Thomas Fritz

The Competitive Advantage Period and the Industry Advantage Period

Assessing the Sustainability and Determinants of Superior Economic Performance

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With a foreword by Prof. Dr. Andreas Bausch

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Foreword

One of the major goals in strategic management research is to identify firm-related and industry-related sources and determinants of profitability differences among firms. Accordingly, essential theoretical views explaining superior economic performance of firms include (1) competitive advantages realized by firms compared to their rivals and (2) industry structural characteristics. Both became prominent in strategic management research by the seminal work of Michael Porter who originally distinguished two corresponding performance effects, the positioning effect and the industry effect. Many empirical studies have already been conducted on these issues. The majority considered market entry barriers and industry concentration (as external factors), competitive strategies and resources/ capabilities (as internal factors) and strategic group membership (as an intermediate factor).

From a strategic and long-term perspective, the sustainability of superior economic performance is of particular interest. Considerably less empirical studies have been conducted with respect to this topic. And there is no empirical study to date existing that has quantified for different industries the time span over which firms had been able to attain superior economic performance. Thomas Fritz bridges this research gap with his PhD thesis by determining the competitive advantage period (CAP) and the industry advantage period (IAP). He gives insights concerning the sustainability of performance differences at both the intra-industry and inter-industry level.

Thomas Fritz significantly contributes with his thesis to a holistic understanding of the drivers influencing the sustainability of superior economic performance. All empirical studies are based on sound theoretical analyses and argumentations. Thomas Fritz starts his research endeavor with a comprehensive narrative and meta-analytic review of past empirical research on the creation of superior economic performance. He then conducts his empirical studies for a broad sample covering more than 6,000 firms located in the G7 countries during the years 1980 to 2005 to calculate the CAP, the IAP, and their determinants.

The conclusions the author draws add perceptibly to the existing body of knowledge in the research field of business and corporate strategy. In addition, the results offer a well founded and sound guidance for practitioners searching for explanations of sustainable superior economic performance.

Prof. Dr. Andreas Bausch

Preface

Completing a PhD is truly a marathon event, and I would not have been able to complete this journey without the aid and support of several people. Although a few words do not do justice to their contribution I would like to thank the following people for making this work possible.

First of all, I would like to thank Prof. Dr. Andreas Bausch for being a great supervisor. His ideas and tremendous support had a major influence on this thesis. Additionally, I would like to thank him for giving me the chance to work at his professorship and to enable me to visit several international conferences. I have learned a lot during this time and I am convinced that this knowledge will help me in the future.

I would like to thank Prof. Dr. Gert Brunekreeft and Prof. Dr. Peter-J. Jost for reviewing my thesis. I am extremely glad to have had such supportive co-supervisors. I enjoyed their interest in my research as well as the fruitful discussions.

My thanks to my friends and colleagues for the great time I had in our research group. I enjoyed the atmosphere, their friendship, and their support. My thanks to Antje Beier, Kathrin Bösecke, Anne Galander, Christian Grube, Kristine Hermann, Michael Hunoldt, Mario Krist, Frithjof Pils, Nina Rosenbusch, Tonia Ruppenthal, Gerlinde Steinborn, Duc Linh Van Tri, and Tobias Waskönig for the great collaboration over the years. It was a pleasure to work with all these people and to benefit from their knowledge. Especially, I would like to thank Christian Grube for the productive discussions and exchange of ideas. Furthermore, special thanks to Duc Linh Van Tri for being such an excellent co-worker and team player. I would also like to thank all the rest of the academic and administrative staff of Jacobs University.

Last but not least, I wish to thank my family who has supported me at all times, particularly my Mum and Dad who are always available for me, my brother, Michael, for his support in hard- and software questions, and, most important of all, my wife, Christina, who not only nearly never complained about all the weekends I spent with my laptop but also cheered me up all the time although she had to cope with all the moods I went through while writing my PhD thesis.

Thomas Fritz

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List of Abbreviations

CA	competitive advantage(s)
CAP	competitive advantage period
CAP ROA	competitive advantage period based on ROA
CAP q	competitive advantage period based on Tobin's q
CE	capital employed
DCF	discounted cash flow
et al.	et alii
EVA	economic value added
f.	following
ff.	forth following
HHI	Herfindahl-Hirschman Index
I	annualized new investments in working and fixed capital
IA	industry advantage(s)
IAP	industry advantage period
IAP ROA	industry advantage period based on ROA
IAP q	industry advantage period based on Tobin's q
IFSAM	International Federation of Scholarly Associations of Management
IO	industrial organization
KBV	knowledge-based view
K-S	Kolmogorov-Smirnov
MBV	market-based view
MICAP	market-implied competitive advantage period
NOPAT	net operating profit after taxes
OLS	ordinary least squares
R&D	research & development
RBV	resource-based view
ROCE	return on capital employed
SBV	strategy-based view
SCP	structure-conduct-performance
SMS	Strategic Management Society
TV	terminal value
US	United States
USA	United States of America
UK	United Kingdom
WACC	weighted average cost of capital

Part One: Introduction

1 Research Objectives

More than five decades after the inception of strategic management as a research discipline, strategy researchers are still asking themselves whether strategy is an academic field and what the specific role of strategy research is within the management disciplines (see, e.g., Hafsi & Thomas, 2005; Hambrick, 2004; Meyer, 1991; Nag, Hambrick, & Chen, 2007; various authors in the European Management Review, Vol. 1, No. 1, 2004). In his survey on the distinctive competences of strategy research, Meyer (1991) identified eight major contributions of strategy research in the area of management research:

- Linking internal characteristics and a firm's long-term performance.
- Bringing the concept of industry to the domain of organizational analysis.
- Capturing intra-industry variations in a firm's competitive positioning and performance.
- Providing theoretical rationales and empirical evidence for linkages between a firm's strategic posture and its internal structures and processes.
- Demonstrating more clearly the importance of cross-level, cross-functional, and cross-theoretical effects.
- Enhancing the conceptualization and measurement of firm performance.
- Introducing new empirical techniques.
- Bringing together the practical and the theoretical worlds.

Most recently, Nag et al. (2007) derived via content analysis of 385 abstracts the following implicit consensus definition of the field of strategic management (942):

> The field of strategic management deals with:
>
> (a) the major intended and emergent initiatives
> (b) taken by general managers on behalf of owners,
> (c) involving utilization of resources
> (d) to enhance the performance
> (e) of firms
> (f) in their external environments.

Building on this definition of strategic management, I will follow the interpretation by Saloner, Shepard, & Podolny (2001) of the *raison d'être* of the field of strategy management (1):

> …developing a set of tools and conceptual maps for uncovering the systematic relationship between the choices the manager makes and the performance the firm realizes.

It is those managers having to make strategic decisions that strategy research is intended to aid. As a result, strategy research needs to remain grounded in reality, and its methods should incorporate real-world complexity (Hafsi & Thomas, 2005, 517). By doing so, strategic management research not only offers managers a high degree of guidance, but also provides strategy researchers a richer flow of ideas with respect to management practices and thus an opportunity to profit from an enhanced understanding of firm processes.

Since the establishment of strategy research, one research question has evolved as the most prominent – one that is essential for this research field, and which is highlighted by its prominent inclusion in the definition of strategic management by Nag et al. (2007): What are the reasons that allow a firm to outperform other firms on a sustainable basis (see, e.g., Barney, 1986a, 791; Meyer, 1991, 828; Porter, 1991, 95)? In other words, the discipline centrally aims at explaining the sustainability of superior economic performance. Essential theoretical constructs explaining the achievement of superior economic performance include competitive advantages (CA) realized by firms *vis-à-vis* their rivals, as well as industry's structural characteristics (Porter, 1991, 99f.). The latter form an industry effect that results in an industry inherent profit level. In addition to this industry inherent profit level, individual firm actions allow a firm to attain an attractive relative position within its industry.

Despite the prominence of this research question, no empirical study to date has quantified the exact sustainability of superior economic performance. Most past empirical research analyzing the phenomenon of sustainable superior economic performance analyzed factors leading to superior economic performance. These factors especially include industries' structural characteristics (see, e.g., Bain, 1951; Demsetz, 1973; Mann, 1966), generic strategies (see, e.g., Dess & Davis, 1984; Hall, 1980; Snow & Hrebiniak, 1980), strategic group membership (see, e.g., Hatten & Schendel, 1977; Hatten, Schendel, & Cooper, 1978; Oster, 1982), and resources and capabilities (see, e.g., Dyer, 1996; Henderson & Cockburn, 1994; Miller & Shamsie, 1996).

The inherent assumption of these studies is that factors allowing the generation of superior economic performance (via an industry effect or CA) will also lead to a sustainability of this position. Although this assumption might be true for some factors, the assumption is probably questionable. Many factors resulting in superior economic performance might only be of a

short-term nature and even hinder a sustainable position of superior economic performance. An example would be a firm stopping research and development (R&D) activities once having achieved a technological advantage with the firm's products. On a short-term horizon, the firm might be able to increase the relative performance in its industry due to the decreased cost but the technological advantage and thus CA will typically erode due to the imitative and innovative behavior of competitors. Although the effect is obvious for the given example, for other, less obvious factors, such a short-term effect may also exist, not permitting us to draw a conclusion of a sustainable effect.

Although another line of previous empirical research explicitly looks at the dynamic development of superior economic performance (see, e.g., Cubin & Geroski, 1990; Jacobsen, 1988; Mueller, 1977), here, too, none of these studies goes so far as to quantify the sustainability of superior economic performance. However, it is only after having quantified the sustainability of superior economic performance, that the determinants steering the sustainability can then, in a next step, be assessed. Thus, my two central research objectives are:

1. To test whether and for how long superior economic performance is sustainable.

2. To identify determinants of the sustainability of superior economic performance.

Hence, this will be the first empirical work precisely quantifying the sustainability of superior economic performance and analyzing factors that affect this quantified sustainability of superior economic performance. As highlighted by the examples given previously, this approach will permit us to draw more direct and, in turn, enhanced conclusions about the central research theme of strategic management research.

In line with the above-described understanding of the goal of strategy research, a third research objective thus arises:

3. To develop a general framework on factors affecting the sustainability of superior economic performance.

Such a general framework, based on the results of this work, should serve two interest groups: (1) it will provide academicians with an empirically validated guideline for future work on the sustainability of superior economic performance; (2) it should also offer practitioners an overview of empirically relevant factors influencing the sustainability of superior economic performance as a basis for both strategic decision in their firms and a further discourse between practice and academia on this research topic. At the same time, however, when apply-

ing such a framework the particularities of the specific context (e.g., type of industry) have to be taken in consideration.

To fulfill the third research objective with regard to the first named interest group, it is important to pursue an integrative approach. Only by including inter-industry, intra-industry, and dynamic competitive processes in the analyses – and, finally, if relevant, in the framework – the results will draw a more complete picture, one that can form a basis for developing integrative theories of strategy (Barney, 1986a, 791 & 798).

By achieving this goal, the relevance for the second interest group will also be enhanced and thus the gap between rigor and relevance might partly be bridged (see, e.g., Kelemen & Bansal, 2002, 97ff.). Non-integrative frameworks are typically not able to explain complex and dynamic real-world phenomena and are, in turn, of little importance for practitioners. The provision of an integrative framework that triggers the development of integrative theories can be expected to increase the relevance for practitioners and the exchange of ideas between academics and practitioners. At the same time, however, it is important to note that despite the integrative and thus complex nature of the framework, it is still a "down-to-earth" instrument, general enough to be a source of explanatory power and a guide to collective action in daily business (Hafsi & Thomas, 2005, 517). In the words of Hafsi & Thomas (2005, 517), it should provide managers with a "walking stick" for strategy.

2 Research Design

Methodical literature typically distinguishes between a pragmatic and a theoretical scientific goal – forecast and formation on the one hand and explanation on the other (Popper, 1972, 49ff.). However, experience within management literature shows that pragmatic approaches directly aiming at recommendations, e.g., developed based on individual experience, often do not convince practitioners (Grochla, 1976, 632). Formative statements should therefore be derived from theoretical research achievements.

To achieve this goal, research has to be based on a clear target system. Strategic management research should first of all aim at providing frameworks for practitioners. These frameworks can guide practitioners and provide room for maneuvering when structuring highly complex decision-making processes. To offer such a framework, several sub-targets have to be fulfilled: (1) inclusion and definition preferably of all relevant decision parameters, (2) formulation of hypotheses on relationships between these parameters, (3) empirical tests of the hypotheses, and (4) interpretation of the results. Fulfilling these four basic steps will lead to a

high information content, applicability, and decision relevance (Chmielewicz, 1974). However, these characteristics of a framework can only be developed gradually. A relatively immature framework, still in development and not fulfilling all mentioned criteria, can also guide decision-making processes within firms. An early application of such still developing frameworks may at the same time help to guide the further theoretical development.

Frameworks providing high information content, applicability, and decision relevance are typically developed via several stages of theory building (see Chmielewicz, 1994, 9, for a similar structure):

- Stage 1: Conceptual statements
- Stage 2: Descriptive statements
- Stage 3: Explanatory statements
- Stage 4: Formative statements

Besides differentiating these stages, research strategies have to be distinguished. Grochla (1976) makes a distinction between three research strategies: (1) objective-analytical research, (2) formal-analytical research, and (3) empirical research. Figure 1 shows the differences and overlaps between these research strategies on the basis of the above mentioned stages of research.

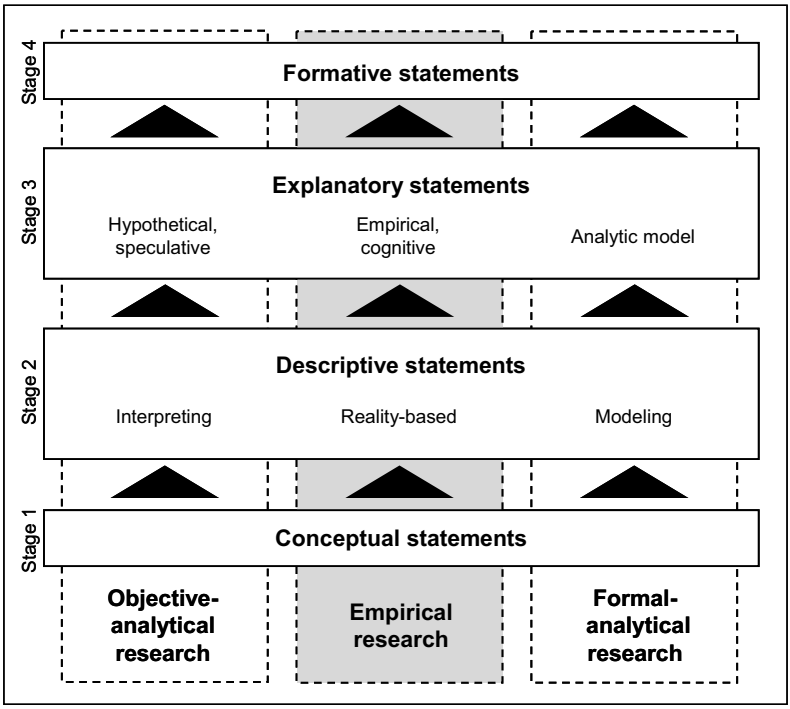
An objective-analytical research strategy aims especially at analyzing complex relationships in conjunction with speculative elements. The goal of this approach is not to test the results, but to develop the qualitative structure of the problem.

The goal of the formal-analytical research strategy is to structure a problem based on formal models. The reliance on formal models is the main distinction of the formal-analytical approach as compared to the objective-analytical approach.

Finally, the empirical research strategy strives essentially for a systematic generation of experience. Testing statements on the observed reality by means of statistical techniques is at the heart of this approach.

For this paper, an empirical research strategy was chosen that has several implications for the different stages of the research process. The conceptual statements have to take into account that certain ideas and characteristics should be observable. In the second stage, the areas of reality analyzed are described on the basis of the previously developed ideas in order to test

Figure 1: Stages and strategies of research
(Grochla, 1976, 637)



whether these ideas are able to depict reality. The descriptive statements thus formulated can be described as reality-based. In the third stage of the research process, empirical, cognitive statements on the relationship between analyzed variables then have to be made. These will allow the researcher to form empirical-based explanations of cause-effect relationships. However, the results are only interpretable on the basis of the causal assumptions that lead to the inclusion of these variables. Typically, this is achieved in a three-step process: (1) formulating hypotheses on cause-effect-relationships, (2) testing these hypotheses, and (3) interpreting the results. In the third and last stage, based on empirically verified and specified statements, it should be possible to derive concrete recommendations for practice from which formative statements can be developed.

3 Structure

This book consists of five parts within which the four stages of theory development described will be covered. After the general introduction, a narrative and meta-analytic review of past

empirical research on the creation of superior economic performance will be presented in part two. This review will allow an assessment of the most dominant determinants of superior economic performance found in past empirical research. Thus, the review will also give an overview of the status of research on the creation and sustainability of superior economic performance with regard to the first three research stages described above. Based on this assessment, an integrative framework for the creation of superior economic performance will be developed that will guide my empirical analyses in part three and part four.

In part three, the concrete sustainability of superior economic performance at the firm- and industry-level will be empirically analyzed by assessing whether and how long firms and industries can sustain a position of superior economic performance. Therefore, the period during which firms/industries typically can achieve superior economic performance will be quantified via the concepts of the competitive advantage period (CAP) and the industry advantage period (IAP). The focus of part three of the paper thus lies on generating reality-based descriptive statements. However, inasmuch as determining the actual sustainability of superior economic performance within and across industries already allows for an assessment of the applicability of several theories typically applied to describe the generation and sustainability of superior economic performance, the results will also permit the generation of formative statements for management practice and research.

After determining the CAP and the IAP, the determinants of the sustainability of superior economic performance are then analyzed in a next step. Hypotheses on cause-effect relationships will therefore be derived and then tested in part four to assess these determinants. Empirically testing determinants on the sustainability of CA proposed in theory will allow us to derive explanatory statements that will then be the basis for developing further formative statements to guide management practice.

Finally, in part five the main results will be summarized and integrated into a general framework to draw an overall picture with respect to the creation of superior economic profits. This overall assessment will be the basis for formulating general implications for both future research and management practice.

This PhD thesis follows a “cumulative approach.” That is to say that the thesis comprises three papers (parts two, three, and four) which can be independently presented or published. Indeed, some parts of the thesis were submitted to and accepted at international conferences. An earlier version of part two was accepted for presentation at the VIIIth IFSAM (Interna-

tional Federation of Scholarly Associations of Management) World Congress and presented during this conference in September 2006 in Berlin, Germany. An earlier version of part three was accepted for presentation at the 2007 SMS (Strategic Management Society) International Annual Conference and presented during this conference in October 2007 in San Diego, USA. The application of my results for the length and determinants of the CAP to the question of firm valuation suggested in part 5 was presented at the Vallendarer Controllertagung in March 2008 in Vallendar, Germany.

Please note that as a result of this approach certain ideas and elements may be discussed more than once within the thesis. Nonetheless, the advantage of the approach in providing several independently publishable papers seems, from the author's perspective, to outweigh this disadvantage.

Part Two: Past Empirical Research on the Creation of Superior Economic Performance – A Narrative and Meta-Analytic Review of Industry- and Firm-level Influences

1 Introduction

Studying superior economic performance is at the heart of both industrial organization (IO) research and strategic management research. Researchers in these fields have accumulated a vast number of empirical studies on the sources and sustainability of superior economic performance.

Research in IO economics usually examines the role of industry effects such as entry barriers, concentration, and growth. Traditional IO research generally ignores the question of firm behavior and focuses on the performance effects of industry membership, highlighting inter-industry profit differences. In contrast to IO economics, strategic management research sees strategy effects leading to CA as predominant sources of superior economic performance. Generic strategies and strategic group membership are here considered to be drivers of intra-industry profit differences. More recently, resources and capabilities of firms have been discussed in strategic management research as internal factors underlying CA and intra-industry profit differences. The Austrian school and its predecessors, who apply a dynamic perspective, underline, in contrast, constant environmental changes that erode an existing position of superior economic performance and generate the necessity for continuous development.

Although the majority of empirical studies testing the concepts mentioned attempt to explain superior economic performance, empirical research has resulted in a wide variety of results. The sources of this heterogeneity are multiple, but the most dominant are the differences in (1) the primary theoretical perspective, (2) the choice of variables, (3) the definition and measurement of variables, and (4) the statistical techniques employed.

The observed heterogeneity – not only between the mentioned research fields but also within them – leaves the reader in state of uncertainty about the nature of superior economic performance. This uncertainty is increased by the fact that researchers often focus on their respective research topics without referring to other lines of research that also analyze sources and sustainability of superior economic performance. Due to the differences in the theoretical perspectives, even reviews of existing literature often focus on just one aspect without giving a comprehensive overview of the overall research topic.

In order to allow better insights into the body of research on the creation and sustainability of superior economic performance, the goal in this part is to review existing empirical studies on the research topic, analyzing one of the above mentioned theoretical concepts. This review will allow an assessment of determinants of the sources and sustainability of superior economic performance. Based on this assessment, an integrative theoretical framework will be developed in order to draw a clearer picture of the determinants of superior economic performance.

The review comprises 144 empirical investigations published between 1951 and 2007 examining factors influencing the generation and/or sustainability of superior economic performance. Due to the observed heterogeneity of the studies, the review will be primarily of a narrative nature following the five steps suggested by Cooper (1998) for literature reviews in general, but will also provide for a subsample quantitative integration based on the meta-analytic techniques introduced by Hunter, Schmidt, & Jackson (1982) and Hunter & Schmidt (1990; 2004). Analogous to the main research streams introduced above, the review will include both industry- and firm-level influences on the sustainability of superior economic performance.

In section two of this part, the major research streams explaining the generation and sustainability of superior economic performance are introduced. Section three describes the methods employed for the review, and in section four the sample selection and sample are presented. Based on the past empirical research results discussed in section five, an integrative framework of the influences on superior economic performance is developed in the concluding section.

2 Theoretical Background and Propositions

In both strategic management and strategic management research firm performance and factors explaining differences in firm performance are of focal interest (Venkatraman & Ramanujam, 1986, 901). Because of its direct linkage to the performance of firms, CA has been one of the major concepts used in strategic management research (see, e.g., Hunt & Morgan, 1995; Jacobsen, 1988; Porter, 1985; Varadarajan & Ramanujam, 1986). But what is CA exactly? In 1965, Ansoff defined CA as follows (110):

> …characteristics of unique opportunities within the field defined by the product-market scope and the growth vector...It seeks to identify particular properties of individual product markets which will give the firm a strong competitive position.

This definition by Ansoff already comprises the basic idea on which most of today's work on CA is still grounded: the generation and sustainment of a superior competitive position in comparison to other companies, which leads to superior economic performance. The choice of the benchmark for the superior performance position (and the search for the sources of this position) used for assessing the generation of CA relies heavily on the chosen theoretical perspective.

Besides strategic management research, several other research disciplines in management and economics research have notably focused on the question of superior economic performance. In the following, I will distinguish three major research streams concerning the creation and containment of superior economic performance that can be found in theory: (1) dynamic concepts, (2) IO economics, and (3) strategic management research (see Figure 2 for an overview). Additionally, I will introduce and distinguish neoclassical economics as a base case for formulating a null hypothesis. For economists, the neoclassical model postulates a general reference model in economic theory. Nonetheless, the application of neoclassical economics as a basis for a null hypothesis allows a more structured and complete formulation of propositions (Wiggins & Ruefli, 2002, 85). Additionally, being the foundation for the null hypothesis of the review, the approach also fulfills the function of reference model in this analysis.

In the perfect competition model of neoclassical economics, firms exist to combine inputs – namely: labor and capital (Alchian & Demsetz, 1972, 791). In the neoclassical market, all participants have perfect knowledge and thus the market is in equilibrium (Debreu, 1959, 74ff.). Additionally, the production function is specifiable, which assures that each firm has equal access to product technology. Moreover, resources are mobile and divisible. Thus, profit maximization by firms results in no superior economic performance. The achieved return equals the rate required to maintain capital investment. In turn, market participants have no motivation to search for new products and methods. Although competition is seen as beneficial for the market, the competitive process itself is not included in the analysis. In this static model of perfect competition, no more possibilities for competition exist. Firms can only earn abnormal profits when they exercise monopoly power (Bain, 1959, 377). With respect to monopoly power, neo-classicists speak of a possible disequilibrium in the market. Yet, they do not explain the competitive process that leads to this disequilibrium.

The neoclassical model of perfect competition leads to the following proposition:

P1: No superior economic performance can be realized by market participants.

Figure 2: Main research streams and related/(sub-)concepts on the creation and sustainability of superior economic performance
(SEP: superior economic performance, CA: competitive advantages)

Research stream	Related/(Sub-) concepts	Main determinants	Creation of SEP
Neoclassical economics		• Market participants have perfect knowledge • Production function specifiable	• Profit maximization results in zero profits and in turn no SEP
Dynamic concepts	Austrian school of economics	• Markets are a dynamic process • Entrepreneurial discovery leads to innovation • Bounded rationality • Markets are constantly in disequilibrium	• Innovations result in SEP • Competitive process erodes SEP which is in turn only a temporary phenomena
	Schumpetrian perspective	• Model of creative destruction • Constant process of innovation and imitation • Market equilibrium in certain time periods possible	• Innovation leads to SEP • SEP attracts imitators and SEP is in turn eroded
	Hyper-competition	• Competition is characterized by constant disequilibrium and change • Competition continuously escalates	• CA and SEP is only for a short-term achievable • Firms should strive to create a sequence of short-term CA
	Evolutionary economics	• Concept of "natural selection" • Patterns of survival and growth trigger economic change	• Adjustment to changing industry leads to SEP • Ability to survive and to grow as an imperative for firm success
Industrial organization economics	Structure-conduct-performance (SCP) school	• SCP paradigm • Managerial actions are not independent decisions	• SEP are a result of industry membership • Barriers to entry protect SEP • Inter-industry profit differences can be observed

Figure 2 continued

Research stream	Related/(Sub-) concepts	Main determinants	Creation of SEP
Industrial organization economics (continued)	Price theory	• Independent market processes lead to optimal structure • Increasing firm size results in higher efficiency	• Efficiency increases cause SEP • Barriers to entry are not necessary • Inter-industry profit differences can be observed
Strategic management research	Market-based view	• Industry inherent profitability level due to industry structure • Firm actions also influence market structure	• SEP is in parts predetermined by industry structure • Both industry membership and strategic positioning have performance effects
	Strategy-based view	• Strategic choice as product of and response to industry structure • Development of generic strategies to structure reality • Strategic grouping as a method to explain conduct differences within an industry	• Strategic positioning as the main source of CA and in turn SEP • Intra-industry profit differences are an effect of strategic choice • Mobility barriers protect established profit differences
	Resource-based view	• Strengths and weakness due to company controlled resources and capabilities • Not perfectly competitive factor markets	• Resources and capabilities are the driving factor for CA and in turn SEP • Intra-industry performance differences are caused by not perfectly competitive factor markets

Within the *dynamic concepts,* four main approaches can be distinguished: (1) the Austrian school of economics, (2) the Schumpeterian perspective, (3) Hypercompetition, and (3) evolutionary economics. The Austrian school of economics (see Jacobsen, 1992, for an overview) can be traced back to Carl Menger's Principles of Economics, in 1871. The basic idea of the Austrian school is that markets are viewed as a process of discovery and not as a static model. In this process supernormal profits are earned through entrepreneurial discovery of new products and/or methods which lead to superior economic performance. These possible abnormal profits are the motivation for both the discovery by an entrepreneur and the imitation by competitors. Thus, the abnormal returns are temporary and can only last until the competitive

process of imitation erodes the superior competitive position. At the same time, innovations are seen as a continuous process leading to a constant disequilibrium. In this disequilibrium model the success of companies relies primarily on unobservable factors and not on *ex ante* derived strategic regularities. The model clearly emphasizes the role of knowledge and learning in the competitive process as a source for disequilibrium in markets. Hayek (1937) stresses this fact by highlighting that the world is uncertain and constantly changing, which in combination with knowledge differences leads to entrepreneurial discovery and a constant state of disequilibrium. Furthermore, Austrians point out that it is mostly unobservable, non-quantifiable factors that are sources of superior economic performance (Kirzner, 1973, 7).

