companies in this study mostly operate in the same industry. To be able to generalize the findings, it is necessary to survey serial entrepreneurs that founded businesses in different industries to identify the industry-dependent influences on the characteristics and specifics of serial entrepreneurs in the business foundation process.

In addition, all businesses were founded in the southern part of Germany. The findings could, therefore, be influenced by given macro-economical ramifications. To exclude a possible bias, serial entrepreneurs from other regions of Germany should also be interviewed or a German-wide survey should be conducted.

As all serial entrepreneurs stem from Germany, the findings of this study cannot be generalized for serial entrepreneurs outside Germany due to cultural biases.

Furthermore, only male serial entrepreneurs were interviewed because identified female serial entrepreneurs did not participate. Further studies should also include female entrepreneurs in the sample. Gender-specific similarities and differences could then be detected.

The findings of this study remain in an area of tendency statements as they could not be proved on statistical significance. Therefore, quantitative surveys with a broader sample should be conducted.

Another limitation concerns the comparison of the survey finding with entrepreneurship literature, which did not always use the same distinction of entrepreneurs. The entrepreneur types were, hence, in some studies conceptualized in a broader way.

6.6 Discussion and Conclusions

Within this research, several remarkable basic differences between literature and researched cases could be identified, as serial entrepreneurs

seem to fundamentally differentiate themselves from other entrepreneurs. In contrast to entrepreneurship literature, planning tools like a business plan were extensively used and market research analyses were conducted.

But even more important, it can be seen within this study that serial entrepreneurs possess a high fondness towards the pre-seed phase and an exceedingly positive attitude towards future foundations. Hence, 'they found because of the founding', which does not only distinguish them from other entrepreneur types, but mainly from portfolio entrepreneurs shown in literature. Therefore, a successful entrepreneur has more in common with a kind of artist than with a normal manager in industry.

Concerning the entrepreneurial traits, the surveyed entrepreneurs have a high risk-taking propensity in which they also differ from the findings in literature.

In summary, this research allows interesting insights in the characteristics and specifics of serial entrepreneurs in the business foundation process on the basis of seven expert interviews. Therefore, it gives several starting points how to improve the search and the integration of entrepreneurial thinking people within existing companies and business foundations as well. In the latter case, implications can even made for entrepreneurship education: e.g. in order to enforce entrepreneurial decision behavior, because this can be taught and learned (Gustafsson 2006).

Concluding Remarks

Based on the introduced framework of innovation and entrepreneurship in the first chapter, selected aspects were chosen for further research. In the following, the main results will be summarized.

At the beginning, the second chapter presented a conceptual framework for corporate innovation management integrating technology push and market pull activities. The research was conducted with a case study, based on extensive analysis and evaluation of secondary data (corporate documentation analysis) and ten qualitative expert interviews with managers of different departments of a German software company (R&D, marketing, sales, technology, etc.). The results show the high importance of legislative and regulatory issues influencing the corporate innovation management. Moreover, the used methodology of the researched company can be used for further research and for practitioners as well.

Integrating customers, suppliers, competitors, and other stakeholders into an integrated idea management enables companies to consider ideas from different directions and implement them into the framework of a corporate innovation management. Within the third chapter, a sophisticated model of an integrated idea management was derived. In order to realize the practical relevance of the presented model, qualitative guided interviews with nine experts were conducted using explorative analysis. The results of the analysis confirm the relevance of an integrated idea management in practice, particularly the clear tendency towards an integration of external groups. The results show that those businesses which have already built up intensive customer and/or supplier relationships in order to generate ideas usually do not encourage them with a centralized idea management system. On the contrary, individual functional areas like sales, procurement and production are involved in these processes, though mostly uncoordinated. Although most of the interviewed companies are already integrating external partners into their idea management processes, they do not work efficiently as they lose ideas through the problems inherent with decentralized management.

Within the fourth chapter, micro-social, study-related, and inhibiting and fostering factors that are influencing the choice of starting a business were examined, in a sample of 553 students. The comparison in the founding

intention between males and females shows significant differences, which confirms the assumption that the entrepreneurial intention of males is higher than that of females. The family background only partially shows a significant influence on founding intention, however, with the father's influence only resulting in significant differences in the founding intention of male and female students. When only looking at the field of study, males are more interested in founding their own business than women. Moreover, the findings tend to indicate that there could be a positive relationship between general business administration education and the intention to start a business. Surprisingly, entrepreneurship as a major and courses in entrepreneurship do not bring significant differences in the founding intentions. Finally, the results indicate that inhibiting factors towards founding a company influence founding intention negatively and fostering factors positively. However, the results show that men and women differ according to inhibiting factors, but not regarding to fostering factors.

The fifth chapter dealed with the optimum timing strategies for a market entry. The corresponding survey sample comprised 300 companies from the automobile supplier industry in Germany. As demonstrated, the choice of a specific timing strategy is not the sole influence on success. Furthermore, only slight differences between the results of the R&D timing strategy and the market entry strategy could be found. Thus, it can be stated that there is no right or wrong timing strategy for companies, it is in fact more important that the diffusion progression happens quickly and that production synergies can be realized. An analysis with the moderate variables illustrated another important finding. Thus, the diffusion progression in combination with the pioneer strategy correlates with success if the R&D strategy is part of the market entry strategy. The corresponding conclusions can be used to better rate and plan the different alternatives of organizational implementation resulting from innovative activities and the later successful market diffusion.