Schumpeter (1934) – a scholar of the Austrian school – introduced with his model the term "creative destruction" to describe the dynamic market process: innovation leads to monopoly power; monopoly power creates superior economic performance; superior economic performance attracts imitators; imitators diminish monopoly power; and thus superior economic performance once again disappears (Mueller, 1990, 3). He argues that new products, production processes, and organizational techniques are the basis for economic development (see Roberts, 2001, for an overview). Due to these innovations, the market is no longer in equilibrium – an innovator can realize superior economic performance by means of his innovation(s). At the same time, the abnormal returns that motivated the innovator stimulate other market participants to produce imitations and the realized superior economic performance disappears again. In contrast to the classical Austrian perspective, Schumpeter assumes that in certain time periods the markets can be in equilibrium.

D'Aveni (1994; 1995) builds his concept of hypercompetition on the Schumpeterian idea of creative destruction. Hypercompetition puts the increasing pace of market turbulence (see, e.g., Eisenhardt, 1989, 543ff.) into the center of attention: stable and continues competition is a nonpareil. Rather competition is characterized by constant disequilibrium and change (D'Aveni, 1995, 96). As a consequence, firms can not earn superior economic performance on a sustainable basis. This is to say that in an environment of hypercomeptetition CA are rapidly created and eroded. Thus, firms should concentrate on building a sequence of short-term CA than striving for sustainable CA (D'Aveni, 1994, 26). Hypercomeptition can occur within four different arenas (D'Aveni, 1994, 13ff.):

1) Cost/quality arena
2) Timing/know-how arena

3) Strongholds creation/invasion arena

4) Deep pockets arena

Within these arenas competition continuously escalates: measures lead to countermeasures. Although the logical order of the arenas would be as sequenced above, jumps back and forth between the different arenas will occur based on the opportunities firms encounter.

Evolutionary economics (Nelson & Winter, 1982) also relies on a dynamic market model. Nelson & Winter (1982) frame their approach in Schumpeterian terms (Nelson & Winter, 1982, 39), relying on basic ideas from biology, such as the concept of "natural selection" described by Darwin (Nelson & Winter, 1982, 9). They see patterns of survival and growth as triggers for economic change for all incumbents in a market. The adjustment to these changing industry characteristics is crucial for surviving in the market. At the same time, however, the ability to survive and to grow is imperative for firm success. The concept clearly stresses the interdependence of original growth and change carried out by the company itself as well as adjustment to changing market conditions.

On the basis of the dynamic concepts presented, Proposition 2 can be derived:

> P_2: *Superior economic performance can be realized but is definite and decays over time.*

In *IO economics,* we distinguish between two arms of research: the structure-conduct-performance (SCP) school of IO and the price-theory IO perspective. According to the SCP paradigm, developed by Mason (1939) and Bain (1956; 1959), firm performance depends on firm conduct, which in turn depends on industry structure. Thus, in this concept the industry structure influences not only firm conduct but also firm performance. Bain (1956; 1959) and Mason (1939) both state that industry structure constrains firm conduct such that managerial actions, like choice of strategy, are not independent decisions. If this is true, superior economic performance will be a result of industry membership, and performance will be relatively homogeneous within an industry. In particular, industry concentration, product differentiation, and growth of demand are highlighted as important structural variables (Bain, 1959, 408; Mason, 1939, 66).

Industry concentration (structure) leads in IO to collusion and market power (conduct), hence monopoly pricing (performance). Product differentiation is seen as an important structural characteristic as it leads, together with high advertising intensity, to established product pref-

erences, therefore allowing price increases and thus higher profit margins. High growth in demand can increase profits when investments in additional capacity are lower than demand growth.

Entry barriers sustain the performance level of a particular industry generated by other structural variables as they insulate firms from potential competitors. In his work, Bain derives four dominant barriers to entry (Bain, 1959, 248 and 251):

- Economies of scale
- Product differentiation
- Absolute cost advantages
- Capital requirements

Other authors highlight the importance of advertising to erecting entry barriers (see, e.g., Comanor & Wilson, 1974). Although the separation between entry barriers and other structural characteristics that lead to a certain performance level is not mutually exclusive, the conceptualization of performance level–generating structural characteristics and performance level–sustaining barriers to entry is useful for explaining the generation and preservation of industry specific performance levels. In contrast to neoclassical economics, the IO perspective – due to the introduction of barriers to entry – allows the persistence of superior economic performance in the equilibrium (Mann, 1966, 296). Nonetheless, in the traditional approach of this concept, profit differences exist only on an inter-industry-level.

Proponents of the price theory IO perspective and the Chicago School, such as Demsetz (1968), Stigler (1968), and Posner (1979), argue that only independent market processes lead to optimal welfare. Industries that are not influenced over a certain amount of time realize an optimal market structure in which only efficient firms with an optimal size will survive. Stigler (1968) describes this process as “survival of the fittest.” Market share and industry concentration, in particular, are the primary determinants in this concept. Supporters of the Chicago School see increases in concentration as a necessary condition for reaching an optimal efficient size. Economies of scale, transaction cost advantages, as well as organizational advantages are the foundation for an efficiency increase in connection with increasing firm size. Thus, increases in concentration are not only connected with a decrease in the efficiency of allocation – due to an increase in market power – but also with increases in cost efficiency. Therefore, in contrast to the SCP approach, barriers to entry are not necessary to protect superior economic performance attained through higher concentration, as they are a result of effi-

ciency increases leading to a superior cost position (Stigler, 1968, 72 ff.). Of course, concentration-based superior economic performance also has to be interpreted on an inter-industry-level, hence concentration-related efficiency increases are industry-wide phenomena influencing market structure. Thus, in turn, although relying on a different theoretical model, in the end in the price theory approach, too, certain structural characteristics (namely increased concentration) of an industry – while relying on a different line of argumentation – typically go along with increased industry performance. The implication for competition policy is, of course, different. Whereas SCP proponents would argue for the necessity of policy actions to lower concentration, price theory proponents would argue that due to this being an outcome of efficiency gains, policy actions preventing an increase of or reducing the existing concentration level are not necessary (see Leach, 1997, 13, for a summary of the different competition policy implications of the two approaches).

As a matter of course, price theory introduces the term "perfectly contestable markets" (as opposed to perfectly competitive markets). Perfectly contestable markets, unlike perfectly competitive markets, are in line with a variety of industry structures, including monopoly and oligopoly. Absolutely free entry and costless exit are the fundamental characteristics of contestable markets (Baumol, 1982, 3). This means that incumbents have no advantage with regard to production technique and/or perceived product quality, allowing in connection with free exit a hit-and-run entry. Thus, in contestable markets prices are equal to marginal cost and no supernormal profits are achieved.

Observed real world profit differences in the same structural environments cannot be explained by the traditional SCP or price theory approaches. For example, Demesetz (1973) and McGee (1988) address this criticism of the basic SCP paradigm by including efficiency-generating competencies in their line of argumentation. Competence differences between firms of the same industry allow intra-industry profits to deviate from one another.

Based on the traditional IO economic based-models, the following proposition – which suggests with respect to price theory the existence of an imperfectly contestable market – can be formulated:

> P_3: *Superior economic performance depends on the structural characteristics of the industry.*

While IO economics assumes that firms of one industry are homogeneous except for differences in size, *strategic management research* has been developed at the level of the individual

firm that assumes that firms are idiosyncratic in strategically important ways (Porter, 1981, 612). In strategic management research, three dominant research perspectives have been established: the market-based view (MBV), the strategy-based view (SBV), and the resource-based view (RBV). The basis for the SBV can be seen in the MBV and thus also in the SCP paradigm of IO economics. However, unlike traditional IO economics, MBV research typically highlights the performance effects of both industry membership and strategic positioning within the industry.

The most prominent framework of the MBV was developed by Porter (1980; 1985), who described five forces driving industry competition: (1) rivalry among existing firms, (2) bargaining power of suppliers, (3) bargaining power of buyers, (4) threat of new entrants, and (5) threat of substitute products or services. The strength of each of these five forces determines the attractiveness of an industry, leading to an inherent profitability level (Porter, 1985, 4). Although this concept clearly supports Proposition 3, Porter (1991) views the market environment only partly as being a stable determinant for the generation of superior economic performance, arguing that market structure is also influenced by firm actions (Porter, 1991, 100).

To include the effect of strategic positioning in his analysis, Porter (1980; 1985) – on the basis of the two dimensions: strategic advantage and strategic target – develops three generic strategies (see Figure 3):

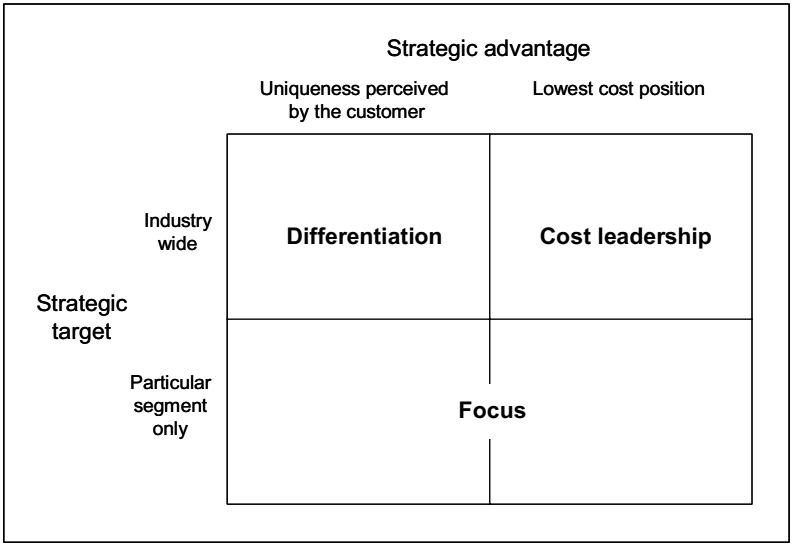
- Overall cost leadership
- Differentiation
- Focus

Within this SBV framework, strategic choice is both the product of and the response to the perceived industry structure, leading to intra-industry profit differences besides the inter-industry differences stemming from the structural industry characteristics.

Cost leaders focus on the efficiency of their processes in order to achieve lower prices than competitors with equivalent products. On the contrary, differentiators strive to create superior product quality, which creates unique value for customers. A strategy of focus is characterized by defining a narrow market segment – e.g., with regard to customers, product type, geography – and typically focusing on either cost leadership or differentiation. Firms that clearly

position themselves with regard to the two dimensions are predicted to achieve CA and thus superior economic performance.

Figure 3: Porter's generic strategies
(Porter, 1980, 39)

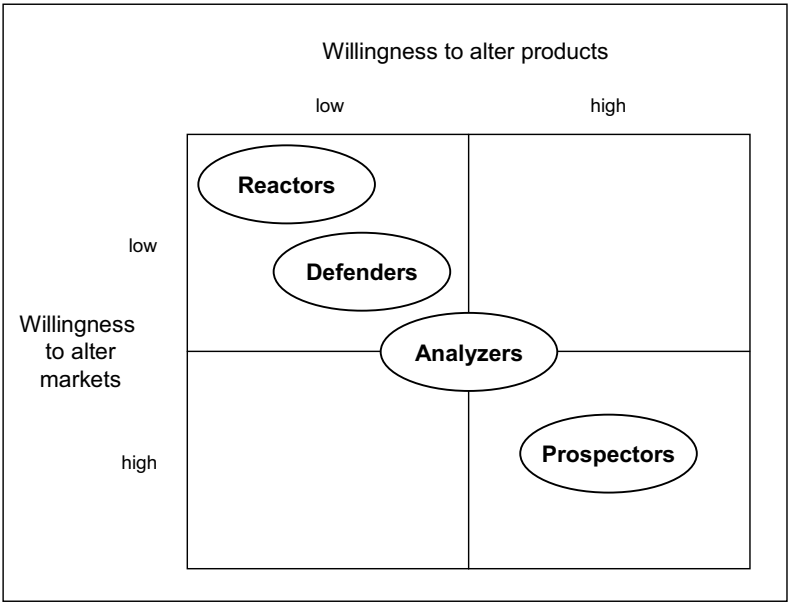


In addition to Porter's generic strategies, the Miles & Snow (1978) typology – also prominent in the literature – should be mentioned. They distinguish defenders, prospectors, analyzers, and reactors on the basis of a firm's willingness to alter its products and markets Figure 4. The first strategy is characterized by maintaining a stable offering to exploit its stability in the form of low cost, product quality, or a combination of both. The second pursues a particular type of differentiation strategy: early innovation to exploit market opportunities. Analyzers operate at the same time in stable and changing market domains. In stable areas they implement formalized structures and processes, whereas in the more turbulent areas they closely scan their competitors for new ideas, looking for those that seem to be most fruitful. Finally, reactors seldom make adjustments until environmental changes force them to do so (Miles & Snow, 1978, 29).

Although the two typologies presented differ, they are not incompatible. In fact, a juxtaposition of them shows the multidimensionality of strategic options in reality. Both have to be seen as attempts to categorize a complex phenomenon. Such a *ceteris paribus* declination is,

of course, never able to thoroughly explain real-world phenomena, but can provide a useful framework with which to structure real-world complexity and thus guide decision making.

Figure 4: Miles and Snow typology of generic strategies
(based on Miles & Snow, 1978)



Besides the development of generic strategies, the concept of strategic groups – introduced by Hunt (1972) – has attracted a great deal of attention in the SBV of strategic management research. Originally used and developed within both IO economics and strategic management, today the strategic group concept is in addition to generic strategies the SBV's dominant concept in explaining intra-industry profit differences. While IO economists – following the classical SCP approach – used the model to explain structural differences within an industry (see, e.g., Newman, 1978), strategists focused from the beginning on conduct differences within an industry (see, e.g., Hunt, 1972).

In his study on the major home appliance industry, Hunt (1972) observed heterogeneity of pursued strategies within the industry, yet at the same time, he was able to identify groups of firms pursuing homogeneous strategies. Similarly, Porter (1979) defines strategic groups as a set of companies within an industry following strategies that are similar to each other but heterogeneous with respect to other groups of firms in the industry. Firms in better positioned

groups will then be able to realize a higher performance level stemming from CA that the group possesses.

These performance differences as compared to other strategic groups within an industry can only be durable if firms of worse positioned strategic groups are not able to invade the strategic group. Mobility barriers – entry barriers idiosyncratic to a strategic group – prevent not only new firms from entering the industry but also protect members of a strategic group against the entry of a member of another group within the industry (Caves & Porter, 1977, 249). Typical factors influencing mobility barriers are product line, relative cost position, brand identification, product quality, technological leadership, asset specificity, extent of services offered, degree of financial leverage, and degree of integration (Harrigan, 1985, 57).

The SBV results in Propositions 4 and 5:

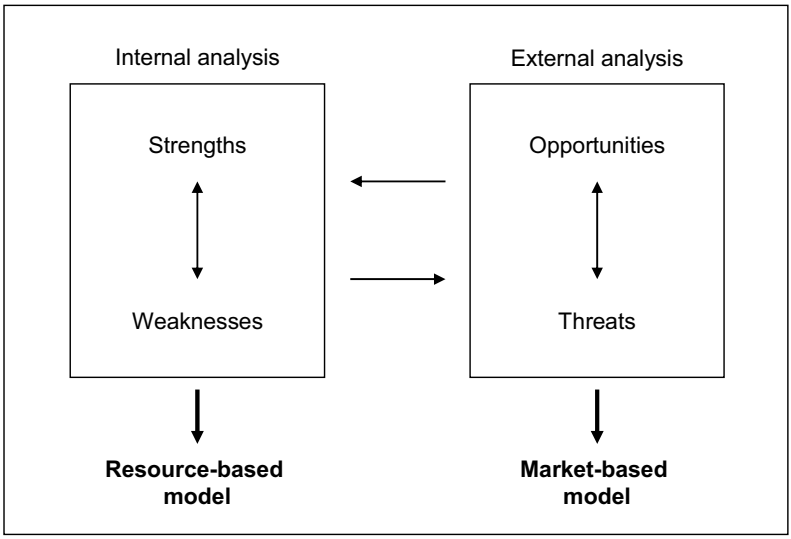
P_4: *Superior economic performance depends on the strategy the firm pursues.*

P_5: *Superior economic performance depends on the strategic group a firm is active in.*

In the 1990s, the field of strategic management research underwent a shift in focus from strategic and industry positioning to firm resources and capabilities. The RBV – rooted in evolutionary economics and the work of Penrose (1959) – highlights the importance of the internal analysis of strength and weakness to explain intra-industry performance differences in addition to the external analysis of opportunities and threats (see Figure 5).

Wernerfelt (1984), in probably the first article of the RBV, develops a theory of CA based on the resources a firm acquires or develops to implement a product market strategy. In the same year, Rumelt (1984) published a paper in which he describes a theory that explains why firms exist and explores rent-generating and appropriating characteristics of firms. Like Wernerfelt, Barney (1986b) proposes that firms can create superior economic performance on the basis of the resources a firm controls. Furthermore, Barney (1986b) introduces the idea of strategic factor markets – markets, where firms acquire or develop strategic resources – which are not always perfectly competitive. A common factor in all three of these fundamental papers is the focus of attention on idiosyncratic firm capital and the basic idea that performance is ultimately a return to unique firm competencies.

Figure 5: Relationship between traditional "strength, weaknesses, opportunities, threats" analysis, the resource-based model, and the market-based model
(see Barney, 1991, 100)



To be a source of CA resulting in superior economic performance, resources must be (Hopes, Madsen, & Walker, 2003, 890):

- *Valuable:* to enable a firm to achieve a superior market position.
- *Rare:* resources can only be valuable in generating CA when not all market participants have access to them.
- *Isolated from imitation or substitution:* only immobile and difficult-to-imitate or difficult-to-substitute resources can be rare.

Although the RBV shares the basic idea with neoclassical economics that firms are input combiners, the above-mentioned criteria for resources leading to CA clearly show the differences between both concepts: the production function is not perfectly specifiable by all market participants, and resources are not perfectly mobile (without expense). Additionally, the RBV explicitly views superior economic performance as being a result of firms acquiring, combining, and developing resources – and thus, of firm conduct – and not an outcome of industry structure (Conner, 1991, 132).

Today, RBV literature distinguishes between resources and capabilities. Makadok (2001), relying on Amit and Schoemaker (1993), defines resources as observable, not necessarily tangible assets that can be valued and traded. A capability, on the other hand, is not observable and thus necessarily intangible, cannot be valued, and can be sold or transferred only as part of an entire unit. In other words, capabilities are a special kind of resource that is organizationally embedded, non-transferable, and firm-specific.

Building on these ideas, Proposition 6 will be true:

> P_6: *Superior economic performance depends on the firm's resources and capabilities.*

3 Method

Regardless of the importance and influence of specific research studies, each study in a particular research field adds just one piece to the overall picture. In fact, the value a study contributes is a function of its fit with previous studies and the study's intrinsic properties (Cooper, 1998, 1). At the same time, however, each replication study conducted on a research question contains less of the available information than the preceding one. In fact, the initial study contains 100% of the available information, whereas the second contains roughly 50% and the 50th only 2% of the available information (Schmidt, 1992, 1180). Additionally, studies are never perfect – the biggest error stemming from imperfections is sampling error. Sampling error is a result of unsystematic deviations of the sample results from the real population values (Schmidt, Pearlman, Hunter, & Hirsh, 1985, 697). All these effects highlight the importance of systematic reviews of existing empirical studies on a research question in order to draw a clearer picture of the true relationships.

In general, literature reviews are a "systematic, explicit, and reproducible method for identifying, evaluating, and interpreting the existing body of recorded work produced by researchers, scholars and practitioners" (Fink, 1998, 3). Today, we distinguish between two basic types of literature reviews: narrative reviews and meta-analyses. The latter allows a systematic quantitative integration of the primary empirical studies by determining an overall effect size and moderating variables in the case of heterogeneity in the sample. Narrative reviews are a verbal description of the trends found in the analyzed research. They can be subdivided into research syntheses, which include only empirical findings, and theoretical reviews, which present solely theoretical papers (Cooper, 1998, 3).

As the existing empirical studies on the generation and sustainability of superior economic performance are extremely heterogeneous with regard to empirical methods, underlying theoretical concepts, and definitions of independent and dependent variables, application of meta-analysis is not a suitable approach for a review of the overall research body. A narrative review in the form of a research synthesis therefore seems to be the most appropriate way to summarize the existing literature.

The narrative review is conducted in the five steps suggested by Cooper (1998) for reviews analogous to primary empirical studies (see also Fink, 1998):

1. *Problem Formulation:* Consider carefully the research problem.
2. *Literature Search:* Develop identification criteria for relevant studies and conduct a systematic literature search.
3. *Data Evaluation:* Separate "valid" from "invalid" studies.
4. *Data Analysis and Interpretation:* Synthesize valid retrieved studies.
5. *Presentation:* Apply editorial criteria to separate important from unimportant information.

Although a quantitative integration of the primary investigations with meta-analytic techniques is not possible for the overall sample, a subsample of studies analyzing the impact of different kinds of effects (e.g., industry or firm effects) on performance allows the application of these techniques. For this subsample, the meta-analytic procedures proposed by Hunter, Schmidt and Jackson (1982), as well as Hunter and Schmidt (1990; 2004), are applied to determine the relative importance of the different effects.

The term meta-analysis was first introduced by Glass (1976). Meta-analysis statistically integrates existing empirical studies on a single research topic, thus allowing one to reach consistent overall conclusions. Unlike a narrative review, meta-analysis permits us to not only systematically quantify the relationship being analyzed, but also account for sampling error.

The main purpose of quantitatively integrating existing empirical results is to determine an average effect size. Under the assumption that all studies originate from one population, the best estimate for the population effect size (ρ) is the weighted average effect size ($\overline{E}$) in which each effect size is weighted by the individual study size (Hunter & Schmidt, 2004, 81):

$$\overline{E} = \frac{\sum \left[N_i \, E_i \right]}{\sum N_i}$$

with E_i as the effect size in study i and N_i as the number of observations in study i.

Analogous to the weighted average correlation, the variance across studies (s_E^2 – observed variance) is determined by the weighted average squared difference between the observed effect sizes and the weighted average effect size (Hunter & Schmidt, 2004, 81):

$$s_E^2 = \frac{\sum \left[N_i \left(E_i - \overline{E} \right)^2 \right]}{\sum N_i}.$$

Hunter and Schmidt (1990; 2004) ascertained eleven artifacts that can influence effect sizes. Based on the data given in the integrated empirical studies, I was only able to deal with sampling error – which, incidentally, accounts for most of the variability in effect sizes resulting from artifacts (Schmidt et al., 1985, 697ff.). This is assuming a reliability of 1.0 and no range restriction. To correct for the sampling error and to calculate the variance of the population (s_ρ – residual variance) I subtracted the sampling error variance (s_e^2) from the observed variance.

The next step of a meta-analysis is to assess the homogeneity of the sample. When the observed variance can be entirely attributed to sampling error, the homogeneity of the sample is obvious. However, a residual variance often remains in the sample. This can be either a result of heterogeneity in the sample and thus an indicator of the existence of a different population or a result of remaining uncorrected artifacts. Therefore, it is necessary to test for homogeneity. Credibility intervals and the 75% rule are commonly accepted tests of homogeneity (see, e.g., Bausch & Fritz, 2005; Bausch & Krist, 2007; Bausch, Pils, & Van Tri, 2007; Dalton, Certo, & Roengpitya, 2003; Dalton, Daily, Ellstrand, & Johnson, 1998; Dalton, Daily, Johnson, & Ellstrand, 1999; Gooding & Wagner III, 1985; McEvoy & Cascio, 1987).

Credibility intervals are generated around the weighted corrected average correlation using the corrected standard deviation (s_ρ). If the interval is large or includes zero, there is a high probability that several subpopulations exist. Correspondingly, small credibility intervals not including zero indicate that the weighted average correlation is the best predictor of a single homogenous population. Koslowsky and Sagie (1993) suggest on the basis of an empirical test a threshold of 0.11 to separate small from large credibility intervals.

The 75% rule tests the homogeneity of the included studies by comparing the sampling error variance to the observed variance. If the sampling error variance is larger than 75%, the source of the remaining unexplained 25% of the observed variance can be expected to be uncorrected artifacts and thus the population can be assumed to be homogenous (Schmidt, Hunter, & Raju, 1988, 665ff.).

When the total sample is found to be heterogeneous, a search for moderators is initiated. These moderators are derived from the underlying theories relevant to the topic under consideration or from characteristics of the primary investigations. In a next step, the total sample is divided into subsamples according to the moderators and a separate meta-analysis is performed for each subgroup. A moderating variable can be confirmed when the (a) weighted average correlations differ in the two subgroups and the average residual variance is smaller than in the total sample or (b) significant differences between the two subgroups are identified via a z-test (Hunter et al., 1982, 47f.).

To check the significance of the weighted average effect sizes, I calculated 95% confidence intervals. A 95% confidence interval that does not include zero is an indicator that there is a true relationship between the variables (Whitener, 1990, 315ff.).

4 Sample

Empirical studies on the creation and sustainability of superior economic performance are the basis for this review. All studies included in the analysis test the predictions of at least one of the theoretical concepts presented above. Only primary investigations published in English have been included in the analysis. The literature search to identify the empirical studies for this review was conducted both electronically and manually.

The computer-based search was carried out using the databases EBSCO and ABI/Inform Global Edition. To identify the first set of studies I utilized the following search terms: *abnormal performance*, *abnormal profits*, *competitive advantage*, *firm effect*, *generic strategies*, *industry effect*, *intra-industry*, *inter-industry*, *market-based view*, *resource-based view*, *strategic groups*, and *superior economic performance*. I then searched the reference sections of the identified articles for bibliographic references leading to further relevant studies.

Applying these search criteria resulted in a sample of 209 empirical studies published between 1951 and 2007. The 144 investigations shown in Figure 6, which analyze data between 1936 and 2003, were included in the sample. The other 65 articles were excluded due to a lack of fit with the research question. Figure 7 gives an overview of the main characteristics of the sample.

Figure 6: Past research included in the narrative review
([a]: also relevant for past research on the influence of industries' structural characteristics; [b]: also relevant for past research on the influence of generic strategies; [c]: also relevant for past research on the influence of strategic groups; [d]: also relevant for past research on the influence of firm resources and capabilities; *: used for meta-analytic integration in sub-sample A reported in Figure 14; **: used for meta-analytic integration in sub-sample B reported in Figure 14)

Study	Study
Past research on the dynamic development of superior economic performance:	Hart & Morgan (1977)
Bou (2007)*	Hawawini, Subramanian & Verdin (2004)*
Cool & Schendel (1987)[c]	Holterman (1973)
Cubin & Geroski (1990)	Imel & Helmberger (1971)
Droucopoulos & Lianos (1993)[a]	Kessides (1990b)
Geroski & Jacquemi (1988)[a]	Khalizadeh-Shirazi (1974)
Goddard & Wilson (1996)[a]	Leach (1997)
Jacobson (1988)[a]	Mann (1966)
Jenny & Weber (1990)[a]	Mauri & Michaels (1998)[d] *
Kessides (1990)[a] *	McDougal, Robinson & DeNiso (1992)[b]
Khemani & Shapiro (1990)[a]	McGahan (1999)*
Makhija (2003)[a d]	McGahan & Porter (1997)**
Mascarenhas (1989)[c]	McGahan & Porter (2002)**
Mueller (1977)	Misangyi, Elms, Greckhamer & Lepine (2006)[d] **
Mueller (1990)[a]	Nadkarni & Narayanan (2007)[b]
Odagiri & Yamawaki (1990)[a]	Newman (1978)[c]
Schwalbach & Mahmood (1990)[a]	Peltzman (1977)
Waring (1996)	Phillips (1972)
Wiggins & Ruefli (2002)[a c]	Porter (1979)[c]
Past research on the influence of industries' structural characteristics on superior economic performance:	Powell (1996)
Allen (1983)	Ravenskraft (1983)
Amel & Froeb (1991)	Resende (2007)
Bain (1951)	Robins & Wiersema (1995)[d]
Bass (1974)	Robinson & McDougal (1998)
Brush, Bromiley & Hendrickx (1999)*	Roquebert, Phillips & Westfall (1996)
Carter (1978)	Ruefli & Wiggins (2003)
Catin & Wittink (1976)	Rumelt (1991)**
Chang & Singh (2000)**	Schmalensee (1985)*
Chappell & Cottle (1985)	Shepherd (1971)
Chen & Lin (2006)*	Shepherd (1972)
Christensen & Montgomery (1981)[b]	Short, Ketchen Jr, Bennett & du Toit (2006)*
Clarke (1984)	Short, Ketchen Jr, Palmer & Hult (2007)[c] *
Comanor & Wilson (1967)	Spanos, Zaralis & Lioukas (2004)[b]
Comanor & Wilson (1974)	Wernerfelt & Montgomery (1988)
Connolly & Hirschey (1984)	**Past research on the influence of generic strategies on superior economic performance:**
Cubin & Geroski (1987)	Anderson & Zeithaml (1984)
Demsetz (1973)	Ariyawardana (2003)[c d]
Furman (2000)**	Beal (2000)
González-Fidalgo & Ventura-Victoria (2002)[c] *	Carter, Stearns, Reynolds & Miller (1994)
Grabowski & Mueller (1978)[d]	Caves & Ghemawat (1992)
Grinyer, McKiernan & Yasi-Ardekani (1988)	David, Hwang, Pei & Reneau (2002)
Hansen & Wernerfelt (1989)[d]	Davis & Schul (1993)
	Dess & Davis (1984)[c]
	Douglas & Rhee (1989)[c]
	Galbraith & Schendel (1983)
	Green, Lisboa & Yasin (1993)

Figure 6 continued

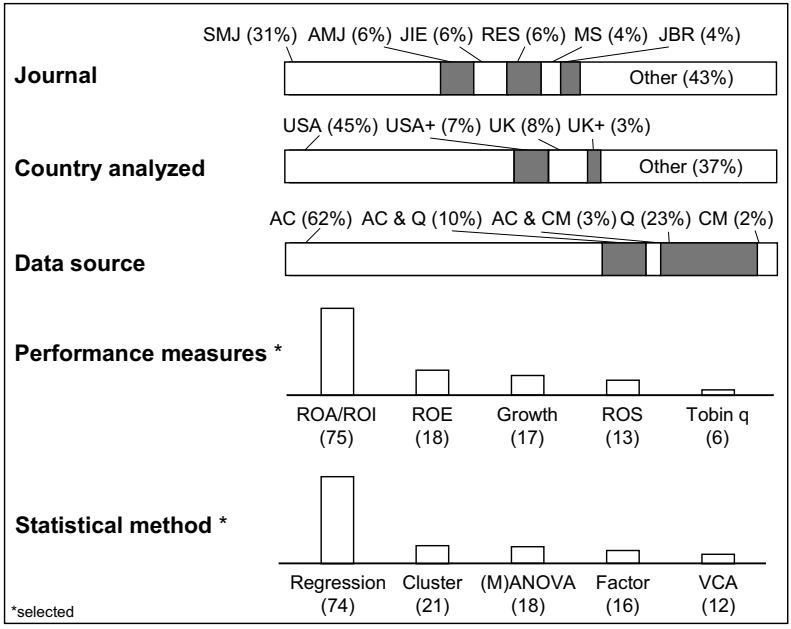
Study	Study
Past research on the influence of generic strategies on superior economic performance (continued): Hall (1980) Hambrick (1983) Hitt & Ireland (1985) Kim & Lim (1988)[c] Kim, Nam & Stimpert (2004) Kotha, Dunbar & Bird (1989) Kotha & Nair (1995) Kotha & Vadlamani (1995) MacMillan, Hambrick & Day (1982) Marlin, Huonker & Hasbrouk (2004)[c] McNamee & McHugh (1989) Miller & Dess (1993) Miller (1992) Miller & Friesen (1986) Morrison & Roth (1992) Parker & Helms (1992) Parnell & Hershey (2005) Phillips, Chang & Buzzell (1983) Robinson & Pearche (1988)[c] Shah (2007)[c] Song, Di Benedetto & Mason (2007)[d] Snow & Hrebiniak (1980) Thornhill & White (2007) Venkatraman (1989) White (1986) Wright, Kroll, Tu & Helms (1991)	**Past research on the influence of strategic groups on superior economic performance:** Chang, Chang & Hsin (2006)[d] Cool & Schendel (1988) Feigenbaum & Thomas (1990) Harrigan (1985) Hatten & Schendel (1977) Hatten, Schendel & Cooper (1978) Houthoofd & Heene (1997)[d] Leask & Parker (2007) Mascarenhas & Aaker (1989) Marlin, Ketchen Jr & Lamont (2007) McNamara, Deephause & Luce (2003) Nair & Kotha (2001) Olusoga, Mokwa & Noble (1995) Oster (1982) Oustapassidis (1998) Ryans & Wittinck (1985) Schendel & Patton (1978) Tremblay (1985) Walker, Madsen & Carini (2002) **Past research on the influence of firm resources and capabilities on superior economic performance:** Dreyer & Gronhaug (2004) Dyer (1996) Flamholtz & Hua (2003) Henderson & Cockburn (1994) Hervás-Oliver & Albors-Garrigós (2007) Hooley, Greenley, Cadogan & Fahy (2005) Lin, Lee & Hung (2006) Miller & Shamsie (1996) Ray, Barney & Muhanna (2004) Reed, Lubatkin & Srinivasan (2006) Schroeder, Bates & Junttila (2002) Spillan & Parnell (2006) Zhu (2004) Zhu & Kraemer (2002)

The largest source of empirical studies for this review was the *Strategic Management Journal* (45 articles) followed by the *Academy of Management Journal* (8 articles), the *Journal of Industrial Economics* (8 articles), the *Review of Economics and Statistics* (8 articles), *Management Science* (5 articles), and the *Journal of Business Research* (5 articles). In addition to these primary investigations, four recently published reviews were identified (Bowman & Helfat, 2001; Campbell-Hunt, 2000; Ketchen Jr, Snow, & Hover, 2004; Newbert, 2007). All four of the reviews focus on a special research stream within the research on sources of superior economic performance (see Figure 8 for a short description of the reviews).

Looking at the countries in which the firms analyzed are situated reveals a strong focus on the US market. Of the 144 studies included, 45% solely analyze firms based in the US and an

additional 7% use firms from the US in combination with firms from other countries. The only country that is represented in a larger scale in the sample besides the US is the UK (8% analyze firms from the UK only and 3% analyze firms from the UK and at least one other country). This historical and ongoing strong focus on the US market has triggered, in the recent years, a variety of studies testing research questions that have previously been tested for US-based firms in non-US markets (see, e.g., Ariyawardana, 2003; Dreyer & Gronhaug, 2004; González-Fidalgo & Ventura-Victoria, 2002; Makhija, 2003; Spanos, Zaralis, & Lioukas, 2004). These duplication studies may reveal bias in previous research due to the strong focus on the US market, but at the same time, increasing internationalization of companies in connection with globalization of supplier, customer, and financial markets, as well as the scale of the US market, should allow a generalization of the findings for US-based companies.

Figure 7: Descriptive characteristics of the sample
(SMJ: Strategic Management Journal; AMJ: Academy of Management Journal; JIE: Journal of Industrial Economics; RES: Review of Economics and Statistics; MS: Management Science; JBR: Journal of Business Research; USA: studies analyzing firms in the USA only; USA+: studies analyzing firms in the USA and at least one other country; UK: studies analyzing firms in the UK only; UK+: studies analyzing firms in the UK and at least one other country; AC: studies based on accounting data only; AC & Q: studies based on accounting and questionnaire data; AC & CM: studies based on accounting and capital market data; Q: studies based on questionnaire data only; CM: studies based on capital market data only; ROA/ROI: return on assets/return on investments; ROE: return on equity; Growth: sales growth; ROS: return on sales; Regression: regressions analysis; Cluster: cluster analysis; (M)ANOVA: (multiple) analysis of variance; Factor: factor analysis; VCA: variance component analysis)



Studies using accounting data for their analysis are, at 62%, the most prominent in the analysis. An additional 10% of the studies in the sample apply accounting and questionnaire data and 3%, accounting and capital market data. Besides the studies using both accounting data and questionnaires/capital market data, 23% of the sample studies focused solely on questionnaires and a minority of 2% relied exclusively on capital market data. Although the utilization of accounting measures as proxies for economic performance has attracted considerable criticism in the past (see, e.g., Fischer & McGowan, 1983; Hartcourt, 1965), the composition of the sample indicates a high acceptance of accounting measures within this stream of research. Interestingly, a look at recently published empirical investigations on CA also shows no real trend towards capital market data and still shows a high application of accounting data (see, e.g., Bou & Satorra, 2007; Dreyer & Gronhaug, 2004; Flamholtz & Hua, 2003; Hawawini, Subramanian, & Verdin, 2003; Leask & Parker, 2007; Makhija, 2003; McNamara, Deephause, & Luce, 2003; Misangyi, Elms, Greckhamer, & Lepine, 2006; Ruefli & Wiggins, 2003; Short, Ketchen Jr, Bennett, & du Toit, 2006; Short, Ketchen Jr, Palmer, & Hult, 2007; Spanos et al., 2004).

Figure 8: Recent reviews about empirical research on the sources of superior economic performance

Study	Type	Research goal
Bowman & Helfat (2001)	Narrative review	Assess the relative importance of industry, business and corporate effects determining profitability.
Campbell-Hunt (2000)	Meta-analysis	Examine the performance impact of generic strategies.
Ketchen Jr, Snow & Hoover (2004)	Narrative review	Chronicle recent major research findings regarding the competitive dynamics among firms within and across industries
Newbert (2007)	Narrative review	Conduct a systematic review and analysis of empirical literature on the resource-based view

In a meta-analysis of 131 correlations from 73 articles including firm performance, Glick, Washburn & Miller (2005) highlight the differences not only between accounting data, capital market data, and data from questionnaires, but also within these performance dimensions. Their results clearly stress the influence of performance measurement on the heterogeneity of research results. Additionally, they observe a great variety of performance measures, with

43% of the performance measures not being used in any other study in their sample. In their quantitative integration of 238 empirical studies, Combs, Crook, & Shook (2004) find a comparable distribution of applied performance measures in articles published in the strategic management journal.

The most frequently applied accounting-based performance measure in the sample at hand is return on assets/return on investments (ROA/ROI), which is used in 75 cases, followed by return on equity (ROE), used in 18 studies. Irrespective of whether the study is accounting-based or not, multiple performance measures are often implemented. In particular, sales growth is frequently applied as an additional measure of performance. Six of the studies using capital market data chose Tobin's q as a performance variable. Although the usage of performance measures seems to be quite heterogeneous at first glance, a comparison with the results of Glick et al. (2005), as well as the results of Combs et al. (2004), indicates a relatively homogeneous utilization of performance measures within the research on superior economic performance as compared to the overall field of management/strategy literature. The frequent usage of ROA as a performance variable might be influenced by the initial articles in this field of research, which already applied this performance measure (see, e.g., Bain, 1951; Catin & Wittink, 1976; Mann, 1966; Mueller, 1977; Schmalensee, 1985). While the overall percentage of capital market data is much lower in this sample, the high percentage of Tobin's q/market to book ratio within this performance dimension can also be found in the Glick et al. (2005) analysis as well as the Combs et al. (2004) paper.

With regard to the applied statistical technique(s), the sample is also quite heterogeneous. Regression analysis is most prominent in the empirical research on superior economic performance. A large proportion of investigations use multiple statistical techniques for their analysis. Depending on the research stream followed to assess superior economic performance, dominant statistical techniques can be identified. For example, strategic group analyses focus on cluster analysis and regression analysis, whereas studies on the importance of industry, business, and corporate effects on performance particularly apply variance component analysis (VCA) and analysis of variance/multiple analysis of variance (ANOVA/MANOVA).

5 Past Empirical Research

To be able to assess the foregoing considerations on the creation and sustainability of superior economic performance that lead to Propositions 1 to 6, past empirical research addressing these six propositions will be presented and discussed in the following. Figure 9 through

Figure 13 give a summary of the respective studies. Primary investigations addressing more than one of the theoretical underpinnings are marked at their first appearance with a cross reference to the other figure(s) to which they could also be allocated. Due to the number of studies in the sample, the discussion of the proposition will always concentrate on studies focusing on the respective topic.

Past empirical research on the dynamic development of superior economic performance

As Proposition 1 rejects the existence of superior economic performance, research results supporting any of the other propositions will lean towards the non-comparability of the neoclassical approach in general with the outcomes of competitive market processes. The possibility of generating superior economic performance is broadly accepted today in theory and practice. Nevertheless, the research streams presented differ substantially in their predictions concerning the generation and sustainability of superior economic performance as well as with respect to the determinants steering the generation and sustainability of superior economic performance.

A look at the findings of the included studies analyzing the dynamics of CA (Figure 9) reveals a surprisingly homogeneous picture. All studies since Mueller (1977) come to the conclusion that superior economic performance can be achieved by some firms in an industry. At the same time, however, the results indicate that profit levels – at least within an industry – seem to converge in the long run to a certain level (Jacobsen, 1988; Kessides, 1990a; Khemani & Shapiro, 1990; Mueller, 1977; Schwalbach & Mahmood, 1990; Wiggins & Ruefli, 2002). Additionally, the achieved profit level in the past seems to predetermine current and future profit levels (Cool & Schendel, 1987; Droucopoulos & Lianos, 1993; Mueller, 1977; Odagiri & Yamawaki, 1990).

The results are clearly in contrast to Proposition 1, arguing in the neoclassic view that no firm will achieve persistent superior economic performance. Of course, this result is not surprising, as neoclassical economics builds its reasoning on strict assumptions that cannot be expected to exist in reality. However, the evidence of superior economic performance in a broad range of samples comprising a variety of industries by means of the application of different statistical techniques and measurement variables is a noteworthy finding.

Figure 9: Past empirical research on the dynamic development of superior economic performance
([a]: also relevant for Figure 10; [c]: also relevant for Figure 12; [d]: also relevant for Figure 13; *: used for meta-analytic integration in sub-sample A reported in Figure 14)

Study	Sample size & industry	Main results
Bou (2007)*	N=5,000 342 industries	Significant and permanent differences between profit rates exist both on industry- and firm-level. Variation of abnormal returns is greater at the firm-level. Firm- and industry-level do not differ significantly.
Cool & Schendel (1987)[c]	N=22 Pharmaceutical	Performance differences exist between strategic groups in terms of market share but not in terms of profitability. Altogether the analysis reveals that strategic groups are a relatively stable phenomenon.
Cubin & Geroski (1990)	N=217 48 industries	Some companies are able to experience profits above the norm over time. Industry and company effects on firm profits can be observed.
Droucopoulos & Lianos (1993)[a]	N=20 20 Manufacturing industries	Profit rates show a high persistence and a generally high permanent component. At the same time, the permanent component shows substantial variation between industries (12 to 40%). Structural variables can explain up to 86% of the differences in the speed of adjustment towards the permanent profit rate between industries.
Geroski & Jacquemin (1988)[a]	N=134	Specialization and nationality affect persistence of profits significantly positive. Whereas rate of exports, age and concentration show significant negative correlations. Surprisingly, countrywide factors have turned out to be more discriminating than firm or industry specific ones.
Goddard & Wilson (1996)[a]	N=995 Manufacturing and Service	Firm size and growth are significantly positive related to long-run profitability. Industry effects seem to be very important in the manufacturing but not in the service industry.
Jacobson (1988)[a]	N=241	Firms are able to earn abnormal returns for a substantial number of years. Vertical integration, market share and intensity of marketing expenditures slow the convergence process. Firms implementing strategies to increase these factors tend to earn longer-term abnormal profits.
Jenny & Weber (1990)[a]	N=450 16 industries	Firms earning abnormal profits in one period tend to do so also in the long run. Industry effects have an important influence on profit differences.
Kessides (1990)[a]*	N=334 334 Manufacturing industries	Profit adjustment differs widely across U.S. manufacturing industries, supporting the hypothesis that the underlying industry structure influences the speed of adjustment. Profits erode more slowly in industries with small number of operating firms, high levels of concentration, rapid demand growth, economies of scale, large absolute capital requirements, large sunk outlays, high advertising expenditures.
Khemani & Shapiro (1990)[a]	N=129 Manufacturing and Mining	Profits are pushed down to competitive norm by competitive processes, but vary from industry to industry. High profit rates persist in industries characterized by factors such as product differentiation, technology, and patents. Low profits persist in industries subject to government support policies such as tariffs, quotas, and tax measures. Industry-specific factors are significant determinants of inter-firm differences. However, firm effects are also present.
Makhija (2003)[a d]	N=986	In periods of change a RBV (33.2%) model performs remarkably better than the MBV (10.1%) model in explaining the value of firms.
Mascarenhas (1989)[c]	N=123 Off-shore Drilling	Changes in group membership are associated with substantial environmental shifts. However, these changes in group strategy did not involve most dimensions and all groups. Changes in group membership are less frequent during times of economic stability and growth than during decline.

Figure 9 continued

Study	Sample size & industry	Main results
Mueller (1977)	N=472	Firms in a group of top performers have a relatively high probability of staying in that group whereas firms in the lowest profit group have a low probability of moving to the top profit group. Thus, some firms seem to be able to earn persistently higher profits.
Mueller (1990)[a]	N=551 141 industries	Firm profits do converge to an equilibrium rate but these rates differ across firms. Both industry and firm characteristics are important in explaining in the long run projected profit rates but firm characteristics appear to be relatively more important.
Odagiri & Yamawaki (1990)[a]	N=376 42 industries	Firms with a relatively high (low) profit rate are expected to earn a relatively high (low) profit in the long run. The persistence of profit differences across firms is associated with market structure. The more concentrated the industry, the larger the market share, or the higher the rank of the firm in the industry, the greater the profit rate that the firm is projected to earn. The speed of profit adjustment increases with advertising and R&D intensity.
Schwalbach & Mahmood (1990)[a]	N=299 9 industries	Profits converge only slowly. Profit differences could be explained by firm- and industry-specific effects. Firm effects seem to be related to size and mobility barriers. The larger the firm the stronger the firm effects and the higher the mobility barriers. Consequently, industry effects are less important for larger firms.
Waring (1996)	N=12,986 68 Manufacturing industries	Persistence rates for within-industry profit differences show a wide variation. The largest effect on the persistence have skill, degree of unionization, consumer purchases as a percentage of output, number of firms, economies of scale, and R&D intensity.
Wiggins & Ruefli (2002)[a c]	N=6,772 40 industries	Some firms exhibit superior economic performance. The phenomenon rarely persists for long time frames. Concentration has no effect.

Figure 10: Past empirical research on the influence of industries' structural characteristics on superior economic performance
([b]: also relevant for Figure 11; [c]: also relevant for Figure 12; [d]: also relevant for Figure 13;
*: used for meta-analytic integration in sub-sample A reported in Figure 14; **: used for meta-analytic integration in sub-sample B reported in Figure 14)

Study	Sample size & industries	Main results
Allen (1983)	N=249 249 industries	Market power seems to be the dominating explanation for observed concentration-profit relationships instead of large-firm efficiency as suggested by other authors. A 10% percent increase in market power leads to a 2-3.6% increase in profitability whereas a 10% increase in efficiency leads only to an increase in profitability of less than 0.5% to 1%.
Amel & Froeb (1991)	N=33 Banking	Firm effects (explain up to 80% of firm profitability) dominate market effects (explain up to 14% of firm profitability). Market share and concentration effects are very small. Effects vary over time.
Bain (1951)	N=335 242 industries	Higher industry concentration leads to higher average industry profit rates. Industries with above 70% concentration have an average profit rate of 9% whereas industries with a lower concentration rate had an average profit rate of 7.7%.

Figure 10 continued

Study	Sample size & industries	Main results
Bass (1974)	N=97 13 industries	Structure-profitability relationships vary across industry groups. Total market share seems to have the strongest effect on profitability across all analyzed industry groups whereas the advertising-sales ratio and the concentration ratio are significantly related to profitability in the total sample but vary substantially in the industry groups.
Brush, Bromiley & Hendrickx (1999)*	N=535	Corporate effects are larger than the industry effect but generally under twice the industry effect (1.1 to 1.8 ratios of corporate to industry r^2).
Carter (1978)	N=2024	An increase in concentration of 50% leads to an increase in profitability of 11%. At the same time, however, the results show that this effect is highly influenced by efficiency advantages of large firms.
Catin & Wittink (1976)	N=2500 Food, Tobacco, and Cosmetics	The effect of the advertising-to-sales ratio varies from industry to industry and is found to have a positive effect only in one of five subsets. These results provide only limited support for the hypothesis that advertising serves as a product differentiation barrier-to-entry in a market.
Chang & Singh (2000)**	N=709	The relative importance of corporate, industry and business unit effects depends on the industry aggregation level and whether small businesses are included. Corporate effects on market share are greater when lines of business are defined more narrowly, when small business units are included, and when firms are medium-sized.
Chappell & Cottle (1985)	N=105 274 industries	Without including efficiency variables in the analyses concentration has a significant positive effect on profitability. However, when adding efficiency variables to the model, the effect of concentration on profitability becomes insignificant. The effect of the efficiency variables is stronger for large firms than for small ones. Altogether the findings suggest that efficiency of large firms is the driving force behind the concentration-profit relationship.
Chen & Lin (2006)*	N=343 25 industries	Firm effects dominate performance while industry effects have little impact.
Christensen & Montgomery (1981)[b]	N=128	Across the different categories of diversification strategies performance differences were denied. Differences in market structure variables had a significant effect on performance resulting in different types of diversification strategies.
Clarke (1984)	N=105 105 Manufactur-ing industries	Concentration has no significant effect on profitability. Nonetheless margins seem to decline on average with higher concentration. Firm size seems to have a negative effect on profitability. Variability in profit margins is strongly correlated with concentration.
Comanor & Wilson (1967)	N=41 41 Consumer Goods industries	Advertising has a statistically significant and quantitatively important impact upon profit rates. In industries with high advertising outlays profits are on average 50% higher. Advertising outlays, economies of scale, concentration and high capital requirements can explain approximately 50% of the variation in industry profit rates.
Comanor & Wilson (1974)	N=41	Heavy advertising, a proxy for differentiation, leads to increased profits and serves as a barrier to entry.
Connolly & Hirschey (1984)	N=390	R&D intensity is positively related with firm performance whereas the R&D-concentration effect is negative (e.g., due to less rivalry less, efficient research, and a trend towards more riskier projects in concentrated industries).