A phenomenon in the entrepreneurship area is that there are individuals who found more than one business, which was researched in the sixth chapter. For this, ten serial entrepreneurs were contacted of which seven participated in this study. The surveyed serial-entrepreneurs fundamentally differ from the entrepreneurs from the entrepreneurship literature, especially in terms of the foundation planning and motivation. In contrast to entrepreneurship literature, the majority of serial entrepreneurs in this

study had a university degree. Regional differences in educational systems, especially in an international context, could explain this difference. All portfolio entrepreneurs conducted market research, the same is true for writing business plans. Regarding the interest in the pre-seed phase and the plans for future foundations, the case entrepreneurs significantly differ from other entrepreneurs, as their level is very high.

Within this work, several emphases lay on particular spots of the introduced innovation-entrepreneurship model, but not every single part of the model could be researched in detail. However, this offers several opportunities for future research.

For instance, it would be very helpful to have a methodology for continuous searching and identifying 'environmental changes' and 'entrepreneurial events'. A detailed typology of the introduced roles, namely 'creative thinker', 'entrepreneur' and 'manager' could improve the corporate education and recruiting strategy. Another open point is the missing or at least ambiguous systematic assignment of tasks within the innovation process (e.g. project leading) to the corporate roles (e.g. 'manager'). Moreover, further research could investigate the exact classification of the presented options of organizational implementation for realizing ideas. In this context, another interesting point is the relevance of different selection criteria in the context of diverse industries or regions. As a fast diffusion progression was identified as a key success factor, further research should include the evaluation of best practice methods to optimize the time-to-market planning.

Finally, it can be stated that the relationship between innovation and entrepreneurship is indeed very complex, but important at the same time.

Appendix to Chapter Four

A. Hindering Factors Intention Male Sample

Model summary

Model	R	R square	Adjusted R square	Std. error of the estimate
1	.230(a)	.053	.036	1.05316

a Predictors: (constant), social hindrances, lacking pre-start up know-how, lacking interest and ideas, financial and failure risk

ANOVA(b)

Model		Sum of squares	df	Mean square	F	Signifi-cance
1	Regression	13.723	4	3.431	3.093	.017(a)
	Residual	246.233	222	1.109		
	Total	259.956	226			

a predictors: (constant), social hindrances, lacking pre-start up know-how, lacking interest and ideas, financial and failure risk

b dependent variable: intention

Coefficients(a)

Model		Unstandardized coefficients		Standardized coefficients	T	Signifi-cance
		B	Std. error	Beta		
1	(Constant)	2.173	.322		6.747	.000
	Lacking pre-start up know-how	-.081	.106	-.062	-.759	.448
	Financial and failure risk	-.093	.100	-.076	-.926	.356
	Lacking interest and ideas	-.168	.080	-.162	2.099	.037
	Social hindrances	.080	.078	.073	1.032	.303

a dependent variable: intention

B. **Hindering Factors Intention Female Sample**

Model summary

Model	R	R square	Adjusted R square	Std. error of the estimate
1	.277(a)	.077	.062	.90792

a Predictors: (constant), social hindrances, lacking pre-start up know-how, lacking interest and ideas, financial and failure risk

ANOVA(b)

Model		Sum of squares	df	Mean square	F	Signifi-cance
1	**Regression**	16.817	4	4.204	5.100	.001(a)
	Residual	202.784	246	.824		
	Total	219.602	250			

a predictors: (constant), social hindrances, lacking pre-start up know-how, lacking interest and ideas, financial and failure risk
b dependent variable: intention

Coefficients(a)

Model		Unstandardized coefficients		Standardized coefficients	T	Signifi-cance
		B	Std. error	Beta		
1	**(Constant)**	1.886	.261		7.226	.000
	Lacking pre-start up know-how	.049	.088	.044	.553	.581
	Financial and failure risk	-.226	.079	-.225	2.853	.005
	Lacking interest and ideas	-.102	.065	-.125	1.569	.118
	Social hindrances	.000	.070	.000	-.003	.998

a dependent variable: intention

C. Fostering Factors Intention Male Sample

Model summary

Model	R	R square	Adjusted R square	Std. error of the estimate
1	.301(a)	.090	.074	1.02871

a Predictors: (constant), independence, status, external factors and experience

ANOVA(b)

Model		Sum of squares	df	Mean square	F	Signifi-cance
1	**Regression**	23.640	4	5.910	5.585	.000(a)
	Residual	238.103	225	1.058		
	Total	261.743	229			

a predictors: (constant), independence, status, external factors and experience
b dependent variable: intention

Coefficients(a)

Model		Unstandardized coefficients		Standardized coefficients	T	Signifi-cance
		B	Std. error	Beta		
1	**(Constant)**	.419	.387		1.082	.280
	Indepen-dence	.323	.095	.245	3.382	.001
	Status	.032	.079	.028	.399	.690
	External factors	.006	.078	-.005	-.075	.940
	Experience	.088	.083	.081	1.051	.294

a dependent variable: intention

D. Fostering Factors Intention Female Sample

Model summary

Model	R	R square	Adjusted R square	Std. error of the estimate
1	.249(a)	.062	.047	.91136

a Predictors: (constant), independence, status, external factors and experience

ANOVA(b)

Model		Sum of squares	df	Mean square	F	Signifi-cance
1	**Regression**	13.525	4	3.381	4.071	.003(a)
	Residual	205.154	247	.831		
	Total	218.679	251			

a predictors: (constant), independence, status, external factors and experience

b dependent variable: intention

Coefficients(a)

Model		Unstandardized coefficients		Standardized coefficients	T	Signifi-cance
		B	Std. error	Beta		
1	**(Constant)**	-.400	.365		1.096	.274
	Indepen-dence	.214	.091	.163	2.341	.020
	Status	-.025	.074	-.024	-.337	.737
	External factors	.040	.066	.044	.611	.542
	Experience	.128	.081	.118	1.568	.118

a dependent variable: intention

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