Figure 10 continued

Study	Sample size & industries	Main results
Cubin & Geroski (1987)	N=217 48 industries	Structural variables can not explain most of the variation in disequilibrium profits. Although not being able to offer a comprehensive explanation of performance differentials, the most important structural variables are concentration, advertising, and import intensity.
Demsetz (1973)	N=95 95 industries	Rates of return are not higher in more concentrated industries. However, the performance difference between large and small firms is higher in more concentrated industries, therefore large firms may have grown due to their superior efficiency.
Furman (2000)**	N=5,683 510 industries	Business-specific effects predominate in explaining variance in accounting profits. Nevertheless, corporate and industry effects are also found to be significant but smaller in magnitude.
González-Fidalgo & Ventura-Victoria (2002)[c] *	N=562	Year, industry, strategic group and firm effects significantly explain variation in firm profitability. The latter show the strongest explanatory power followed by strategic group and industry effects.
Grabowski & Mueller (1978)[d]	N=86 9 Producer Goods industries	R&D expenditures, advertising expenditures and industry growth have a significant positive impact on profit rates whereas concentration has a significant negative. R&D capital results in an after tax return that is 4.6-7.5% higher than return on total capital. The impact of advertising intensity depends extremely on the type of industry. At the same time, a negative R&D-concentration interaction effect on profitability is observed which may be due to R&D rivalry in highly concentrated industries.
Grinyer, McKiernan & Yasi-Ardekani (1988)	N= 45 Electrical Engineering	Economic analysis of market structure, particularly of market share and company-specific barriers to entry, is of dominating importance in explaining high profit margins.
Hansen & Wernerfelt (1989)[d]	N=60 9 Producer Goods industries	Industry and firm variables explain 18.5% of the variance in firm performance whereas organizational variables explain 37.8%. Surprisingly, economic and organizational effects are roughly independent. Thus, top management teams that can demonstrate excellence in both arenas will do significantly better.
Hart & Morgan (1977)	N=113 113 industries	Concentration leads to higher profit but explains merely 10% of variation in profitability. Capital intensity and advertising intensity both have a significantly positive effect on profitability and add the most power to model.
Hawawini, Subramanian & Verdin (2004)*	N=304 55 industries	Accounting and market measures of performance reach comparable results concerning industry- and firm-specific effects. For industry leaders and loosers firm factors seem to dominate whereas for the rest of the companies, industry factors seem to dominate.
Holterman (1973)	N=113 113 industries	Labor productivity increases with higher concentration whereas capital productivity and return on assets seem to decrease with higher concentration. Entry barriers are created by advertising expenditures and the size of efficient plants.
Imel & Helmberger (1971)	N=99 Tobacco and Food	Concentration and product differentiation explain substantial variation in profit rates.
Kessides (1990b)	N=1,775 242 industries	Firm, industry and market share effects are statistically significant and quantitatively important, accounting for a significant portion of the variance of business unit rates of returns on sales.

Figure 10 continued

Study	Sample size & industries	Main results
Khalizadeh-Shirazi (1974)	N=61 61 industries	Market structure significantly influences profitability. However, concentration has no significant effect on profitability, which may be due to multicolinearity. Exports are also significantly positive related to profitability. Imports and foreign direct investments show no effects
Leach (1997)	N=102 26 industries	Concentration and industry profitability are positively correlated. However, separating large and small firms shows insignificant effects for the latter. Adding an efficiency variable to the analysis shows highly significant effects for large but not for small firms and results in concentration becoming insignificant, underlining the dominating effect of efficiency instead of concentration.
Mann (1966)	N=30 30 industries	Concentration has a significantly positive influence on profit rates in industries. When entry barriers are included additionally in the analysis, the results show that in highly concentrated industries with high barriers to entry distinctly higher average profit rates can be realized than in highly concentrated industries with lower barriers to entry.
Mauri & Michaels (1998)[d] *	N=264 69 Manufacturing industries	Firm effects have a stronger effect on variability of firm performance than industry effects. At the same time, industry effects have a stronger influence on the competitive strategy of a firm. These results support both industrial theory and resource-based view.
McDougal, Robinson & DeNiso (1992)[b]	N=247 Information Processing	In industries with high barriers to entry new ventures are able to successfully enter the market by emphasizing strategies of superior product quality and higher customer service. When entry barriers are low, strong marketing skills offer advantages. The origin of new ventures, e.g., parented new ventures, offer no significant explanation of new venture profitability.
McGahan (1999)*	N=4,967	Industry effects are important, stable and predictable. Industry effects are stronger for Tobin q than for accounting profitability. Overall, firm effects are about twice as important as industry effects, but less stable and less predictable. Altogether firm effects seem less sustainable than industry effects and investors seem to use industry membership as an important indicator for future returns.
McGahan & Porter (1997)**	N=7,003 628 industries	Industry effects contribute importantly to variation in business-specific profitability. In manufacturing industries, industry and corporate-parent effects account for a relatively lower portion of variance, while segment-specific effects account for a relatively high portion of variance, hinting towards the existence of characteristic differences in the industry structural context.
McGahan & Porter (2002)**	N=7,793 668 industries	Business-specific effects are more important than year, industry and corporate-parent effects in the variance of business specific profitability. The relative importance of the effects differs across sectors. Industry, corporate-parent, and business-specific effects are related in cross-section.
Misangyi, Elms, Greckhamer & Lepine (2006)[d] **	N=1,512 76 industries	Although business segment effects carry the most relative importance, industry and corporate effects are also important. Industry concentration and munificence, as well as the resource environment provided by corporate parents impact performance.
Nadkarni & Narayanan (2007)[b]	N=225 14 industries	Complexity of strategic schemas promotes strategic flexibility and success in fast clock speed industries, whereas focus of strategic schemas fosters strategic persistence which is effective in slow clock speed industries.
Newman (1978)[c]	N=34 34 industries	Strategic group differences are significant elements of market structure. The standard structure-performance model is highly dependent on the assumption of homogeneous industries.

Figure 10 continued

Study	Sample size & industries	Main results
Peltzman (1977)	N=165 165 industries	Efficiency increases are the driving factor behind the positive concentration-profitability relationship
Phillips (1972)	N=71 71 industries	Effective price fixing tends to raise price-cost margins while price-fixing attempts are more numerous when margins are low. High concentration and high barriers to entry seem to have negative effects on profitability.
Porter (1979)[c]	N=38 38 Consumer Goods industries	Important differences exist in structural features that explain profit levels for differently situated firms in an industry. Leaders in terms of size in an industry are not necessarily more profitable. Especially, in industries where economies of scale are either absent or not great and/or where the industry is highly segmented and firms can achieve a high product differentiation, followers rate of return appear generally higher. Leaders are more successful in industries with high advertising and/or research outlays.
Powell (1996)	N=54	Industry factors explain about 20% of overall performance variance. Entry barriers and competitive power explain significant performance variance. Industry maturity impacts performance indirectly through its statistical interaction with entry barriers.
Ravenskraft (1983)	N=3,186 258 industries	Positive concentration-profit relationships are a result of advantages larger firms enjoy relative to smaller ones. Higher returns to advertising and assets for firms with larger market shares appear to underlie the positive market share-profit relationship. Lower costs appear to explain the positive returns of vertical integrated or diversified lines of business.
Resende (2007)	N=7,188	Variables relating to barriers to entry play an important role in affecting market structure. Concentration has a non-linear effect on concentration. Firm size impacts the propensity to exert R&D efforts. Concentration has a significant positive impact on profitability.
Robins & Wiersema (1995)[d]	N=88	Corporations with more highly interrelated portfolios in terms of shared strategic assets outperform firms with lower levels of portfolio relatedness. Firms in highly concentrated industries perform less well than firms in other types of industries.
Robinson & McDougal (1998)	N=115 31 Manufacturing industries	Influence of industry structural elements on measures of firm performance is strongly dependent upon particular operationalizations used. Additionally, performance variables do not seem to be interchangeable proxies for one another.
Roquebert, Phillips & Westfall (1996)	N=1,000-1,500 160 industries	The results show a strong business unit effect but also a non-trivial corporate effect. The combined variance in profits accounted for by corporate and business-unit effects is 55%. Industry effects exist but are only modest. Finally, the results suggest that the greater the diversification of a company the less important is the corporate effect.
Ruefli & Wiggins (2003)	N=56,688	Corporate factors have a higher influence on performance than industry factors. Thus corporate managers are playing a significant role in influencing firm performance.

Figure 10 continued

Study	Sample size & industries	Main results
Rumelt (1991)**	N=463 261 Manufacturing industries	Significant business-unit effects exist that strongly outweigh industry and corporate membership as predictors of profitability. The variance among business unit effects is much larger than the variance among industry effects (six to eleven times larger). Corporate effects although present are not important in explaining profit rates.
Schmalensee (1985)*	N=456 242 Manufacturing industries	Industry effects are a major determinant of firm success. Firm effects do not exist. Market share effects exist but account for a negligible fraction of business unit returns.
Shepherd (1971)	N=231	Market share seems to be the main element influencing profitability. Membership in the leading firm group appears to have a small effect. Entry barriers also seem to have only a small role in market structure. Size has a negative effect on profitability, perhaps due to X-inefficiency. The positive impact of advertising is restricted to certain consumer goods industries.
Shepherd (1972)	N=281 281 industries	Concentration is significantly positive associated with margins. Industry growth is also significantly positive related with margins whereas the average sales volume has a significantly negative but small impact on margins.
Short, Ketchen Jr, Bennett & du Toit (2006)*	N=2,802 348 industries	Both industry and firm effect impact firm performance. Additionally, results indicate the need to capture the time effect correctly.
Short, Ketchen Jr, Palmer & Hult (2007)[c]*	N=1,165 12 industries	While firm, strategic group and industry effects all are significantly associated with performance, the firm effect is the strongest. The strategic group effect rivals and for some measures outweighs the industry effect.
Spanos, Zaralis & Lioukas (2004)[b]	N=1,921 Manufacturing	Hybrid strategies are more profitable than pure strategies. Pure strategies produce results that are not different from "no strategies." Concentration has no significant effect on profitability. Entry barriers have a positive effect on profitability. The comparison of industry and strategy effects shows that both are highly significant. However, strategy variables explain more than twice as much profit variance as industry variables.
Wernerfelt & Montgomery (1988)	N=247	Industry effects are the major determinants of firm success. Firm effects exist in form of the positive focus effect. That is, some differences in performance can be explained by efficiency differences firm experience in transferring competencies to widely varying markets.

Figure 11: Past empirical research on the influence of generic strategies on superior economic performance
([c]: also relevant for Figure 12; [d]: also relevant for Figure 13)

Study	Sample size & industries	Main results
Anderson & Zeithaml (1984)	N=1,234 69 Manufacturing industries	Product life cycle is an important contingency factor for strategy formulation. There seems to be no set of strategies suitable in any stage of the product life cycle.
Ariyawardana (2003)[c d]	N=40 Value Added Tea Producing	Identifiable resource and strategy patterns exist and both have to be considered in strategic group formation. On basis of this approach three significantly different strategic groups could be identified.
Beal (2000)	N=101 Manufacturing	Obtaining information on several aspects of specific environmental sectors (customer, competitors, suppliers) facilitates alignment between some competitive strategies and environments whereas the frequency of scanning has no effect on such alignments.
Carter, Stearns, Reynolds & Miller (1994)	N=2,500 6 industries	Overall traditional strategy typologies are inadequate to describe the breadth of differentiation exhibited among new ventures. Strategies with a narrow scope of segmentation tend to prevail in industries near the end of the supply chain whereas those that adopted a broad approach tend to predominate in industries near the beginning or middle of the supply chain.
Caves & Ghemawat (1992)	N=59	Intra-industry profit differentials are primarily based on differentiation-related strategies rather than cost-related ones. Differentiation-related advantages lead to higher margins and larger market share, while cost-related advantages lead to market share increases.
David, Hwang, Pei & Reneau (2002)	N=194 20 Manufacturing and Services	Firm performance is higher when firms pursuing a cost strategy are centralized rather than decentralized or when firms pursuing a differentiation strategy are decentralized rather than centralized. Moreover, purchasing efficiency is more likely to be associated with firms pursuing cost-efficiency with a centralized design than those pursuing differentiation with a decentralized design.
Davis & Schul (1993)	N=180	Low-cost firms achieve higher ROA but lower sales growth than firms pursuing differentiation-based strategies. Sharing of resources and programs among business units positively influences performance in low-cost firms whereas sharing did not affect the performance of firms in differentiation-based strategic clusters. A strategy of granting business units substantial decision making autonomy was found to negatively affect the performance of low-cost firms, but positively the performance of firms with differentiation-based strategies.
Dess & Davis (1984)[c]	N=15	Low-cost firms achieve higher profit rates than firms pursuing a differentiation strategy. Altogether, a classification of firms into groups on the basis of Porter's generic strategies reveals clear performance differences between the strategic groups. Firms with at least a generic strategy outperform firms identified as stuck-in-the-middles.
Douglas & Rhee (1989)[c]	N=307 Industrial Businesses	The same competitive strategic types can be identified irrespective of market location. Nonetheless, some differences in the performance and characteristics of certain strategy types were observed between US and European markets. Market growth seems to be a key factor conditioning performance.
Galbraith & Schendel (1983)	N=1,200 Consumer Goods and Industrial Products	Different strategy types are associated with different business performance outcomes. Additionally, the impact of strategies upon business performance varied according to the relative competitive strength of the firms (measured on basis of market share).
Green, Lisboa & Yasin (1993)	N=68	Also in developing countries Porter's generic strategies explain the behavior of companies correctly. Especially, the results show an emphasis on efficiency.

Figure 11 continued

Study	Sample size & industries	Main results
Hall (1980)	N=64 8 Manufacturing industries	Companies which pursue a low-cost strategy typically grow more slowly whereas differentiators grow faster. Altogether the most successful companies in all analyzed industries achieve either the lowest cost or the most differentiated position.
Hambrick (1983)	N=164 Capital Goods	Within an industry different strategies can lead to high growth. From industry to industry both successful and unsuccessful strategies can differ. Additionally, asset configuration and utilization are important factors for profitability.
Hitt & Ireland (1985)	N=185	Distinctive competencies associated with firm performance vary according to grand strategy used and the principal industry.
Kim & Lim (1988)[c]	N=185 Electronics	Multiple perceived environments exist in an industry. In technically dynamic environments, companies perform relatively poorly. Also in developing countries cost leadership, differentiation and focus are pursued as generic strategies. Differentiation strategies are especially successful when firms have weak bargaining power whereas cost leadership outperformed other strategies in an environment of strong bargaining power.
Kim, Nam & Stimpert (2004)	N=75	Porter's generic strategies explain performance differences between firms. Cost leadership exhibited the lowest performance. Firms pursuing a hybrid strategy of cost leadership and differentiation exhibit the highest performance
Kotha, Dunbar & Bird (1989)	N=285 Discrete-Parts Manufacturing	Managers from the U.S. and Japan emphasize many similar competitive methods. Nevertheless, the analysis shows that US mansgers concentrate their activities more on quality and operating efficiency as well as on reputation. Japanese mansgers, on the contrary, show a greater emphasis on product development, product line breadth and cost.
Kotha & Nair (1995)	N=25 Machine Tool	Both environmental and strategy variables explain a large portion of variance in firm profits and sales growth. A low-cost strategy based on efficiency and an export-driven scale/scope strategy are both positively related to performance. A differentiation strategy based on advertising is, however, negatively related with firm performance. Growth is influenced by none of the tested generic strategies.
Kotha & Vadlamani (1995)	N=126 Discrete-Parts Manufacturing	Mintzberg's typology of generic strategies outperforms Porter's in clarity and descriptive power. More fine-grained strategy typologies than Porter's seem to be necessary to capture intended strategies of managers.
MacMillan, Hambrick & Day (1982)	N= 200	Capital intensity, value added, and manufacturing cost have the most explanatory power in all cells of the BCG portfolio. A strategy based on cost and asset efficiency seems to be highly profitable. With regard to the product life cycle the analysis shows that in mature businesses efficiency and product quality are important factors for profitability.
Marlin, Huonker & Hasbrouk (2004)[c]	N= 173 Hospitals	Hospitals combining a low-cost and differentiation strategy perform especially well. Matching strategies with the environment affect the performance but the appropriate match changes over time. Significant movement between strategic groups is observable.
McNamee & McHugh (1989)	N=77 Clothing	Small firms enjoy the highest profits when they strongly differentiate. Those firms that are stuck-in-the-middle do worst of all. Firms which are most differentiated perform best, and strong commitments by small firms to differentiating activities such as marketing, design, own branding, training and management intensity, boost profitability.

Figure 11 continued

Study	Sample size & industries	Main results
Miller & Dess (1993)	N=1,789 Manufacturing	Any combination of strategic advantage coupled with a narrowly-defined strategic target (average ROI 21.5%) is less profitable on average than those same advantages coupled with broad targets (average ROI 32.8%). Stuck-in-the-middle strategies have a low average ROI. The lowest average ROI was observed for the differentiation and narrow businesses. The applicability of Porter's generic strategies seems not to be independent from the environmental context.
Miller (1992)	N=45	The analysis reveals three distinct differentiation strategies and a strategy of cost leadership. Companies can combine a number of these strategies without any penalty to financial performance. Additionally, the strategies are shown to be associated with different industry contexts. The study revealed no performance implications for these associations.
Miller & Friesen (1986)	N=102 Consumer Durable	Differentiators also employ a cost-leadership strategy, cost leaders also employ significant elements of differentiation and focusers are also cost leaders. Clusters of business units that show distinctive competences in the areas of differentiation, cost leadership and focus dramatically outperformed all others. Well performing companies show multiple strengths within their dominant category.
Morrison & Roth (1992)	N=115 11 industries	Four general business-level strategies exist for operating in global environments: domestic product niche, exporting high quality offerings, international product innovation, quasi-global combination. Surprisingly, no strong low-cost strategy was identified. Significantly higher performance was associated with businesses pursuing quasi-global strategies versus domestic strategies. A pattern of improving performance is also associated with strategic moves towards technological innovation and global orientation.
Parker & Helms (1992)	N=96 Textile Mill Products	Superior economic performance is associated with mixed as well as single generic strategies. The results seem to confirm that in a declining industry firms need not pursue a single strategy to achieve superior performance. This may be due to the fact that stuck in the middle or reactive strategies may help firms remain flexible at the end of an industry's lifecycle. Additionally, companies in the US and the UK adopt to trends in global competition by adopting to low-cost strategies of low-cost producers in developing countries.
Parnell & Hershey (2005)	N=415	For both frameworks - the Porter and the Miles & Snow typology - it is possible to successfully pursue a combination strategy. Combination strategies can be either superior or inferior depending on the industry's structural characteristics.
Phillips, Chang & Buzzell (1983)	N=623 6 industries	The relative direct cost position is a significant determinant of business performance in five out of six types of business studies. At the same time, product differentiation is a significant determinant of ROI in all six types of business, though the manner in which the effect is manifested varies across businesses. Surprisingly, a direct effect of product quality on performance could only be found in half of the businesses. However, in all businesses quality influences performance indirectly via its effect on market position. Additionally, the results show that product quality is not always associated with a cost premium.
Robinson & Pearche (1988)[c]	N=97 60 Manufacturing industries	Firms following either a brand identification/channel influence and efficiency strategy or a product innovation/specialty and service/high price strategic orientation have significantly higher returns than strategic groups with either no clear strategic orientation or with only marginal emphasis on brand/channel influence and service.
Shah (2007)[c]	N=66 Retail	Strategic groups exist in the retailing industry and significant performance differences between the strategic groups can be observed. The analysis confirms the Porter's concept of generic strategies.

Figure 11 continued

Study	Sample size & industries	Main results
Song, Di Benedetto & Mason (2007)[d]	N=216 11 industries	Capabilities have a significant impact on financial performance if one does not account for strategic type. For different strategic types different capabilities are associated with an increase in financial performance.
Snow & Hrebiniak (1980)	N=88 Plastics, Semi-conductor, Auto-motives, Air Trans.	Different types of strategies have different competences. The special capabilities of analyzers are less apparent. Defenders, prospectors and analyzers consistently outperform reactors in competitive industries. In highly regulated industries, however, reactors outperform other strategy types.
Thornhill & White (2007)	N=2,351	A significant positive relationship exists between strategic purity and performance. Although some industry-specific differences are observable pure strategies never perform less well than hybrid strategies.
Venkatraman (1989)	N=202	Aggressively pursuing market share has no significant effect on growth trends but a significantly negative effect on profitability. Analytical orientation of a business has a no impact on both growth and profitability, while the proactiveness dimension has a positive and significant effect on both growth and profitability. The riskiness has a negative and insignificant effect on growth but a negeative and significant effect on profitability.
White (1986)	N=69	Companies realizing both cost leadership and differentiation advantages have the highest ROI. The highest sales growth is achieved by those businesses with a pure differentiation strategy. Additionally, the fit between business unit internal organization of multi-business companies does have an effect upon business unit performance. Low autonomy corresponds to significantly higher ROI for business units with pure cost strategies.
Wright, Kroll, Tu & Helms (1991)	N=56 Machine Products	Low cost businesses show the lowest performance and differentiated businesses the second lowest. Combination strategies show the highest performance.

Figure 12: Past empirical research on the influence of strategic groups on superior economic performance
([d]: also relevant for Figure 13)

Study	Sample size & industries	Main results
Chang, Chang & Hsin (2006)[d]	N=135 Digital Learning	Based on the resource dominance of firms different strategic groups have evolved in the Taiwan digital learning industry. The leading group in integration of marketing and sales activities shows the best financial performance.
Cool & Schendel (1988)	N=21 Pharmaceutical	Performance differs between members of a strategic group. Risk-return relationship seem to be an important explanation for these findings. The analysis shows that the risk-return relationships varies over time and can thus be positive as well as negative.

Figure 12 continued

Study	Sample size & industries	Main results
Feigenbaum & Thomas (1990)	N=23 Insurance	Performance differences exist among strategic groups and the structure of strategic groups changes over time.
Harrigan (1985)	N=92 Retailing	Performance differences can be observed between strategic groups. At the same time, however, different strategic groups can achieve the same performance levels.
Hatten & Schendel (1977)	N=13 Brewing	The relationship between profitability and managed variables or conduct is not always constant within an industry. The results show important differences between the market conduct of individual brewing firms. Additionally, the industry estimates were significantly different from the group estimates.
Hatten, Schendel & Cooper (1978)	N=13 Brewing	The patterns of significance of coefficients change from industry to group level and between groups. Thus, within a given industry or set of markets, different competitors with different resources should choose different means to attend their needs.
Houthoofd & Heene (1997)[d]	N=36 Brewing	Between strategic scope groups (similar definition of business concerning buyer types, product types, geographical reach, level of vertical integration) significantly different performance levels can be observed. Strategic groups (deploy resources in a similar way and compete against each other in a similar way) do not show differences in firm performance. Thus, scale and scope seem to be strong mobility barriers. Performance differences in strategic groups hint towards the existence of unique resources and capabilities in the possession of firms which allow them to create competitive advantages.
Leask & Parker (2007)	N=33 Pharmaceutical	Statistically significant differences exist between strategic groups leading to statistically significant performance differences.
Mascarenhas & Aaker (1989)	N=33 Oil-Drilling	Strategic groups can be identified on the basis of mobility barriers. Thus, identified strategic groups have a high stability. However, groups protected by higher mobility barriers observe a lower performance suggesting the existence of strong exit barriers which can trap firms within a group.
Marlin, Ketchen Jr & Lamont (2007)	N=173 Hospitals	The strategic group-performance relationship is influenced by environmental changes. Different equifinal situations ask for different strategic set-ups.
McNamara, Deephause & Luce (2003)	N=52 Commercial Banking	Performance differences within strategic groups are significantly higher than across groups. Firms that are loosely aligned with a multi-firms group (secondary firms) outperform both firms that are tightly aligned with a multi-firms group (core firms) and strategically unique firms (solitary firms). The results suggest that secondary firms may be able to effectively balance the benefits of strategic distinctiveness with institutional pressures for similarity.
Nair & Kotha (2001)	N=12 Manufacturing	Even after controlling for both firm-specific and environment effects group membership was significantly associated with firm performance. Significant performance difference exist between strategic groups in an industry.
Olusoga, Mokwa & Noble (1995)	N=16 Cosmetics, Perfumes Toiletries	Strategic group analysis can be used to identify firms that have achieved competitive advantages, the variables underlying their competitive advantage, and exploring the stability of competitive advantages. Firms must be aware of changing industry factors and respond to them by adjusting their strategies in order to successfully compete in their industry.

Figure 12 continued

Study	Sample size & industries	Main results
Oster (1982)	N=19 Consumer Goods	Profit rate differences across groups are not significant. The data on profit variability indicate greater differences across groups. High advertisers had less variable profits than low advertisers. In general, barriers to mobility seem to protect more against variability than to assure high profits. Additionally, the paper shows that at least in the case of advertising, it is the durability of a firm's investments in its strategies that maintains the group structure.
Oustapassidis (1998)	N=23 Dairy	Both advertising and diversification strategies are important only for firms with national branded products and national advertising. The firms of this group are able to apply advertising effectively and to diversify into other dairy products in order to increase their profitability. The results show also differences within the branded group hinting towards the existence of a optimal advertising intensity.
Ryans & Wittinck (1985)	N=22 Airlines	Several strategic groups exist in the US airline industry. Firms within a strategic group show simultaneous behavior to environmental influences.
Schendel & Patton (1978)	N=12 Brewing	Explanatory variables have multiple effects on different performance measures. Performance influences vary between subgroups of the brewing industry. Performance effects on the industry and subgroup level can be negatively correlated.
Tremblay (1985)	N=22 Brewing	Significant differences in the demand for nationals' and regionals' beer exist. Nationals do have a marketing advantage over regionals. Advertising and rivalry from inside, relative to outside a firm's strategic group can have a more detrimental effect upon demand.
Walker, Madsen & Carini (2002)	N=39 Airlines	Inter-firm heterogeneity is clearly higher among entrants than incumbents and variation among incumbents does not grow after deregulation.

Figure 13: Past empirical research on the influence of firm resources and capabilities on superior economic performance

Study	Sample size & industries	Main results
Dreyer & Gronhaug (2004)	N=148 Fish Processing	Flexibility is a valuable skill. This skill allows firms to achieve sustained competitive advantage even in uncertain environments. Especially, financial flexibility seems to be important, followed by volume and product flexibility.
Dyer (1996)	N=5 Automotive	Between value chain asset specificity and performance exists a positive relationship. In the automotive industry a tightly integrated production network will outperform a loosely integrated production network.
Flamholtz & Hua (2003)	N=16	Higher values of total pyramid of organizational development scores are connected with higher ROE values. Additionally, the key source of competitive advantage seems to be a firm's infrastructure and not, contrary to conventional wisdom, markets and products.
Henderson & Cockburn (1994)	N=10 Pharmaceutical	Competences are an important source of advantage in research productivity. Idiosyncratic firm effects account for a very substantial fraction of the variance in research productivity across firms.
Hervás-Oliver & Albors-Garrigós (2007)	N=225 Ceramic tile	Regional clusters have a unique set of resources and capabilities and a certain performance level. On the whole, a cluster's unique set of resources and capabilities matter.
Hooley, Greenley, Cadogan & Fahy (2005)	N=485	Marketing resources impact financial performance indirectly through creating customer satisfaction and loyalty and building superior market performance.
Lin, Lee & Hung (2006)	N=258	Commercialization orientation and R&D intensity complement each other in their performance-enhancing effect. A firm's commercialization orientation can play a more important role than R&D in the process of exploiting the value of technology assets.
Miller & Shamsie (1996)	N=7 Film Studios	Both property- and knowledge-based resources that are hard to buy or imitate contribute to performance. However, the environmental context is conditioning these relationships. Periods of stability and predictability favor firms with knowledge-based resources.
Ray, Barney & Muhanna (2004)	N=104 Insurance	Intangible and social complex capabilities are positively related to customer service performance. Tangible and non-socially complex resources do not seem to explain variation in customer service performance.
Reed, Lubatkin & Srinivasan (2006)	N=292 Banking	The impact of human, organizational, and intellectual capital on financial performance is contingent upon the values of the other components and these leveraging effects are themselves contingent on the conditions of the firm's industry.
Schroeder, Bates & Junttila (2002)	N=164 Manufacturing	RBV is an appropriate framework for addressing manufacturing performance. Routinized learning and idiosyncratic, proprietary processes are associated with better performance.
Spillan & Parnell (2006)	N=153	Two marketing resources in particular – a customer orientation philosophy and a structure that supports coordination among departments and divisions – are most critical in fostering superior firm performance.
Zhu (2004)	N=114 Retail	E-commerce capability and IT infrastructure exhibit positive relationships with firm performance.
Zhu & Kraemer (2002)	N=260 Manufacturing	E-commerce capability has a significant positive effect on performance.

Moreover, Proposition 2 is supported by the results, as both the possibility to achieve superior economic performance and the decay of superior economic performance over time are substantial assumptions of the Austrian school of economics and its descendants. Furthermore, the importance of R&D and advertising expenditures proven by some studies (Jacobsen, 1988, 426f.; Kessides, 1990a, 788ff.; Odagiri & Yamawaki, 1990, 135ff.; Waring, 1996, 1258ff.) shows that innovations, as suggested by Schumpeter, can lead to a certain amount of monopoly power, allowing firms to realize superior economic performance. Additionally, in line with the argumentation of evolutionary economics, the adjustment to changing environmental characteristics is crucial for surviving successfully in the market. (Makhija, 2003, 449; Mascarenhas, 1989, 343ff.). Mascarenhas (1989) finds in his analysis of the off-shore oil drilling industry for example that multinational-multiproduct firms retrenched geographically during a period of decline, whereas during a period of growth they widened their product lines with regard to their rig types.

Past empirical research on the influence of industries' structural characteristics on superior economic performance

The basic assumption of IO economics that industry structure influences superior economic performance is overwhelmingly confirmed by all studies in the sample testing the influence of structural variables on firm performance (Figure 10). These findings strongly support Proposition 3 in general. However, the reader has to be aware that the majority of (variance decomposition) studies comparing the influence on profitability owing to structural and other effects (e.g., firm or year effects) seem to find the influence of industry structure to be less important than firm or business-unit effects (see Chen & Lin, 2006; González-Fidalgo & Ventura-Victoria, 2002; McGahan & Porter, 2002; Misangyi et al., 2006; Ruefli & Wiggins, 2003; Short et al., 2006; Short et al., 2007; Spanos et al., 2004, for some recent results). Nonetheless, the size of the industry effect – the percentage of variance explained by industry membership – varies in these studies from a low 1.6% up to 59.4% (Chang & Singh, 2000, 748).

These variance decomposition studies typically use a model comparable to the following to estimate, e.g., industry, corporate, business-unit and year effects on the variability of performance:

$$r_{i,k,t} = a + b_t + c_i + d_k + e_{i,k} + f_{i,k,t}$$

where $r_{i,k,t}$ is the performance in year t of a corporate parent k's business-unit in industry i, a is the average performance across all business-units in the sample over the entire period, b_t is the

difference between a and the performance across all business-units in the sample in year t, c_i is the increment in profit associated with participation in industry i, d_k is the increment in profit associated with belonging to corporate parent k, $e_{i,k}$ is the increment in profit associated with the specific situation of business-unit i,k given the other effects, and $f_{i,k,t}$ is the residual. The model is estimated using dummy variables to represent industry, corporate, business-unit and year effects.

Given the ongoing debate about the relative role of industry, firm, corporate, business-unit and year effects (see, e.g., Short et al., 2007) and to be able to assess the impact of these effects more precisely, Figure 14 summarizes the sample size weighted averages of the effect sizes reported for 20 independent samples in 17 studies analyzing the relative importance of specific effects on performance. The 20 samples analyzed altogether 37,321 firms. Although more studies generally could be added to this meta-analytically analyzed sample, only 17 of the potentially relevant studies report the necessary effect measures. The studies used for the quantitative integration are marked with an asterisk in Figure 9 and Figure 10.

Generally, two types of studies analyzing the influence of different effects on performance have to be distinguished. The first type (represented in subsample A) differentiates mainly industry, firm, and year effects that may affect performance. Industry effects represent the explained performance variance due to differences across industries. Firm effects, on the contrary, represent the variance in performance due to differences within industries. Year effects describe macroeconomic influences that typically have an effect on all firms in the economy during a certain year. As only a few of the studies that could be included in sample A analyze year effects, they are not reported in Figure 14.

The second type of study (represented in subsample B) primarily distinguishes between industry, corporate, business-unit, and year effects. Corporate effects, in contrast to firm effects, encompass the influence of membership in a particular corporate family on performance variability due, e.g., to corporate-level resources. Some authors therefore also speak of corporate-parent effects. Business-unit effects capture competitive positioning and any other source of persistent idiosyncratic differences at the business-level resulting in profit differences. For reasons of comparability in both subsamples the number of included firms and not the number of business-units was chosen as the sample size.

Figure 14: Meta-analytic integration of the relative influence of industry, firm, corporate, business-unit, and year effects on performance
(K: number of effect sizes; T: total sample size ($\sum N_i$); $\bar{E}$: sample-size weighted average effect size (percent of variance of performance explained by the type of effect); s_E^2: observed variance; s_e^2: sampling error variance; s_ρ^2: residual variance)

Sub-sample A

Type of effect	K	T	$\bar{E}$	s_E^2	s_e^2	s_ρ^2	s_e^2 / s_E^2	95% credibility interval	95% confidence interval
Industry	11	17,968	0.138	0.008	<0.001	0.008	0.069	-0.036:0.311	0.084:0.182
Firm	11	17,968	0.359	0.019	<0.001	0.019	0.024	0.090:0.628	0.277:0.441

Sub-sample B

Type of effect	K	T	$\bar{E}$	s_E^2	s_e^2	s_ρ^2	s_e^2 / s_E^2	95% credibility interval	95% confidence interval
Industry	9	19,353	0.136	0.002	<0.001	0.002	0.191	0.051:0.222	0.105:0.168
Corporate	9	19,353	0.108	0.003	<0.001	0.003	0.136	0.002:0.213	0.070:0.146
Business-unit	9	19,353	0.435	<0.001	<0.001	<0.001	0.953	0.427:0.443	0.424:0.447
Year	9	19,353	0.013	<0.001	<0.001	<0.001	1	0.013:0.013	-0.001:0.026

The results for subsample A, in Figure 14, show a significant (indicated by a confidence interval not including zero) effect of industry membership on profit variability. On average, industry membership accounts for 13.8% of the variance in performance in this subsample. This shows that industry does matter in explaining superior economic performance. However, the sample is heterogeneous (pointed out by the large credibility interval and the small percentage of variance explained by the sampling error in relation to the observed variance in the effect sizes), indicating the existence of further determinants influencing the results. Due to the small sample size, the results for this as well as all other heterogeneous subsamples are not moderated. Possible explanations for the observed heterogeneity in the reported effect sizes are the level of industry aggregation (see Bowman & Helfat, 2001, 7ff., for an overview; Chang & Singh, 2000, 748), the size of the included firms (Chang & Singh, 2000, 748), the type of industry (Goddard & Wilson, 1996, 113; McGahan & Porter, 1997, 23f., 2002, 845f.), the country analyzed (Furman, 2000, 26f.), the performance measures (Robinson & McDougal, 1998, 1092ff.), and the statistical technique (Bowman & Helfat, 2001, 7ff.; Hawawini, Subramanian, & Verdin, 2005, 1083ff.; McNamara, Aime, & Vaaler, 2005, 1075ff.).

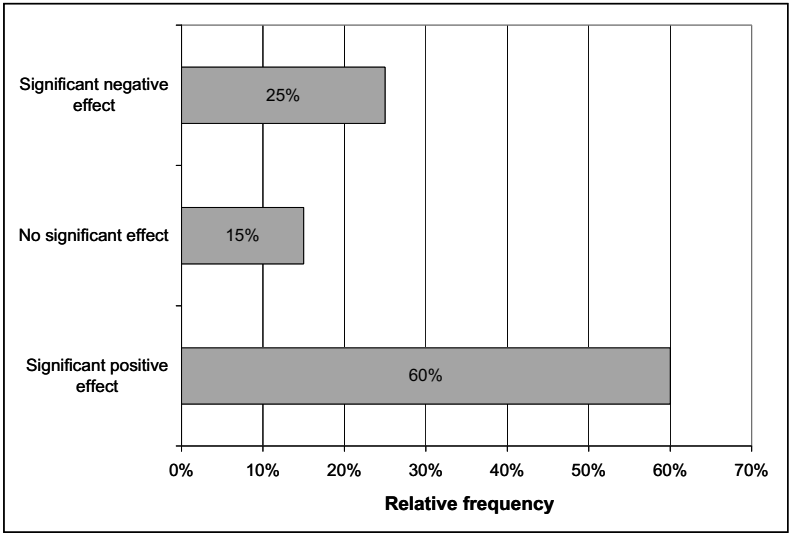
The firm effect in subsample A is also significant, but heterogeneous, with a weighted average value of 35.9% explained variance in profitability. This noticeably higher firm effect in comparison to the industry effect demonstrates that the impact of firm-specific conduct is more important in explaining the generation of superior economic performance than the structural characteristics of the firm's industry. In other words: Industry does matter, but firm conduct matters even more!

The results for subsample B confirm this assessment. With a value of 13.6% of explained performance variability, the effect has nearly the same size as in subsample A. Additionally, the industry effect in this subsample is also significantly different from zero. The corporate effect is roughly equally important. It explains a significant value of 10.8% variability in performance. The business-unit effect, with a significant value of 43.5%, seems to be more important than any other effect. Although the corporate effect is much smaller than the business-unit effect, the significance of the corporate effect confirms the influence from being associated with a corporate-parent and highlights the benefits that corporate parents can provide (e.g., corporate-level resources). At only 1.3%, year effects are relatively unimportant and insignificant. Business-unit and year effects are the only effects that are homogeneous.

Although Proposition 2 can be confirmed in general, the findings for the theoretically suggested structural characteristics determining the generation of superior economic performance

are – at least for some – more heterogeneous. The most prominent structural characteristic discussed in IO-related empirical studies is industry concentration. The findings for the effect of industry concentration on the performance of firms are heterogeneous. A comparatively large portion of the empirical investigations find clear positive effects as suggested by the SCP approach due to increasing market power in the case of increasing concentration (Allen, 1983; Bain, 1951; Bass, 1974; Comanor & Wilson, 1974; Cubin & Geroski, 1987; Hart & Morgan, 1977; Imel & Helmberger, 1971; Kessides, 1990b; Mann, 1966; Misangyi et al., 2006; Ravenskraft, 1983; Shepherd, 1972). Nonetheless, some studies find either no relationship (Khalizadeh-Shirazi, 1974; Spanos et al., 2004; Wiggins & Ruefli, 2002) or a negative one (Clarke, 1984; Grabowski & Mueller, 1978; Newman, 1978; Phillips, 1972; Robins & Wiersema, 1985). Figure 15 reports the results of a vote-counting analysis (Light & Smith, 1971, 429ff.) of the past empirical results for the concentration-performance relationship. Based on vote counting's 33% decision rule – a positive (negative) effect is observable when the relative frequency of significant positive (negative) effects is larger than 33% (Hedges & Olkin, 1980, 360) – the results seem to suggest a positive impact of concentration on performance: a significant positive effect is found in 60% of the sample studies.

Figure 15: Relative frequency of effects for the concentration-performance relationship in past empirical research



However, other studies in the set that analyze the influence of concentration on profitability additionally include efficiency in their model. As suggested by price theory IO economics, several of these studies come to the conclusion that an increase in market power is not responsible for the positive concentration-performance relationship, but rather efficiency gains realized by larger firms (Carter, 1978; Chappell & Cottle, 1985; Demsetz, 1973; Holterman, 1973; Leach, 1997; Peltzman, 1977). However, Allen (1983), introducing a relative efficiency variable, finds both concentration and efficiency significantly related to profitability, but with stronger effects for the latter relationship. The differences in the findings seem to be especially moderated by the concentration measure, the definition of the efficiency variable, the level at which scale economies are accounted for (e.g., firm and/or plant), and the statistical technique (Chappell & Cottle, 1985, 1032; Leach, 1997, 17ff.).

The effect of advertising intensity has also been widely tested in past empirical research. Although the positive influence of high advertising ratios seems to be proven (Bass, 1974; Comanor & Wilson, 1967, 1974; Cubin & Geroski, 1987; Hart & Morgan, 1977; Holterman, 1973; Jacobsen, 1988; Kessides, 1990a; Porter, 1979), some studies find significant differences in the effect depending on the specific industry or country (Catin & Wittink, 1976; Grabowski & Mueller, 1978; Phillips, 1972; Shepherd, 1972). Key rationales for the widely found positive impact are that advertising leading to customer preferences/product differentiation not only allows price increases but also creates substantial barriers to entry. However, and especially, the ability to differentiate a product successfully depends on the characteristics of both the product and the market, which may account for the industry- and country-specific differences reported in past empirical research. For certain products (e.g., power, flour, or cement), as well as certain market conditions (e.g., regulation, existence of an essential facility, or trade tariffs), a successful product differentiation might be extremely expensive or not even achievable.

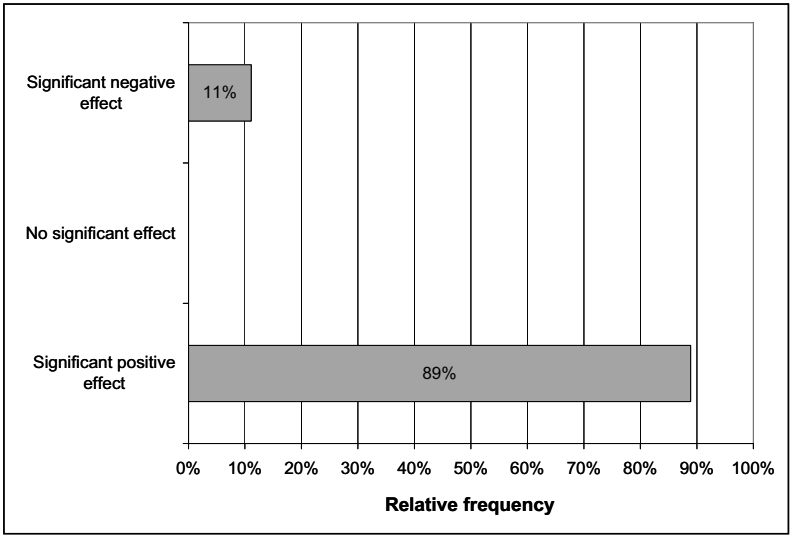
This suggestion is backed by the outcomes reported by Khemani and Shapiro (1990) testing the effects of product differentiation on superior economic performance. They find a positive relationship for this variable. In contrast to studies examining the effects of advertising expenditures – a way to promote product differentiation – here the direct effect of differentiated product portfolios is tested, and so only markets allowing a reasonable differentiation are included in the "differentiator group."

The theoretically suggested positive influence of demand growth is also emphasized in some studies (Grabowski & Mueller, 1978; Imel & Helmberger, 1971), confirming the possible

effects of errors in demand expectations and a lag in supply response. The findings thus contradict proponents of a negative relationship (Caves, 1967, 30f.; Kaysen & Turner, 1959, 105) who argue for the effect of harder-to-maintain collusive agreements in case of growing markets.

After mentioning the influence of product differentiation – one of the barriers to entry proposed in theory – the impact of barriers to entry in general has still to be discussed. Although Phillips (1972) reports negative effects of barriers to entry for a UK sample, the majority of positive findings (89%) reported in Figure 16 confirms that barriers to entry exist and can protect industry-specific profitability levels (Comanor & Wilson, 1974; Hart & Morgan, 1977; Holterman, 1973; Kessides, 1990a; Khemani & Shapiro, 1990; Mann, 1966; Powell, 1996; Spanos et al., 2004). Additionally, the negative impact reported by Phillips (1972) has to interpreted carefully due to the low sample size (71) compared to the variables tested in the regression model (10). Capital requirements and economies of scale, especially, are pointed out as important barriers to entry besides the above-mentioned influences of product differentiation and advertising intensity. When large capital investments are necessary to enter an industry or when large firms operate at a better cost position, newcomers have a natural disadvantage. This disadvantage seems to prevent new market entries when they outweigh possible advantages from the presence of supernormal profit in the specific industry.

Figure 16: Relative frequency of effects for the entry barrier–performance relationship in past empirical research



The aforementioned finding that industry effects are generally found to be less influential on performance variation than firm or business-unit effects, supports the general criticism of the traditional SCP approach for neglecting the influence of managerial actions. Thus, the results clearly support both the adapted SCP approaches, which include efficiency-generating competencies, and strategic management research, which sees industry membership as only one effect besides strategic positioning within an industry. This suggests that studies testing the effects of generic strategies or strategic groups should be able to find influences on firm performance.

Past empirical research on the influence of generic strategies on superior economic performance

Looking at the studies examining the impact of generic strategies on superior economic performance seems to confirm Proposition 4 (Figure 11). All studies in the sample analyzing the impact of generic strategies, with the exception of Christensen and Montgomery (1981), report effects of pursued strategies on firm performance.

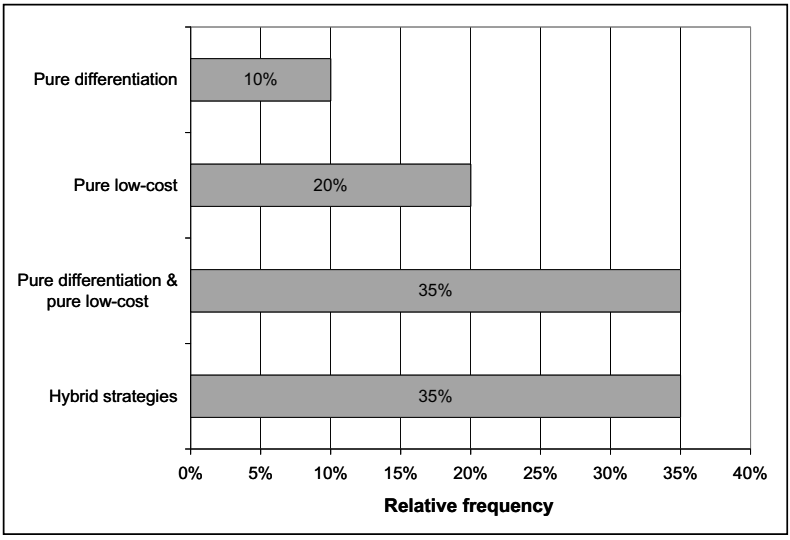
Comparing the typologies of generic strategies tested in the sample shows that 21 of the 41 studies analyzing the impact of pursued strategies use Porter's typology (Beal, 2000; Caves & Ghemawat, 1992; David et al., 2002; Davis & Schul, 1993; Dess & Davis, 1984; Green et al., 1993; Hall, 1980; Hambrick, 1983; Kim et al., 2004; Kim & Lim, 1988; Kotha et al., 1995; Marlin et al., 2004; McNamee & McHugh, 1989; Miller & Dess, 1993; Miller & Friesen, 1986; Parker & Helms, 1992; Phillips et al., 1983; Shah, 2007; Spanos et al., 2004; White, 1986; Wright et al., 1991). Two studies focus on Miles and Snow's typology (Snow & Hrebiniak, 1980; Song et al., 2007), one study applies Porter's and Miles and Snow's typology (Parnell & Hershey, 2005), and the rest define an independent typology.

In some of the above-mentioned 21cases applying Porter's typology, the authors use either an adapted version of this concept with a higher number of generic strategies (Beal, 2000; Hambrick, 1983; Kim & Lim, 1988; Kotha et al., 1995; Miller, 1992; Shah, 2007; White, 1986) or just focus on strategic advantage without looking at the strategic target (Caves & Ghemawat, 1992; David et al., 2002; Hall, 1980; Marlin et al., 2004; McNamee & McHugh, 1989; Phillips et al., 1983; Wright et al., 1991).

Although studies examining Porter's generic strategies find supporting results for the performance implications of this typology, the appraisal of the performance implications of the different strategies diverges (see Figure 17). Only 10% of the studies comparing the perform-

ance effects of the different generic strategies proposed by Porter observe a pure differentiation strategy as the best way to generate CA resulting in superior economic performance (Caves & Ghemawat, 1992; McNamee & McHugh, 1989). Low-cost strategies are viewed by 20% of the studies to be a superior way to improve firm performance (Davis & Schul, 1993; Dess & Davis, 1984; Green et al., 1993; Kotha et al., 1995). With regard to growth, however, the results clearly show the superiority of a differentiation strategy. All studies evaluating the impact of generic strategies on firm growth confirm the superiority of a differentiation strategy (Davis & Schul, 1993; Hall, 1980; White, 1986). Thirty-five percent of the investigations conclude, as suggested by Porter (1980), that both a low-cost and a differentiation strategy can lead to CA and, in turn, to superior economic performance as compared to firms with no clear strategy (David et al., 2002; Hall, 1980; Kim & Lim, 1988; Miller & Dess, 1993; Miller, 1992; Phillips et al., 1983; Shah, 2007). Nonetheless, another 35% are able to find advantages of mixed strategies over pure strategies (Kim et al., 2004; Marlin et al., 2004; Miller & Friesen, 1986; Parker & Helms, 1992; Spanos et al., 2004; White, 1986; Wright et al., 1991). Thus, in certain environments, mixed strategies may perform especially well. In their meta-analytic review, Campbell-Hunt (2000) come to a comparable conclusion.

Figure 17: Relative frequency of superior performance impact resulting from (a) certain strategic set-up(s) in past empirical research
(basis: Porter's typology of generic strategies)



One potential explanation for the effectiveness of mixed strategies is the possibility of avoiding price competition due to improvements in output through product R&D and advertising, as well as an increase in efficiency due to process R&D expenditures and high capacity utilization (Wright et al., 1991, 145). Achieving a low cost position relative to competition coupled with acceptable quality may help a firm – especially in mature markets – to retain a necessary amount of flexibility (see Anderson & Zeithaml, 1984, 21ff., for the general influence of product lifecycle; Hall, 1980; Parker & Helms, 1992, for the mentioned effects).

On the influence of the strategic target, past research also draws no clear picture. Some studies report focus strategies to be less profitable than broad strategies (Dess & Davis, 1984, 482; Miller & Dess, 1993, 573), whereas others state that they perform equally (Miller & Friesen, 1986, 256). Although Dess and Davis (1984) find a negative impact for a focus strategy on performance (ROA), they find the highest sales growth in this segment. This indicates that some small firms may emphasize sales growth at the possible expense of profitability.

Several of the studies either directly test determinants that might influence the performance implications of generic strategies or choose a setting that indirectly influences the analysis. This heterogeneity is a potential source of the reported diversity in the results. Four factors are specially highlighted in the literature as determining factors. First, environmental factors and type of industry seem to affect the usage of generic strategies and their performance implications (Beal, 2000; Christensen & Montgomery, 1981; Hambrick, 1983; Hitt & Ireland, 1985; Kim & Lim, 1988; Marlin et al., 2004; Nadkarni & Narayanan, 2007; Parnell & Hershey, 2005; Phillips et al., 1983; Snow & Hrebiniak, 1980; Thornhill & White, 2007). The characteristics of an industry not only set an industry-specific performance level, as shown above, but also determine the strategic orientation within the industry (Christensen & Montgomery, 1981, 331f.). Management teams that align strategy with the environmental set-up are able to outperform firms that fail to achieve such an alignment (Beal, 2000, 40f.). For example, in industries with comparatively short life expectancies (e.g., manufacturing) price, promotion, and distribution are especially important factors. Thus, little emphasis is put on R&D. Instead, resources are allocated to acquiring market share and providing reasonably priced products (Hitt & Ireland, 1985, 277).

Second, in line with contingence theory, a firm must achieve internal congruency between its organizational design and strategy (Govindarajan, 1986, 846ff.). This performance contingency effect between organizational design and generic strategy does seem to exist (David et al., 2002; Davis & Schul, 1993; White, 1986). Firm performance is higher when firms pursu-

ing a low-cost strategy are centralized and a low degree of autonomy is granted to business-units as well as when firms pursuing a differentiation strategy are decentralized and a high degree of autonomy is in place (David et al., 2002, 82f.; Davis & Schul, 1993, 195; White, 1986, 227f.). A major advantage of centralization is the ability to create opportunities for resource sharing, minimize capacity and coordination costs, and achieve economies of scale. On the other hand, decentralization offers the advantages of flexibility, time to market, and speed of coordination. In fact, these advantages of centralization (decentralization) are perfectly in line with the goals of a low-cost (differentiation) strategy.

Third, regions and nationalities seem to influence the outcome and application of different strategies (Douglas & Rhee, 1989; Kotha et al., 1995). Kotha et al. (1995) find significant differences between the US and Japan. Japanese managers conceptualize strategies more broadly than their US counterparts which emphasize a wider range of competitive methods. Differences in performance for clusters of comparable strategies are also apparent between the US and Europe (Douglas & Rhee, 1989, 448). In addition to the industry-wide structural characteristics, these results may be due to structural characteristics specific to a region.

Fourth, in reality, more finely grained typologies of generic strategies than Porter's three generic strategies may additionally be necessary to capture strategic choice, as they have a higher conceptual clarity and descriptive power (Kotha & Vadlamani, 1995). This result is supported by the fact described above that several of the sample studies applied an adapted and/or more detailed version of Porter's concept. Campbell-Hunt (2000) also emphasizes in his meta-analysis that a more detailed classification may be necessary.

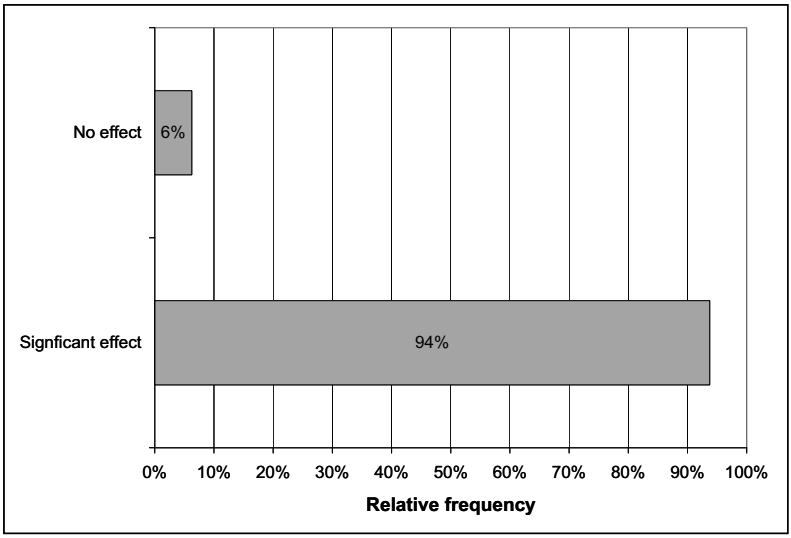
Past empirical research on the influence of strategic groups on superior economic performance

As theoretically suggested, the majority of empirical studies in Figure 12 confirm that within an industry sets of companies exist that pursue strategies that are homogeneous within this set of companies and heterogeneous to other companies or sets of companies in the industry (see Figure 18). Only 6% of the studies find no performance differences between different strategic groups (Cool & Schendel, 1988; Oster, 1982), whereas 94% of the studies testing performance differences between strategic groups confirm the existence of such differences (see, e.g., Chang et al., 2006; Cool & Schendel, 1988; Feigenbaum & Thomas, 1990; González-Fidalgo & Ventura-Victoria, 2002; Leask & Parker, 2007; Marlin et al., 2007; Nair & Kotha, 2001). Thus, past empirical research seems to confirm Proposition 5 (see Ketchen Jr et al., 2004, 791, for a similar assessment). This is also true after correcting for firm and industry

effects (González-Fidalgo & Ventura-Victoria, 2002, 64ff.; Nair & Kotha, 2001, 233; Short et al., 2007, 159). Analogous to the effect of different generic strategies, different strategic groups can achieve comparable performance levels (see, e.g., Harrigan, 1985, 67). This is to say that there is no single way to success within an industry.

The general verification of Proposition 5 suggests the existence of intra-industry profit differences sustaining mobility barriers alongside the inter-industry profit differences that sustain entry barriers (see, e.g., Oster, 1982, p. 382). Houthoofd and Heene (1997), distinguishing between strategic scope groups (similar definition of the business with respect to types of buyers, product types, geographical reach, level of vertical integration), and strategic groups (deployment of resources and competition against each other in a similar way), find mobility barriers to be higher between strategic scope groups than between strategic groups. At the same time, however, firms can also encounter exit barriers that trap firms in a strategic group with low performance (Mascarenhas & Aaker, 1989, 484).

Figure 18: Relative frequency of effects for the strategic group–performance relationship in past empirical research



Although mobility barriers seem to protect performance differences within an industry, firms have to be aware that changes in the environment may impact their performance and thus the structure of strategic groups within an industry (Feigenbaum & Thomas, 1990, 212; Hatten & Schendel, 1977, 110; Marlin et al., 2004, 99ff.; Marlin et al., 2007, 223ff.; Mascarenhas,

1989, 348; Olusoga et al., 1995, 159f.). Congruent with the consequences of environmental characteristics discussed above in connection with Propositions 3 and 4, performance effects of strategic groups are also influenced by the environment. Combined with the already mentioned effect of exit barriers, changes in the environment eroding existing CA may lead to long-lasting negative performance implications. Nonetheless, strategic groups seem to be a relative stable phenomenon over time (Cool & Schendel, 1987, 1120; Mascarenhas & Aaker, 1989, 484).

In addition to the impact of environmental shifts, strategic group members also have to face within-group profit differences. McNamara et al. (2003) even observe profit differences to be higher within strategic groups than across them. They find that firms loosely aligned with multiple firms (secondary firms) outperform both firms that are tightly aligned with a multi-firms group (core firms) and strategically unique firms (solitary firms). They therefore suggest that secondary firms may be able to effectively balance the benefits of strategic distinctiveness and institutional pressures for similarity (McNamara et al., 2003, 167ff.). Cool and Schendel (1987) explain intra-group profit variability through different degrees of efficiency in carrying out a firm's strategy.

Past empirical research on the influence of firm resources and capabilities on superior economic performance

Finally, the explanatory power of the RBV has to be assessed on the basis of past empirical research testing this theoretical model (Figure 13). As suggested in Proposition 6, firm resources and capabilities seem to be a source of superior economic performance. In fact, all studies in the sample find a positive association. However, the reader has to be aware of the still relatively small but growing number of studies testing the implications of the RBV. Although the RBV has received much attention since the 1990s and has been broadly discussed on a conceptual level, empirical work is rare relative to its theoretical influence (Dreyer & Gronhaug, 2004, 484). Nonetheless, the existing empirical support shows the significance of the resource-based model, and thus, of internal strength and weaknesses for the generation of CA allowing firms to realize superior economic performance. Since resources can only lead to superior economic performance generating CA when they fulfill all three requirements named above, certain factor markets are, as Barney (1986b) suggests, not perfectly competitive.

Environmental factors also seem to influence the role resources and capabilities play with respect to the creation of superior economic performance, stressing once again the explanatory power of the SCP paradigm in addition to the strategic management research. Several of

the studies find that the environment plays a conditioning role in the relationship between resources and CA (Dreyer & Gronhaug, 2004, 490ff.; Grabowski & Mueller, 1978, 335ff.; Makhija, 2003, 445ff.; Miller & Shamsie, 1996, 535ff.; Reed et al., 2006, 881ff.).

Distinguishing between knowledge-based resources (e.g., an innovative R&D group) and property-based resources (e.g., patents), Miller & Shamsie (1996) find the latter to have a higher impact on performance in periods of stability and predictability. However, property-based resources can loose their value quickly when an industry changes. Knowledge-based resources are more adaptable to such environmental changes and observe a higher stability as sources of CA (Miller & Shamsie, 1996, 540). These findings are in line with the results of Dreyer & Gronhaug (2004), who see in flexibility itself – especially financial, volume, and product flexibility – a valuable resource.

Reed et al. (2006) highlight the necessity of environment-resource fit. Only when resources match with the industry's characteristics they can be a source of CA and thus allow firms to generate superior economic performance. Otherwise they can be a source of competitive disadvantages and result in performance disadvantages (Reed et al., 2006, 888). Hence, future empirical studies should incorporate IO economics' SCP paradigm in the analysis of the resources-performance relationship.

These findings strongly support the dynamic capabilities approach of the RBV which stresses the ability of firms to adapt existing resources and capabilities to changes in the environment in order to achieve sustainable CA (Teece, Pisano, & Shuen, 1997, 516). Zhu & Kraemer (2002) and Zhu (2004) find also empirical support for the dynamic capabilities approach testing the effect the interaction between information technology and e-commerce capability has on performance.

Song et al. (2007) reveal in their analysis that the impact of certain resources and capabilities on performance is contingent on the chosen strategy. In addition to a fit between firm resources and capabilities and the industry structure, firms have to be aware of a necessary fit of resources and capabilities to the chosen strategy to be able to realize CA leading to superior economic performance. In case of a mismatch, firms should determine how the existing resources and capabilities can best support the currently pursued strategy. At the same time, firms have to ask themselves whether they want to gradually change the chosen strategy to achieve a better fit with the existing resources and capabilities, or whether they will be able to develop the resources and capabilities that support the current strategy (Song et al., 2007, 28).

Additionally, as highlighted above, the match of both pursued strategy and resources and capabilities to the industry structure has to be examined carefully.

Although in recent years more and more studies have explicitly been analyzing the effect resources and capabilities have on the generation of superior economic performance, still only few empirical studies exist on this topic compared to the other research streams presented above. Looking at the comparatively small number of studies testing the predicted impact of resources and capabilities on the generation of superior economic performance via CA and the specificity of both industries and variables tested in most of the studies emphasizes the need for a deeper and broader assessment of the proposed impacts of resources and capabilities in future empirical work. As in the other research streams presented above, the RBV concept would also profit from a broader range of empirical results. In addition, replication studies applying the research design of past studies to other samples can increase the empirical foundation of this research stream. By verifying whether past findings were situation specific or also apply in other contexts, the empirical evidence for the resource-performance relationship will become more representative. Only this will allow a thorough understanding of the influences and moderating effects on the relationship between resources and capabilities, on the one hand, and the generation of CA leading to superior economic performance, on the other.

6 Conclusion

How firms achieve and preserve superior economic performance is a core element of today's economy. Thus, analyzing sources of superior economic performance is crucial for strategic management research. This fact is highlighted by the large number of empirical investigations presented above. Starting from different theoretical foundations, the drivers of superior economic performance have been broadly discussed and analyzed in past research. This has resulted in a variety of explanatory approaches each having been tested in empirical work. The consequential heterogeneity in empirical results leaves the reader in a state of uncertainty.

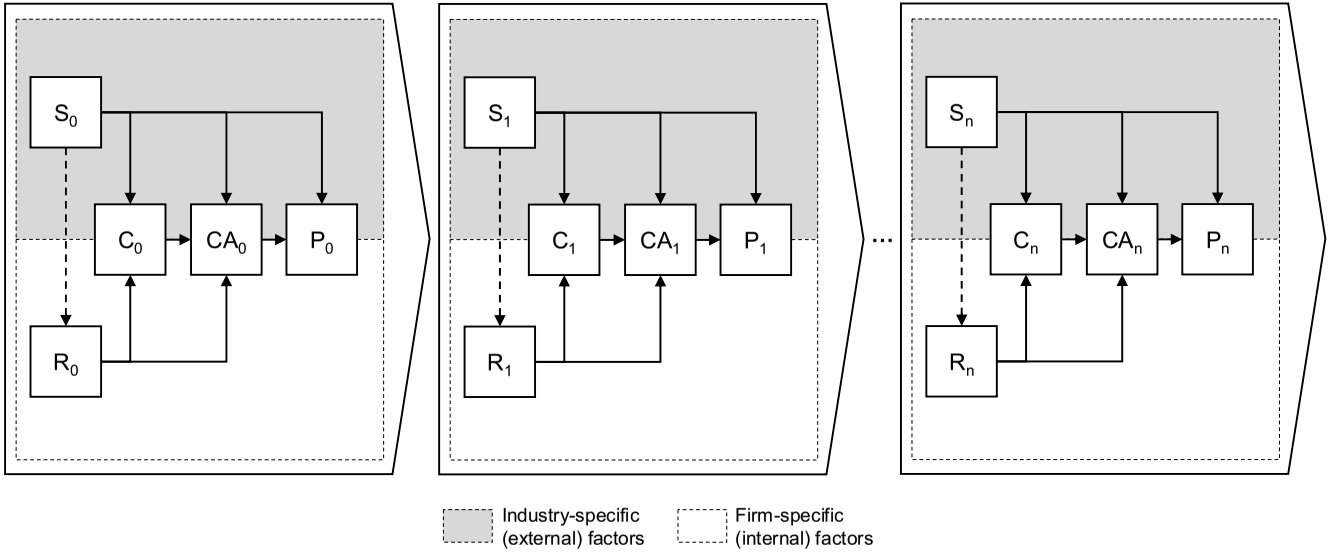
The aim of the discussion already presented was to give a structured overview of the existing body of empirical research and thus to decrease this uncertainty. The discussion allows us to assess the past empirical results and reveals general trends. At the same time, moderating effects were highlighted. To conclude the discussion an integrative frame work presenting the key points of the review will be developed. Additionally, areas for future empirical research will be highlighted.

Key issues and integrative framework

First, in contrast to neoclassical economics, the results clearly show that superior economic performance is achievable by at least some firms. Second, models neglecting competitive dynamics are not able to explain reality. Although profits seem to converge over time, past profit levels predetermine current and future profit levels, and some firms are able to successfully resist the erosion of their high profit levels. Third, industry structure influences superior economic performance. That is to say, industry does matter. Certain structural characteristics foster the generation of superior economic performance. In particular, concentration, demand growth, and barriers to entry are important structural factors leading to profit level differences between industries. Fourth, managerial actions influence the generation of CA and, in turn, the creation of superior economic performance. Although industry does matter, other factors besides industry seem to explain a major part of the variance in profit levels. The generic strategy pursued influences firm performance via CA. The results for the research on generic strategies reveal that the distinction between cost-based and differentiation-based strategies is a reliable way to describe reality. However, finer grained and/or adapted frameworks of generic strategies are needed in order to more broadly depict performance implications. Nonetheless, firms without a strategy are evidently outperformed by firms pursuing a clear strategy. Furthermore, within industries clusters of firms exist which pursue strategies that are homogeneous within this cluster but heterogeneous to other clusters of firms. The resulting profit differences between these strategic groups are protected by mobility barriers. Fifth, resources and capabilities explain intra-industry profit differences caused by CA. Firms have to carefully consider existing strengths and weaknesses before determining future strategies. However, strategies should also aim at generating resources and capabilities leading to CA.

These main results clearly show that none of the existing research streams alone is able to explain the creation and sustainability of superior economic performance. In fact, only an integrative framework of these different approaches will be able to describe the sources of superior economic performance. Figure 19 aims at this goal. The model stresses the need to consider both industry- and firm-specific factors as determinants of superior economic performance because they are not mutually exclusive factors but rather closely connected. The results in all of the strategic management approaches discussed above emphasize the influence of structural factors.

Figure 19: Integrative framework on the determinants of superior economic performance
(S: industry structure; R: firm-specific resources and capabilities; C: firm conduct; CA: competitive advantages; P: performance; $_0$: time period t=0; $_1$: time period t=1; $_n$: time period t=n)



This is to say, that the influences of generic strategies, strategic group membership, as well as resources and capabilities do exist, but depend on the structural characteristics of the industry. Although they also have a direct influence on superior economic performance, industry characteristics cannot explain profit levels in total.

Industry structure seems to form the basis for firm conduct and the use of internal resources and capabilities. Only when taken together these factors can lead to CA. For example, a resource (e.g., the license to offer a product world-wide) can often only be valuable under certain structural characteristics in an industry (e.g., deregulation of the markets for this product in at least a certain amount of national markets), and thus, lead to CA that allow a firm to realize superior economic performance. At the same time, a strategy of differentiation can only result in CA when customer preferences exist and customers are willing to switch suppliers. Additionally, resources have to be employed with the "right" strategies in a market in order to develop their value potential.

Thus, structure not only is a direct source of superior economic performance but also influences firm conduct. At the same time, resources and capabilities not only are a direct source of CA leading to superior economic performance, they also influence firm conduct. Moreover, structure also influences the value potential of resources. Conduct has to be seen as a variable influencing CA. Finally, CA achieved by a firm are themselves heavily dependent on the structural characteristics of the industry. CA influenced by the factors described are observable at the firm-specific profit level and allow firms to generate superior economic performance.

As already discussed, a framework on the generation and sustainability of CA has to take a dynamic perspective. The profit level achieved due to CA and industry characteristics in the past influences market structure and firm conduct, as well as resources and capabilities, and thus CA and performance in the present. Although past performance represents a certain nucleus of the characteristics of industry- and firm-specific factors in the past, the inter-temporal interrelationships are multifaceted. For each component of the model there exists a certain path dependency (Teece et al., 1997, 522f.). In other words, each component is heavily influenced by its past characteristics and heavily influences its future characteristics. For example, the present structure of an industry is at least in part an outcome of its structure in the past. Likewise, the resource position of a firm today depends on its resource position in the past. In

other words, certain elements of the model are persistent to a certain degree and change only gradually.

In particular, barriers to entry, mobility barriers, and imperfect competition in factor markets can – at least for a certain period of time – sustain certain characteristics and thus profit levels – a sharp contrast to the Austrian approach. Another contrast is the fact that abnormal profits in the past resulting from CA can be a source of future CA (e.g., due a particular structure established in a market or particular resources generated). However, the model also includes the Schumpeterian idea of creative destruction. Abnormal profit levels in the past will attract imitators that will erode these abnormal profits unless the profits are protected by certain market characteristics. Additionally, past abnormal profits can also be a motivation for further innovations, allowing a certain persistence of profits due to multiple or rolling innovations within one firm.

In addition to the impact past characteristics of one element of the model have on its current characteristics, they also influence other current elements of the model. Firm conduct, in particular, offers a good example for this type of interrelationship – again an outcome of path dependencies. A specific conduct of a firm in the present may heavily influence the structure of the industry in the future or the resource base of the firm in the future. For instance, an extreme price competition spurred by one firm may force firms with weaker financial power or competitive position to leave the market. As a result, concentration in the industry increases opening chances for cooperative behavior.

Future Research

Where to go from here? The review of past empirical research has shown a considerable heterogeneity in the underlying theoretical concepts applied in research on superior economic performance. Only a few studies so far have tried to include more than one or two of the existing approaches in their analysis. Aside from the challenges such an integration in one study causes, this would seem to be a valuable way to map reality. Only empirical work on the basis of an integrative framework – such as the one presented above – will be able to truly explain the creation and sustainability of superior economic performance.

In addition to this general proposal for future empirical work, four suggestions seem to be obvious when looking at the past empirical research. First, the determinants of the relationship discussed above should be empirically tested further to promote their confirmation. Second, although theoretically widely discussed, the RBV is empirically still in its infancy. Par-

ticularly the formation of common measurement criteria will be necessary to compare findings of different studies. But a transfer of existing empirical approaches to other industrial contexts or a set of markets could also strengthen the empirical research body in this area. Third, research on the effects of strategic grouping is still highly restricted to certain industries. A broader base and especially comprehensive studies comparing the concept and determinants in a variety of industries would allow deeper insights. Fourth, research in all areas should incorporate a dynamic component. Only dynamic analyses will allow a proper understanding of the competitive processes in markets.

Part Three: The Concept and Empirical Measurement of the Competitive Advantage Period and the Industry Advantage Period – A Kolmogorov-Smirnov Approach

1 Introduction

CA and superior performance can be interpreted as two sides of the same coin. With respect to management research the one is mainly driven by strategic management whereas the other is a focal point in financial management. At the same time, IO economics highlights the importance of industry characteristics for explaining profit differences. The aim in part three is to integrate and quantify these perspectives in the concepts of the competitive advantage period (CAP) and the industry advantage period (IAP).

How long are performance differences sustainable? What factors enable the generation and sustainability of these differences? These questions have triggered a great deal of attention, especially in IO economics and strategic management research. A common factor in the majority of these studies is their focus on explaining heterogeneity in firm performance. According to IO theory – mainly ignoring managerial actions – industry structure predetermines firm performance. Although conditions in an industry have a certain influence on a firm's performance, firms are not homogeneous – as inherently suggested by IO economics – but rather heterogeneous. This heterogeneity in both firm behavior – the strategies implemented – and the firm-specific bundle of resources and capabilities – the internal strength and weaknesses possessed by firms – leads to CA versus other firms within the same industry. The SBV and RBV within strategic management research have addressed this weakness of IO economics and discuss in particular the heterogeneity of firms within industries and the impact on the ability to generate and sustain CA, resulting in performance differences. Dynamic concepts, such as in the work of Schumpeter (1934), D'Aveni (1994; 1995) and Nelson and Winter (1982), focus on competitive processes that allow the creation of CA but also can erode CA.

Sustainability of performance difference is achieved when CA resists erosion through competitive behavior and industry structure does not change in a negative way. Empirical research shows that even when a certain sustainability of CA is realized, profit levels seem to converge in the long run (see, e.g., Jacobsen, 1988; Khemani & Shapiro, 1990; Mueller, 1990). However, existing empirical studies typically neither directly and systematically quantify the actual sustainability of performance differences nor do they use an integrative approach for assessing the factors influencing the sustainability of a superior economic position. Only em-

pirical tests over long time periods will be able to better determine the sustainability of performance differences in reality.

This paper aims exactly at bridging this gap by:

- Determining whether performance differences within and across industries are sustainable and, if so, by
- Quantifying the CAP – the average number of subsequent years during which a firm can sustain a superior economic position compared to other firms in the same industry, and by
- Measuring the IAP – the average number of subsequent years during which an industry can sustain a superior economic position compared to other industries.

Performance is measured by both accounting- and market-based means, thus allowing a high comparability with prior studies on the topography of performance (see, e.g., Droucopoulos & Lianos, 1993; Goddard & Wilson, 1996; Jacobsen, 1988; Mueller, 1986; Waring, 1996) as well as adding a second performance dimension (Combs et al., 2004).

Besides neglecting the actual sustainability of superior economic performance, past research has also strongly focused on firms in the US and UK, possibly leading to a certain bias in the results. Thus, in recent years more and more studies have analyzed other national markets (see, e.g., Ariyawardana, 2003; Bou & Satorra, 2007; Chang et al., 2006; Chen & Lin, 2006; Dreyer & Gronhaug, 2004; González-Fidalgo & Ventura-Victoria, 2002; Hervás-Oliver & Albors-Garrigós, 2007; Kim et al., 2004; Makhija, 2003; Resende, 2007; Spanos et al., 2004). Competition today, however, is rather more international than national, and the markets of the leading industrialized countries, in particular, have become more and more integrated (UNCTAD, 2006, 4). This analysis therefore assesses the creation of superior economic performance on the basis of an international sample comprising the G7 countries.

The data employed in this study were extracted from the Datastream Worldscope database. The final sample, covering the years 1980 to 2005, consists of 99 four-digit standard industry classification (SIC) industries and comprises 6,385 firms. The applied time frame complements those analyzed in preceding studies on the topography of performance by Mueller (1986) (1950–1972) and Wiggins & Ruefli (2002) (1974–1997).

In section two, the concept of the CAP and IAP is presented and examined. This includes a brief discussion of the theoretical foundations from which hypotheses about the sustainability

of performance differences and thus about the existence/length of the CAP/IAP can be derived. Thereafter, in part three, the applied empirical methods for measuring the CAP/IAP are described. In a next step, the sample is introduced, before the results of the empirical assessment of the CAP/IAP are presented and discussed in section four. Finally, the concluding section highlights the major results of the analyses and shows both its limitations as well as the areas for future research.

2 The Concept of the Competitive Advantage Period (CAP) and the Industry Advantage Period (IAP)

Past definitions of the CAP by other authors

Mauboussin and Johnson (1997, 68), as well as Mills (1997, 33), define the CAP as "the number of years a company is expected to generate excess returns on incremental investments." The term "excess return" is used in relation to the cost of capital. Miller and Modigiliani (1961) already incorporate the idea of the CAP in their equation for the firm value. An adapted equation from their formula can be summarized as follows:

$$Value = \frac{NOPAT}{WACC} + \frac{I(ROCE - WACC)\ CAP}{(WACC)(1 + WACC)}$$

with *NOPAT* as net operating profit after tax, *WACC* as weighted average cost of capital, *I* as annualized new investments in working and fixed capital, *ROCE* as return on capital employed, and *CAP* as competitive advantage period.

Rearranging this formula, *CAP* is defined as:

$$CAP = \frac{(Value\ WACC - NOPAT)(1 + WACC)}{I(ROCE - WACC)}.$$

In other words, the CAP is in this approach defined as the number of years during new investments can generate a return larger than the WACC. For a meaningful analysis the figure has to be interpreted in relation to the industry, the CAP of a peer group, or the development of the CAP over a time horizon.

Mauboussin and Johnson (1997) suggest that the stock market already incorporates the CAP in the share price. Thus, they speak, with respect to the stock market, of a market-implied competitive advantage period (MICAP). In this concept, a greater gap between the shareholder value of a firm calculated with a discounted cash flow (DCF) model on the basis of unbiased market expectations – concerning the future cash flow profile – and the shareholder

value of a firm calculated on the basis of the current share price refers to a higher MICAP. As a key input, this model needs a proxy for unbiased market expectations to determine the DCF-based firm value. Mauboussin and Johnson (1997), for example, use "Value Line" long-term estimates as a proxy. Another approach suggested by Mills (1997) is a forecast of unbiased market expectation on the basis of the company's current profitability and historical growth.

Using these expected values as the basis, the shareholder value of a company is calculated under the assumption that after the planning period no further value is generated. Initially, the planning period encompasses just a single year. If the thusly derived shareholder value is smaller than the market value, then the CAP is larger than one year and the shareholder value is calculated again using a two-year planning period. This process is continued until the calculated shareholder value meets the actual market value. The derived planning period equals the CAP.

These past definitions of the CAP are rooted in finance theory. Thus, they strongly focus on the capital market and rely on the assumption that the capital market is at least efficient on a medium level (see Fama, 1970, 383ff., for a description of the types of efficiency on the capital markets). That is, the stock price of a company reflects all past and public information influencing current and future profits of a company.

In calculating the MICAP, the model relies on estimates for so called "fundamental values," modeling unbiased market expectations as necessary in the DCF approach. This procedure seems to have several weaknesses. In particular, it is difficult to imagine how estimates – although they might be reasonable and well accepted estimates – or even the current profit rate in conjunction with historical growth rates can model unbiased market expectations. If the model assumes, however, that the capital market uses the same approaches to forecast the MICAP as applied in the DCF model described above, then the MICAP is a relatively weak predictor for the actual CAP achieved by a company.

Definition of the CAP and IAP and Formulation of Hypotheses

In the definition of the CAP that follows, I address the weaknesses of past definitions described above. Furthermore, I attempt to bridge the gap between financial management research and strategic management research on superior economic performance. As a result, I propose not only a new definition of the CAP but also an additional measure: the *industry advantage period* (IAP).

Explaining performance differences between firms is one of the leading research questions in strategic management (Schendel & Hofer, 1979; Venkatraman & Ramanujam, 1986). One of the dominant concepts behind the empirical research testing performance differences between firms is the concept of CA. The majority of research analyzing the generation and sustainability of CA uses firm performance as the dependent variable (see, e.g., Dreyer & Gronhaug, 2004; Flamholtz & Hua, 2003; Spanos et al., 2004). The assumption behind choosing firm performance as the dependent variable for analyzing CA is that CA realized by firms will be observable in performance differences between firms. At the same time, the influence of industry structural characteristics on explaining performance differences is widely recognized in strategic management research (see, e.g., Biggadike, 1979; Buzzell & Gale, 1987; Harrigan, 1983).

Relying on the early definition by Ansoff (1965) CA is defined in this paper as a superior competitive position of a company vis-à-vis other companies in the same industry that leads to superior economic performance. Industry advantage (IA) is defined as a superior industry position vis-à-vis other industries that leads on average to superior economic performance of the firms in the respective industry. Superior economic performance will be determined by statistically significant above-average performance (Day, 1984; Porter, 1985). The average number of subsequent years during which a firm can sustain a superior economic position compared to other firms in the same industry is defined as the CAP. The average number of subsequent years during which an industry can sustain a superior economic position compared to other industries is defined as the IAP.

To test for the significance of performance differences, the non-parametric two-sample Kolmogorov-Smirnov (K-S) test will be applied (see, e.g., Conover, 1999, 428ff.; Siegel & Castellan, 1988, 144ff.). This test will allow us to identify firms that have realized average performance, significantly above-average performance, or significantly below-average performance as compared to other firms in the same industry and identify industries that have realized average performance, significantly above-average performance, or significantly below-average performance as compared to other industries. Assuming that the superior economic performance occurring within an industry (across industries) is the result of achieved CA (IA), the allocation of firms to one of these groups will reveal the existence of CA (IA).

Unlike other research in this area, a necessary specific time period before we can speak of a sustained superior economic performance position will not be presumed (see Porter, 1985, 11; Wiggins & Ruefli, 2002, 87, for examples). The aim is to shift the perspective and determine

how sustainable performance differences are by answering the question of how many consecutive years on average a firm or industry realizes a superior economic position. Existing theory streams offer no uniform prediction here (see part two for a detailed description of the below mentioned theory streams and for past empirical results of studies testing the effects of these theory streams). If the forecasts of neoclassical economics are true, then neither firms nor industries will be able to realize superior economic performance. (Debreu, 1959, 74ff.).

Applying this theoretical perspective, Hypothesis 1 will be true:

H_1: Neither a CAP nor an IAP will be observed.

Both the SCP (Bain, 1959; Mason, 1939) and the price theory (Demsetz, 1968; Stigler, 1968) approach of IO economics see structural characteristics as the driving force behind the generation of firm performance. Although their lines of reasoning differ – both concepts in IO economics essentially focus on structural factors influencing firm performance that lead to inter-industry performance differences. Taken together, the following hypothesis will confirm the traditional view of IO economics:

H_2: An IAP will be observable.

In its competitive strategy framework, SBV clearly identifies the role of firm conduct in influencing firm performance. Strategy represents "an integrated and coordinated set of commitments and actions designed to exploit core competencies and gain a CA" (Hoskisson, Hitt, & Ireland, 2004, 7). By means of the strategy pursued, firms strive to create value for their stakeholders (Hunt, 1972; Porter, 1979, 1985). The RBV treats idiosyncratic resources and capabilities of firms as the major source of CA and thus of intra-industry profit differences (Barney, 1986b; 1991; Rumelt, 1984; Wernerfelt, 1984). Idiosyncrasies in the resource and capability position accumulated by a firm will result in internal strengths and weakness vis-à-vis other firms due to specific competencies (Barney, 1991, 105f.; see also Hopes et al., 2003, for a general assessment of the RBV).

Solely focusing on the SBV and RBV of strategic management, Hypothesis 3 will be true:

H_3: A CAP will be observable.

Very early on, Porter (1981) highlighted the promising effects of combining the ideas of IO economics and strategic management research. Nonetheless, much debate is still going on about the dominance of one of the research streams and few empirical studies attempt to ap-

proach them as coexisting or perhaps even reinforcing concepts, treating them instead as a question of either/or.

Including the ideas of IO economics and the MBV and, at the same time, the SBV and the RBV leads to the following hypothesis:

H_4: Both an IAP and a CAP will be observable.

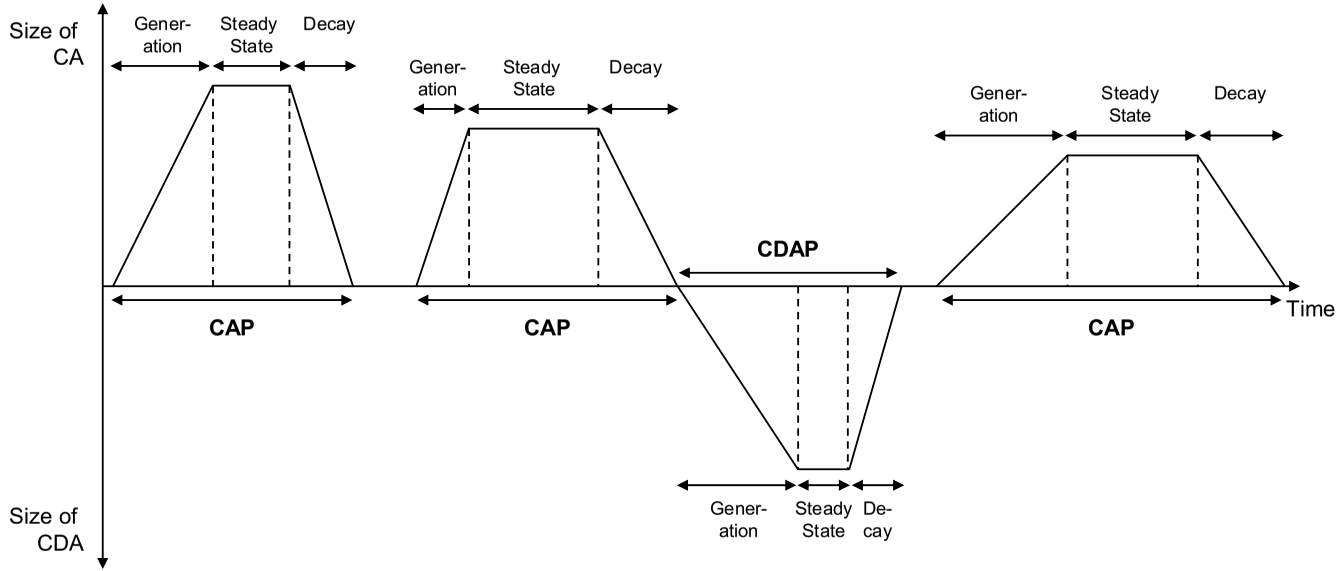
Common to all concepts discussed so far is their traditionally rather static perspective. Dynamic models such as the Austrian school of economics (see Jacobsen, 1992, for an overview), Schumpeter's model of "creative destruction" (Schumpeter, 1934), hypercompetition (D'Aveni, 1994, 1995), and evolutionary economics (Nelson & Winter, 1982), although building on rather different principles, predict cycles of innovation and entrepreneurial activity that both create CA and destroy it. By following these concepts we will be able to observe the cyclic nature of CA and competitive disadvantages (Figure 20).

Although the predicted time period during which supernormal profits can be sustained differs among the dynamic models presented above, all of them state that abnormal profits are achievable but will erode over time. The predictive power of the dynamic models in general will be examined as Hypothesis 5:

H_5: Both an IAP and a CAP exist but will be limited in time.

The concept of dynamic capabilities (Teece et al., 1997) is a recent extension of the dynamic models that attempt to explain the sustainability of CA. As an expansion of the RBV, the dynamic-capability view tries to address the criticism that the RBV has not adequately answered the questions of "how and why certain firms have CA in situations of rapid and unpredictable change," (Eisenhardt & Martin, 2000, 1106) based on their existing resource position. The approach explicitly refers to the Schumpeterian world of "creative destruction," characterized by abnormal profits resulting from innovation and profit-deterring competition (Teece et al., 1997, 509). Capabilities in general can be defined as resources that are organizationally embedded, non-transferable, and firm-specific, with the special purpose of improving the productivity of other resources possessed by the firm (Makadok, 2001, 389; Teece et al., 1997, 516ff.). Thus, capabilities must in most cases be built inside the company and cannot be bought.

Figure 20: Rise and fall of competitive advantages and competitive disadvantages
(based on MacMillan, 1989, 24; C(D)A: competitive (dis-)advantages; C(D)AP: competitive (dis-)advantage period)



To successfully operate in dynamic environments and thus sustain CA, companies must adjust to often rapid changes in market conditions. Dynamic capabilities are referred to as the processes inside a company that ensure the ability to achieve new forms of CA within dynamic markets. In addition to this adaptive response to changes in the environment, they may also create market change (Eisenhardt & Martin, 2000, 1107; Teece et al., 1997, 516). In other words, dynamic capabilities ensure the generation of new and innovative ways to generate CA. Therefore, in rapidly changing environments, as well, certain learning mechanisms may be able to guide the generation of dynamic capabilities. Path dependencies in particular are highlighted in this context. Typically, the possible future developments of a firm – and thus its reactions to environmental changes – depend on the current position and the paths ahead. The current position of a firm is often a function of (1) the past paths, (2) the firm's previous investments, and (3) the repertoire of routines, and thus experiences constrain future behavior (Teece et al., 1997, 522f.). Following the dynamic capability approach and the predicted path dependencies, firms possessing these capabilities will be able to sustain CA over a longer time horizon than firms without such capabilities:

H_6: A CAP will be observable but only few firms will achieve a long CAP.

As the strategic group approach predicts that certain groups of firms will achieve sustained CA – generated by a superior strategic set-up and protected by mobility barriers – the confirmation of Hypothesis 6 will not allow a differentiation of the predictive power of the two concepts. However, the confirmation of Hypothesis 6 will show that at least one of the concepts is able to explain sustainability of CA. Furthermore, Lee, Lee and Rho (2002) demonstrate in a simulation model that strategic groups are unlikely to persist in absence of dynamic capabilities.

3 Method

Performance Measurement

Although studying firm performance is central to strategic management, defining and assessing firm performance has always been a great challenge for strategy researchers (Venkatraman & Ramanujam, 1986). Yet, empirical studies testing influences on firm performance have paid little attention to the central measurement construct (Hitt, Boyd, & Li, 2004). Reviews of the dimensionality of firm performance (Combs et al., 2004; Glick et al., 2005) come to the conclusion that firm performance cannot be treated as a uni-dimensional construct. Both Combs et al. (2004) and Glick et al. (2005) show in their meta-analytic reviews of stud-

ies using firm performance as the dependent variable that not only between performance dimensions (e.g., accounting and capital market measures) but also within performance dimensions (e.g., accounting measures) only relatively low correlations between different performance variables exist. These results clearly emphasize the need for recognizing the multidimensional nature of performance measures when conducting empirical research applying firm performance as one of the variables to be analyzed. This study will incorporate two dimensions in measuring firm performance: (1) accounting-related values and (2) market-related values (Combs et al., 2004, 274ff.).

Accounting returns are generally expected to be more strongly influenced by operational performance than other performance dimensions (Glick et al., 2005, 9). Within the accounting-based measures, return on assets (ROA) in particular reflects the operational performance of a company. I therefore applied ROA as one performance variable in the analysis. The ROA is calculated before interest expense on debt but after taxes. The capital base for the ROA is total assets at the beginning of the year. Total assets are calculated as the sum of total current assets, long-term receivables, investment in unconsolidated subsidiaries, other investments, net property plant and equipment, and other assets. Other financial investments than those in unconsolidated subsidiaries are not included in the total assets. Definitions are adjusted for banks, insurance companies and other financial companies, analogous to the definitions used in Datastream Worldscope. Applying this performance measure will allow a high degree of comparability with existing research studies on superior economic performance (see, e.g., David et al., 2002; Dreyer & Gronhaug, 2004; McGahan & Porter, 2002; Ruefli & Wiggins, 2003).

Whereas accounting returns tend to give a historical view of operational performance, capital market–related measures are future-oriented and driven by anticipation of profits. Thus, the inclusion of a capital market–oriented performance measure will allow us to assess the stock market's perception of the future sustainability of CA. Additionally, Hawawini et al. (2003), for example, emphasize that the application of accounting-based measures tends to result in an underestimation of the presence of intangible assets since accounting principles widely exclude them from the balance sheet. Tobin's q – the ratio of the market value of a firm to the replacement cost of its assets (Tobin, 1969, 19ff.) – was chosen as the capital market–related measure of firm performance. This longer-run equilibrium measure captures both risk and return dimensions (Lin et al., 2006, 682). Market expectations that also reflect less quantifiable dimensions of performance, such as the portion of a firm's intangible assets, are mirrored

in Tobin's q (Jose & Lancaster, 1996, 85f.). Besides incorporating a long-term perspective, the application of Tobin's q is less influenced by tax laws and accounting conventions than pure accounting-based measures (Wernerfelt & Montgomery, 1988, 247). Furthermore, it guarantees a high comparability with other empirical studies incorporating a capital market–related performance measure in their analysis of superior economic performance (see, e.g., McGahan, 1999; Wernerfelt & Montgomery, 1988; Wiggins & Ruefli, 2002). In this analysis, Tobin's q is approximated by the ratio of the market value of total assets divided by the book value of total assets. The market value of total assets is calculated as the sum of the book value of total liabilities and the market capitalization (see Agrawal & Knoeber, 1996; Aivazian, Ge, & Jiaping, 2005, for a similar calculations e.g.). Chung & Pruitt (1994) show that at least 96.6% of the variability of Tobin's q can be explained by such approximations.

Calculation of the CAP and IAP

To identify firms (industries) that significantly outperform other firms (industries) I applied the K-S two-sample test (Kolmogorov, 1941; Smirnov, 1948). This non-parametric test allows determining whether two samples have identical distributions or stem from two statistically different distributions. The two-tailed test is – in contrast to other statistical techniques traditionally used to determine performance differences (e.g., categorization on the basis of the grand mean and/or standard deviation, cluster analysis) – sensitive to any kind of differences in the distribution of the two samples – central tendency, dispersion, skew, etc. (Ruefli & Wiggins, 2000, 686f.; Siegel & Castellan, 1988, 144). Essentially the test is concerned with the agreement between two cumulative distributions. Two samples that are drawn from one population distribution can be expected to have cumulative distributions that are relatively close to each other and show only random deviations from the common distribution. Thus, statistically significant deviations of the two-sample cumulative distributions will result in a rejection of the test hypothesis that there is one underlying distribution (Conover, 1999, 458). In other words, Hypothesis 1 of this paper will initially be assumed to be true – no statistically significant performance differences exist between firms or industries.

In addition to the above-mentioned advantages, the K-S test has a higher power efficiency than the t-test. Furthermore, its power is higher in all cases than for the alternative chi-square test. The K-S test also has high predictive power for small samples (Siegel & Castellan, 1988, 55 and 151). The Cramér-von Mises test – an alternative two-sample test – is more difficult to compute and offers no significant increase in power (Conover, 1999, 456). Therefore, the K-S test is applied to determine significant performance differences between firms/industries (see

Ruefli & Wiggins, 1994, 2000; Ruefli & Wiggins, 2003; Wiggins & Ruefli, 1995, 2002, for other applications of the K-S test to determine performance differences).

The K-S test consists of four steps (see, e.g., Conover, 1999, 51ff. and 144ff.; Hays, 1988, 816ff.). First, the cumulative frequency distributions are determined by using the same interval for both distributions. Second, for each interval, one step function is subtracted from the other. Third, the K-S test statistic is calculated for the largest observed deviation:

$$D_{m,n} = \max\left|S_m(X) - S_n(X)\right|,$$

with $S_m(X)$ as the observed cumulative distribution for one sample (size m) and $S_n(X)$ as the observed cumulative distribution for the second sample (size n). $S_m(X)$ equals K divided by m, with K as the number of data equal to or less than X. $S_n(X)$ equals K divided by n. Fourth, the calculated test statistic is compared with a critical value generated from a sampling function to determine whether significant differences (significance level 5%) exist between the two distributions, allowing us to reject the hypothesis that both distributions originate from one underlying distribution.

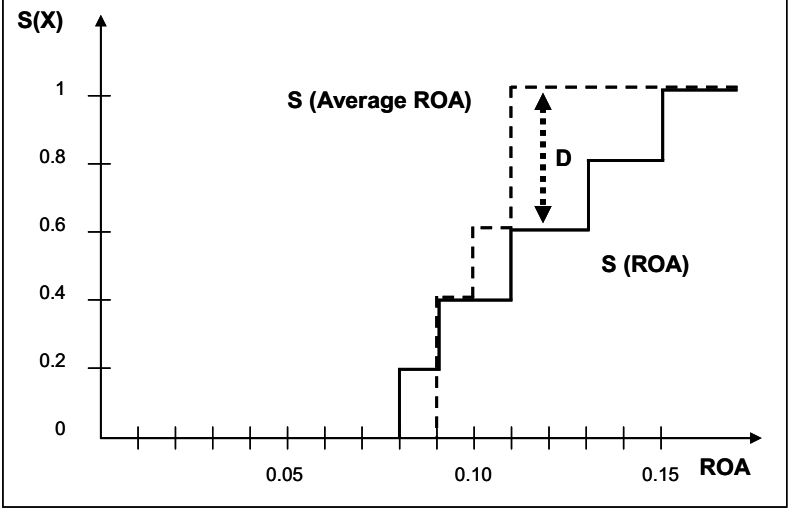
For calculating the CAP, each firm's performance distribution over a period of five years (Cool & Schendel, 1988; Feigenbaum & Thomas, 1990; Ruefli & Wiggins, 2003; Wiggins & Ruefli, 2002) is tested against the average performance distribution in the industry during these five years using the K-S two-sample test (see Figure 21 for an illustration). A period of five years was chosen as the initial underlying time period to identify generated CA because of three reasons. First, five years approximates the period commonly associated with business cycles (McGahan & Porter, 1999, 22; Ruefli & Wiggins, 2003, 867; Rumelt, 1991, 167). Second, I wanted to avoid the problem of year-to-year differences and eliminate the bias due to a single outstanding year (Rumelt, 1991, 168). Third, my own tests using the technique in association with different periods (e.g., three and seven years) have shown that the length of the underlying period has nearly no effect on the calculated average CAP. I included a firm in a five-year window when three out of five years of data were available.

Firms for which the performance distribution is significantly different from the average performance distribution in the industry are marked as out- or underperformers, depending on the direction of the performance difference. The same procedure is then carried out for the next five-year window, et cetera. After conducting the test for all industries in the sample, every firm is classified as an out-, under- or average performer in each of the rolling five-year win-

dows of the time frame analyzed. Periods during which a firm realized a significantly above-average firm performance are then identified, and the number of consequential years of membership in the superior economic performance group is summed up for each of these periods. The CAP is then calculated as the arithmetic mean of the already summed up consecutive years of membership in the above-average performance group.

Figure 21: Illustration of the Kolmogorov-Smirnov (K-S) test
(ROA: return on assets)

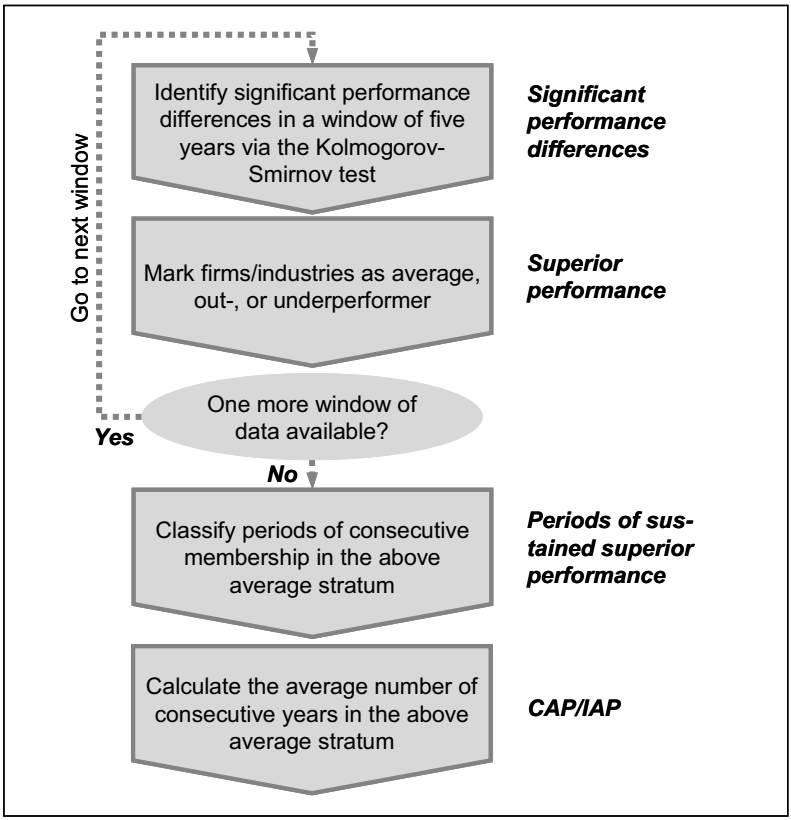
	2001	2002	2003	2004	2005
ROA firm i	0.13	0.15	0.09	0.08	0.11
Average ROA (industry)	0.1	0.09	0.11	0.11	0.09



To calculate the IAP, the procedures described above for calculating the CAP are applied to the average performance realized in an industry vs. the average performance realized in all other industries in the sample. Thus, the IAP will allow us to make an assessment of how long IA can be sustained on average in an industry as compared to other industries and to identify industries that are recognized by periods of superior economic performance vis-à-vis other industries. Figure 22 summarizes the procedure applied for calculating the CAP and IAP.

As with the calculation of the CAP and IAP, the procedures described above allow us to calculate a competitive disadvantage period (CDAP) and an industry disadvantage period (IDAP), but in contrast to the CAP and IAP, we calculate the average number of subsequent years with below-average performance for the CDAP and IDAP.

Figure 22: Procedure applied for calculating the competitive advantage period (CAP) and the industry advantage period (IAP)



4 Sample

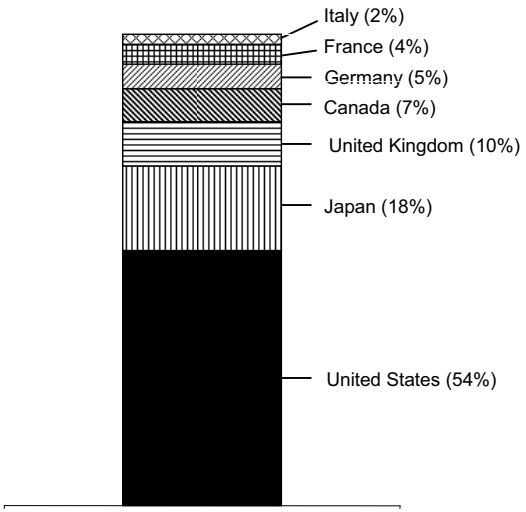
To perform these analyses I collected accounting and capital market data for the years 1980 to 2005 from Datastream Worldscope for firms located in the G7 countries. I chose the time period 1980 to 2005 as this was the maximum number of years available when I collected the data. The data collection process resulted in an initial sample of 19,085 firms. I then grouped the firms, based on their four-digit SIC codes, into industries. To be included in the analysis an industry must consist of at least 20 firms. A CAP was only calculated for firms with at

least five years of available data. Furthermore, four-digit SIC codes comprising only firms not classified elsewhere were excluded. These criteria resulted in a final sample of 99 industries comprising 6,385 firms (see Figure 25).

Figure 23 gives an overview of the size and the country of origin of the included firms. Although both the average number of employees and the average sales volume indicate that the included firms are, on average, relatively large, the median, the 25% percentile, and the 75% percentile demonstrate that the size of the firms is quite heterogeneous and that the high average values are strongly influenced by a few very large firms. A look at country of origin reveals a relatively unequal distribution: more than 70% of the firms are located in the United States and Japan. However, this unequal distribution merely reflects the differences in economic importance of these countries, i.e., is based on the gross national product (see OECD, 2007, 25).

Figure 23: Size and country of origin of firms analyzed

	Average	Median	25% percentile	75% percentile
Number of employees	8,586	471	116	2,455
Sales (in mil. U.S.$)	1,880,275	115,218	23,093	616,931



5 Results and Discussion

For the analyzed sample of 99 industries, the average IAP based on ROA is 8.85 years and, based on Tobin's q, 9.19 years (Figure 24). At the same time, the average CAP based on ROA is 7.56 years and 7.38 years, based on Tobin's q (Figure 25). Striking is that for both the IAP and the CAP, the calculated averages do not substantially diverge across the two applied performance dimensions.

These results allow us to reject Hypothesis 1. The rejection of Hypothesis 1, relying on the argumentation of neoclassical economics is not surprising. Nevertheless, the confirmation of at least a certain level of sustainability of performance differences across a wide range of industries in an international sample is a noteworthy finding. This conclusion is underlined by the facts that 79% (35%) of the industries realize an IAP based on ROA (Tobin's q) and that, on average, 48% (21%) of the firms in an industry are able to achieve a CAP based on ROA (Tobin's q).

Figure 24: Industry advantage period (IAP) and industry disadvantage period (IDAP)
(N: number of analyzed industries; ROA: return on assets; q: Tobin's q; I(D)AP ROA: industry (dis-)advantage period with ROA as performance variable; I(D)AP q: industry (dis-)advantage period with Tobin's q as performance variable; % of industries: percentage of industries realizing an industry (dis-)advantage period)

N		99
IAP ROA	Average	8.85
	Variance	15.17
	% of industries	79%
	Maximum	24.00
IDAP ROA	Average	8.25
	Variance	14.69
	% of industries	61%
	Maximum	24.00
IAP q	Average	9.19
	Variance	22.06
	% of industries	35%
	Maximum	26.00
IDAP q	Average	13.41
	Variance	56.92
	% of industries	71%
	Maximum	26.00

Figure 25: Competitive advantage period (CAP) and competitive disadvantage period (CDAP)
(SIC: Standard Industry Classification; N: number of analyzed firms; ROA: return on assets; q: Tobin's q; C(D)AP ROA: competitive (dis-)advantage period with ROA as performance variable; C(D)AP q: competitive (dis-)advantage period with Tobin's q as performance variable; Aver.: average competitive (dis-)advantage period; Var.: variance of competitive (dis-)advantage period; %: percentage of firms realizing a competitive (dis-)advantage period; Max.: maximum length of competitive (dis-)advantage period)

SIC	Description	N	ROA	q	CAP ROA				CDAP ROA				CAP q				CDAP q			
			(in %)		Aver.	Var.	%	Max.	Aver.	Var.	%	Max.	Aver.	Var.	%	Max.	Aver.	Var.	%	Max.
1041	Gold Ores	122	-22.48	2.33	6.55	0.65	55%	9.00	6.00	2.40	4%	9.00	5.50	0.25	8%	6.00	7.69	7.23	72%	23.00
1311	Crude Petroleum & Natural Gas	185	-9.10	1.75	7.65	1.75	94%	11.00	5.00	0.00	2%	5.00	5.97	1.51	9%	26.00	9.51	6.95	92%	26.00
1381	Drilling Oil & Gas Wells	33	4.30	1.81	6.62	1.55	64%	9.00	0.00	0.00	0%	0.00	5.50	1.25	18%	12.00	6.93	3.35	42%	12.00
1382	Oil & Gas Field Exploration Services	59	-12.61	1.96	7.99	2.30	69%	12.00	6.40	5.18	8%	10.00	6.25	1.69	7%	8.00	7.44	6.27	59%	15.00
1521	General Contractors-Single-Family Houses	30	5.89	1.17	8.20	6.95	53%	16.00	8.54	6.98	40%	13.00	7.64	6.05	23%	12.00	8.60	10.84	67%	15.00
1522	General Contractors-Residential Buildings, Other Than Single-Family	45	4.15	1.18	9.07	8.98	47%	16.00	9.60	20.90	47%	22.00	7.22	6.84	20%	14.00	9.98	10.32	60%	18.00
1531	Operative Builders	20	5.14	1.03	6.47	2.57	55%	11.00	7.50	2.19	73%	10.00	10.36	28.41	55%	21.00	11.21	21.89	60%	23.00
1542	General Contractors-Nonresidential Buildings, Other than Industrial Build. and Wareh.	28	2.05	1.20	8.40	5.18	29%	12.00	9.67	10.89	32%	17.00	5.29	0.20	25%	6.00	7.45	2.73	75%	12.00
1611	Highway and Street Construction, Except Elevated Highways	28	3.22	1.19	9.34	14.55	54%	21.00	7.14	3.08	64%	11.00	8.75	5.96	36%	13.00	7.87	5.46	86%	13.00
1623	Water, Sewer, Pipeline, Comm & Power Line Construction	28	3.73	1.14	5.40	0.64	18%	7.00	6.40	2.24	18%	9.00	6.57	2.82	25%	9.00	7.02	3.05	68%	11.00
1731	Electrical Work	26	3.82	1.24	6.08	1.56	38%	9.00	7.30	1.21	38%	8.00	7.00	2.86	27%	10.00	8.36	6.70	73%	14.00
2082	Malt Beverages	28	4.45	1.25	11.45	20.07	39%	20.00	7.82	9.56	39%	20.00	11.59	20.60	61%	20.00	10.12	21.52	75%	20.00
2086	Bottled & Canned Soft Drinks & Carbonated Waters	30	4.75	1.37	7.81	7.48	87%	20.00	8.86	8.84	47%	15.00	9.20	23.76	17%	18.00	10.76	19.06	83%	22.00
2621	Paper Mills	25	5.07	1.06	8.17	7.47	24%	14.00	6.67	2.89	24%	9.00	7.67	7.28	32%	13.00	8.93	9.92	72%	16.00
2711	Newspapers: Publishing or Publishing & Printing	31	7.33	1.24	7.79	9.66	48%	18.00	7.40	3.24	32%	10.00	7.18	2.65	35%	10.00	9.83	23.48	65%	25.00
2721	Periodicals: Publishing or Publishing & Printing	27	7.14	1.93	5.35	0.30	37%	6.50	7.67	9.89	22%	14.00	9.06	8.58	33%	14.00	9.28	26.41	59%	23.00
2821	Plastic Materials, Synth Resins & Nonvulcan Elastomers	44	3.90	1.35	7.96	15.02	27%	19.00	6.14	1.48	48%	11.00	7.27	7.11	25%	13.00	8.95	12.20	70%	18.00
2834	Pharmaceutical Preparations	236	-8.81	4.88	9.51	16.39	89%	26.00	6.06	2.18	17%	12.00	8.23	11.65	8%	17.00	9.64	14.68	89%	26.00
2835	In Vitro & In Vivo Diagnostic Substances	35	-10.10	3.94	9.71	19.06	40%	17.00	6.42	3.74	34%	11.00	7.83	9.06	9%	12.00	10.09	18.69	46%	21.00
2836	Biological Products (No Disgnostic Substances)	52	-22.29	4.42	9.85	24.65	65%	20.00	7.22	3.73	17%	11.00	5.80	0.56	10%	7.00	9.64	28.87	54%	21.00
2844	Perfumes, Cosmetics & Other Toilet Preparations	48	5.50	1.90	7.02	6.06	46%	13.00	7.22	2.62	19%	10.00	8.18	7.77	29%	14.00	9.59	19.17	77%	21.00
2851	Paints, Varnishes, Lacquers, Enamels & Allied Prods	26	5.36	1.37	8.50	22.94	35%	20.00	8.99	16.89	46%	19.00	8.80	13.11	38%	17.00	7.58	6.58	77%	16.00
2911	Petroleum Refining	46	5.87	2.39	6.56	2.69	20%	11.00	6.74	3.80	20%	12.00	8.40	4.32	35%	13.00	8.80	8.90	72%	16.00
3312	Steel Works, Blast Furnaces & Rolling Mills (Coke Ovens)	49	4.32	1.18	6.92	9.25	39%	19.00	6.59	3.04	33%	11.00	6.43	1.58	20%	9.67	8.65	14.78	49%	18.00
3357	Drawing & Insulating of Nonferrous Wire	27	2.78	1.76	5.58	1.91	44%	10.00	6.75	0.69	15%	8.00	5.75	0.69	15%	7.00	8.23	20.20	56%	18.00
3541	Machine Tools, Metal Cutting Types	34	3.19	1.33	6.61	7.65	26%	14.00	5.63	0.42	12%	6.50	5.40	0.24	15%	6.00	7.50	10.66	47%	17.00
3571	Electronic Computers	25	2.01	2.64	5.79	0.81	48%	8.00	7.75	3.69	16%	10.00	5.00	0.00	24%	5.00	8.46	16.21	52%	21.00
3572	Computer Storage Devices	33	-1.07	2.81	6.78	4.62	27%	11.00	7.00	5.50	12%	11.00	8.20	7.76	15%	13.00	10.19	15.39	67%	21.00
3651	Household Audio & Video Equipment	39	-11.81	2.82	7.45	2.52	82%	13.00	7.00	3.00	15%	9.00	6.50	1.36	18%	8.00	9.14	6.83	82%	15.00
3661	Telephone & Telegraph Apparatus	68	-4.54	2.03	7.37	3.66	54%	13.00	6.93	3.07	21%	10.00	7.18	3.63	54%	13.00	6.64	2.66	21%	10.00
3663	Radio & Tv Broadcasting & Communications Equipment	75	-4.21	2.50	8.86	7.32	61%	18.00	6.78	2.98	24%	11.00	5.85	1.05	17%	8.00	8.63	18.11	64%	26.00
3672	Printed Circuit Boards	27	3.07	1.63	7.09	6.04	41%	12.00	5.83	0.14	22%	6.00	6.60	3.44	19%	10.00	7.94	8.93	59%	15.00
3674	Semiconductors & Related Devices	133	1.88	2.43	6.61	6.89	50%	19.00	6.77	3.42	18%	11.00	7.81	18.06	18%	24.00	9.52	13.65	60%	25.00
3711	Motor Vehicles & Passenger Car Bodies	54	2.40	1.24	7.10	11.53	72%	25.00	8.00	6.07	39%	13.00	6.61	4.50	22%	13.00	9.84	18.25	70%	26.00

Figure 25 continued

SIC	Description	N	ROA	q	CAP ROA				CDAP ROA				CAP q				CDAP q			
			(in %)		Aver.	Var.	%	Max.	Aver.	Var.	%	Max.	Aver.	Var.	%	Max.	Aver.	Var.	%	Max.
3714	Motor Vehicle Parts & Accessories	130	1.18	1.48	7.61	10.33	62%	25.00	7.87	8.04	32%	17.00	7.32	6.66	22%	15.00	10.97	10.00	82%	20.00
3812	Search, Detection, Navagation, Guidance, Aeronautical Sys	40	3.95	2.24	8.10	9.87	38%	15.00	5.67	0.56	15%	7.00	6.50	1.58	15%	9.00	7.96	3.36	70%	13.00
3823	Industrial Instruments For Measurement, Display, and Control	48	4.96	3.11	7.86	6.13	38%	14.00	7.19	8.71	29%	14.00	6.25	2.86	21%	11.00	8.89	8.43	58%	14.00
3825	Instruments For Meas & Testing of Electricity & Elec Signals	35	6.52	2.00	5.95	1.32	29%	8.00	5.13	0.05	23%	5.50	6.67	0.22	9%	7.00	8.88	10.28	60%	17.00
3826	Laboratory Analytical Instruments	34	-3.47	2.95	9.24	10.52	68%	20.00	7.36	3.34	21%	10.00	7.00	2.33	18%	9.00	8.89	9.63	53%	16.00
3841	Surgical & Medical Instruments & Apparatus	100	-41.78	3.14	11.07	25.14	70%	26.00	6.25	2.31	16%	10.00	6.90	4.89	20%	11.00	9.23	21.52	70%	26.00
3842	Orthopedic, Prosthetic & Surgical Appliances & Supplies	42	7.34	2.78	9.00	13.25	57%	20.00	7.08	3.76	31%	11.00	7.08	7.26	31%	15.00	10.58	35.45	57%	26.00
3845	Electromedical & Electrotherapeutic Apparatus	74	-11.76	2.71	8.87	6.59	62%	14.00	6.13	0.78	20%	7.00	6.67	2.39	16%	10.00	8.65	10.17	59%	19.00
3944	Games, Toys & Children's Vehicles (No Dolls & Bicycles)	22	0.41	1.85	6.65	3.37	64%	12.00	6.40	3.44	23%	10.00	7.67	5.56	14%	11.00	8.85	22.59	59%	20.00
4213	Trucking (No Local)	39	6.91	1.48	7.86	5.52	36%	13.00	6.84	3.68	41%	13.00	8.63	18.48	21%	19.00	8.28	11.01	67%	16.00
4412	Deep Sea Foreign Transportation of Freight	26	4.88	1.28	6.67	1.56	12%	8.00	5.75	0.94	31%	8.00	6.38	1.73	31%	9.00	9.69	15.29	50%	18.00
4512	Air Transportation, Scheduled	38	1.51	1.44	6.80	1.62	42%	24.00	6.00	1.00	26%	8.00	7.68	5.65	29%	13.00	9.39	19.74	76%	24.00
4731	Arrangement of Transportation of Freight & Cargo	20	4.59	1.65	6.95	2.44	65%	10.00	6.50	3.17	15%	9.00	8.17	4.39	15%	11.00	9.00	7.33	60%	14.00
4812	Radiotelephone Communications	40	1.84	1.94	7.38	5.58	33%	13.00	6.00	1.11	23%	8.00	6.50	7.00	20%	13.00	6.62	3.79	63%	13.00
4813	Telephone Communications (No Radiotelephone)	115	-10.33	1.93	8.14	5.37	69%	16.00	6.15	1.51	11%	9.00	6.47	4.37	15%	13.00	7.84	6.38	61%	14.00
4833	Television Broadcasting Stations	42	7.37	2.55	7.17	5.44	21%	12.00	9.33	15.90	26%	16.00	9.00	0.40	12%	10.00	9.83	18.92	79%	20.00
4841	Cable & Other Pay Television Services	27	-5.56	1.87	6.75	2.56	70%	10.00	6.00	0.40	19%	7.00	6.75	6.19	15%	11.00	8.57	24.56	56%	23.00
4911	Electric Services	124	3.85	1.09	7.92	9.90	80%	24.00	8.47	15.83	28%	19.00	7.52	4.75	29%	14.00	9.42	20.06	44%	26.00
4923	Natural Gas Transmisison & Distribution	20	4.68	1.19	6.55	0.99	65%	9.00	8.00	1.50	40%	10.00	5.50	0.25	10%	6.00	7.56	9.14	45%	14.00
4924	Natural Gas Distribution	32	5.88	1.24	9.81	30.48	41%	22.00	9.78	21.71	38%	17.00	8.85	10.32	28%	15.00	8.94	15.65	78%	21.00
4931	Electric & Other Services Combined	24	5.87	1.18	6.11	1.49	38%	8.50	6.64	2.77	29%	10.00	7.11	8.32	38%	14.00	10.07	23.60	58%	22.00
4941	Water Supply	28	5.66	1.34	7.00	2.54	46%	10.00	10.18	19.79	39%	18.00	8.00	9.50	29%	13.00	9.95	8.50	71%	18.00
4953	Refuse Systems	21	-0.54	1.98	8.73	4.93	52%	12.00	6.00	1.00	10%	7.00	8.20	2.56	24%	10.00	7.42	5.04	67%	13.00
5045	Wholesale-Computers & Peripheral Equipment & Software	70	3.32	1.81	6.75	1.76	51%	11.00	6.72	2.53	26%	10.00	6.36	3.69	16%	12.00	9.69	18.26	63%	26.00
5047	Wholesale-Medical, Dental & Hospital Equipment & Supplies	37	-3.44	1.90	7.43	2.72	57%	12.00	8.25	8.19	11%	12.00	5.93	1.03	19%	8.00	8.12	7.23	68%	14.00
5063	Wholesale-Electrical Apparatus & Equipment, Wiring Supplies	26	6.00	1.43	9.87	16.03	38%	20.00	5.76	0.91	27%	7.33	13.57	54.53	27%	26.00	7.86	3.62	54%	12.00
5084	Wholesale-Industrial Machinery & Equipment	54	3.48	1.35	7.35	5.34	43%	13.00	5.88	1.43	24%	8.00	6.44	2.64	17%	10.00	9.53	10.82	70%	16.00
5122	Wholesale-Drugs, Proprietaries & Druggists' Sundries	40	3.05	1.83	7.86	5.84	35%	12.00	6.93	3.60	18%	10.00	6.67	0.89	15%	8.00	10.17	16.46	63%	24.00
5172	Wholesale-Petroleum & Petroleum Products (No Bulk Stations)	20	3.75	1.32	7.80	2.16	25%	10.00	5.47	0.45	45%	7.00	6.20	0.96	25%	8.00	9.56	15.75	55%	17.00
5311	Retail-Department Stores	62	4.48	1.48	9.39	19.50	35%	20.00	8.81	16.20	53%	20.00	7.38	15.28	27%	19.00	8.98	21.13	85%	26.00
5411	Retail-Grocery Stores	92	5.83	1.40	10.59	27.11	45%	26.00	10.38	27.42	42%	22.00	8.59	7.34	36%	17.00	10.78	18.91	66%	26.00
5621	Retail-Women's Clothing Stores	36	8.56	1.68	6.67	2.19	42%	9.00	7.77	6.06	31%	13.00	6.20	1.76	28%	8.00	8.71	8.44	78%	15.00
5651	Retail-Family Clothing Stores	23	10.63	1.95	6.98	7.17	43%	14.00	7.13	8.05	52%	16.00	6.13	0.55	17%	7.00	7.58	6.57	57%	13.00
5812	Retail-Eating Places	142	6.44	1.92	8.36	9.75	58%	21.00	7.47	6.79	24%	15.00	7.45	5.07	20%	16.00	8.90	10.80	68%	20.00

Figure 25 continued

SIC	Description	N	ROA	q	CAP ROA				CDAP ROA				CAP q				CDAP q			
			(in %)		Aver.	Var.	%	Max.	Aver.	Var.	%	Max.	Aver.	Var.	%	Max.	Aver.	Var.	%	Max.
5912	Retail-Drug Stores and Proprietary Stores	21	4.52	1.85	7.22	3.41	71%	13.00	6.88	0.80	19%	8.00	7.30	6.56	24%	12.00	7.77	4.87	62%	12.00
6021	National Commercial Banks	323	0.88	1.04	8.23	7.30	51%	19.00	14.67	46.01	43%	26.00	7.05	7.27	34%	20.00	9.98	16.36	64%	21.00
6022	State Commercial Banks	311	1.21	1.04	8.71	13.32	52%	26.00	6.72	4.06	34%	16.00	6.84	8.38	16%	22.00	7.01	9.04	29%	18.00
6035	Savings Institution, Federally Chartered	171	1.42	1.02	7.81	8.15	44%	19.00	7.66	4.89	42%	14.00	6.56	6.23	10%	14.00	6.12	2.22	22%	10.00
6153	Short-Term Business Credit Institutions	23	2.20	1.22	6.39	2.32	39%	10.00	9.75	7.69	17%	12.00	8.10	4.84	22%	11.00	9.21	16.03	61%	18.00
6162	Mortgage Bankers & Loan Correspondents	26	-3.07	1.17	7.31	4.56	31%	11.00	6.46	4.48	46%	12.00	6.33	1.56	12%	8.00	8.32	14.70	54%	16.00
6211	Security Brokers, Dealers & Flotation Companies	92	2.25	1.42	5.95	2.97	23%	11.00	5.78	3.20	32%	13.00	7.57	6.10	15%	13.00	9.19	16.32	66%	26.00
6282	Investment Advice	49	6.50	2.53	6.86	9.38	59%	18.00	7.53	9.29	37%	14.00	8.00	4.18	22%	12.00	10.88	35.22	65%	26.00
6311	Life Insurance	79	1.92	1.08	6.71	6.33	52%	14.00	8.42	15.22	51%	19.00	9.90	33.33	15%	26.00	9.79	20.61	59%	24.00
6331	Fire, Marine & Casualty Insurance	105	2.82	1.15	7.37	6.69	36%	15.00	10.09	35.14	37%	21.00	6.98	5.07	25%	13.00	8.63	16.54	62%	25.00
6411	Insurance Agents, Brokers & Service	20	6.87	1.84	9.79	2.70	35%	13.00	7.42	3.70	30%	10.00	8.70	11.76	25%	14.00	12.00	37.41	55%	26.00
6512	Operators of Nonresidential Buildings	82	4.80	1.62	6.90	4.30	26%	12.00	7.19	6.24	43%	18.00	8.00	15.05	23%	21.00	13.04	26.20	76%	24.00
6513	Operators of Apartment Buildings	27	5.85	1.85	8.29	7.70	26%	13.00	6.50	0.77	41%	8.00	9.83	12.47	22%	14.00	10.93	17.92	85%	22.00
6531	Real Estate Agents & Managers (For Others)	93	4.02	1.42	7.76	14.55	31%	19.00	6.33	2.95	35%	14.00	7.97	10.59	20%	18.00	10.03	20.76	73%	26.00
6552	Land Subdividers & Developers (No Cemeteries)	56	6.38	1.62	8.07	5.10	39%	13.00	5.96	1.20	25%	9.00	8.94	42.65	14%	26.00	10.71	23.78	73%	22.00
6726	Unit Invest. Trusts, Face-Amount Certificate Offices, and Closed-End Manag. Invest. Offices	37	5.54	1.27	6.57	1.67	19%	9.00	6.33	1.72	32%	8.00	9.00	9.25	22%	15.00	10.79	16.95	57%	20.00
6794	Patent Owners & Lessors	24	-16.10	3.67	7.13	3.36	33%	10.00	7.00	3.20	21%	9.00	5.50	0.20	21%	6.00	7.02	4.39	54%	11.00
6798	Real Estate Investment Trusts	138	15.50	2.07	9.53	15.40	75%	24.00	8.50	12.25	1%	12.00	10.43	45.67	5%	26.00	10.96	19.30	94%	24.00
7011	Hotels & Motels	72	5.08	1.37	6.29	4.02	46%	16.00	7.29	7.61	26%	16.00	9.28	17.00	24%	17.00	9.15	14.18	61%	21.00
7311	Services-Advertising Agencies	26	1.83	1.94	6.20	7.63	58%	16.00	5.80	0.96	19%	7.00	6.63	2.92	15%	9.50	6.94	4.43	62%	11.50
7363	Services-Help Supply Services	22	5.80	2.40	5.75	0.19	55%	6.00	7.75	3.69	18%	10.00	6.50	2.25	18%	9.00	8.69	9.29	59%	14.00
7371	Services-Computer Programming Services	145	-23.30	2.88	7.61	6.10	52%	17.00	5.88	1.61	11%	10.00	6.28	3.13	14%	12.00	7.64	14.12	55%	23.00
7372	Services-Prepackaged Software	352	-5.56	3.17	8.15	6.39	53%	22.00	6.13	2.66	14%	12.00	6.38	4.60	14%	16.00	7.13	6.55	56%	21.00
7373	Services-Computer Integrated Systems Design	175	7.65	2.38	5.84	0.73	51%	11.00	6.71	3.64	23%	13.00	5.78	2.14	14%	11.00	7.92	12.31	57%	24.00
7374	Services-Computer Processing & Data Preparation	47	4.27	2.93	6.87	3.65	64%	14.00	6.43	2.35	30%	9.00	9.00	23.14	15%	20.00	7.71	8.09	68%	17.00
7812	Services-Motion Picture & Video Tape Production	41	-6.70	1.79	6.93	3.03	66%	11.00	5.67	2.22	15%	9.00	7.50	8.92	15%	13.00	9.02	23.05	56%	24.00
8071	Services-Medical Laboratories	22	-1.20	3.52	8.04	5.35	55%	13.00	5.78	0.77	14%	7.00	7.63	13.92	18%	14.00	7.93	7.80	68%	13.00
8711	Services-Engineering Services	79	2.78	1.51	6.88	7.41	51%	20.00	7.50	5.33	27%	12.00	6.37	1.88	32%	10.00	10.12	15.16	73%	23.00
8731	Services-Commercial Physical & Biological Research	128	-39.93	3.84	7.21	5.63	55%	14.00	5.54	0.81	9%	8.00	6.73	5.40	12%	13.00	6.50	3.00	50%	11.00
8741	Services-Management Services	20	0.96	2.02	5.32	0.47	55%	7.00	7.00	1.00	10%	8.00	5.60	0.24	25%	6.00	8.42	9.07	65%	15.00
8742	Services-Management Consulting Services	60	5.51	2.42	6.05	0.64	38%	8.00	6.00	1.00	13%	8.00	9.33	44.56	10%	24.00	9.05	20.43	55%	21.00
	Total/Averages	**6,385**	**0.62**	**1.91**	**7.56**	**7.05**	**48%**	**14.72**	**7.07**	**5.61**	**27%**	**11.49**	**7.38**	**7.97**	**21%**	**13.08**	**8.93**	**13.78**	**63%**	**19.04**

In contrast to the calculated averages for the IAP and CAP, the percentage of firms/industries achieving a CAP/IAP diverges markedly across the two performance dimensions. Both the average percentage of industries achieving an IAP and the average percentage of firms achieving a CAP is much lower when applying Tobin's q as the performance variable. In other words, it is much easier to achieve CA and IA that result in significantly higher accounting returns on a sustainable basis than to achieve CA and IA that allow the generation of a relative market value, which is significantly higher on a sustainable basis. This suggests that the capital market seems to be relatively reluctant in the valuation of CA and IA. Inasmuch as a much higher percentage of firms/industries is able to realize sustainable superior economic performance based on accounting returns, this finding might be an outcome of information asymmetries (Akerlof, 1970). The capital market might not be fully capable of incorporating CA and IA in the market valuation of firms. This indicates a potential for managers to increase the stock market performance of their firms by providing information that allows participants in the stock market a better assessment of a firm's CA and IA-related to the industry the firm is active in. Furthermore, the findings are in line with the "Uncertain Information Hypotheses" (see, e.g., Ajayi & Mehdian, 1994, 533f., for an overview). The hypothesis states that investors overreact to bad news but underreact to good news. Moreover, Brown, Van Harlow, & Tinic (1988) find in their analysis an increased post-event volatility of stock prices which may be triggered by disagreement among the investors about the future development of the share price. If this is the case, post-event volatility might prevent firms from realizing a CAP in the capital markets or shorten the CAP. Finally, short-term overreaction followed by subsequent corrections offers also an explanation for my findings (see, e.g., Howe, 1986).

Industries that realize an IAP based on ROA (Tobin's q) of 10 or more years are presented in Figure 26 (Figure 27). Based on ROA 18 of the 99 analyzed industries are able to sustain IA for 10 or more years. On a three-digit SIC level only two industry categories occur more than once in Figure 26: General Building Contractors-residential (SIC 152) and Computer Programming, Data Processing & other Computer Related Services (SIC 737). Thus, based on accounting-related performance measures no general type of industry seems to especially favor the sustainability of IA.

When applying Tobin's q as performance measure only eleven industries reach a sustainability of IA of 10 or more years which supports the above line argumentation concerning irrationalities and information asymmetries in the capital markets. Although only eleven industries reach based on Tobin's q an IAP of 10 ore more years, three industry categories (three-

digit SIC) are represented more than one time in Figure 27: Drugs (SIC 283), Surgical, Medical, & Dental Instruments & Supplies (SIC 384), and Computer Programming, Data Processing & other Computer Related Services (SIC 737). The latter one is the only three-digit SIC category that occurs not only in Figure 26 but also Figure 27 more than once. Contrary to accounting-related performance, capital markets seem to favor certain types of industries with regard to the sustainability of IA.

Figure 28 gives an overview of the firms that realize a CAP based on ROA of 20 or more years. Altogether 38 firms (0.6% of the analyzed firms) are able to sustain competitive advantages for more than 19 years. Among those firms are both internationally well known firms (e.g., Coca-Cola or Microsoft) and relatively unknown firms (e.g., Mylan Laboratories or Otter Tail). Looking at the industry these firms are active in (see Figure 29) reveals that altogether nine of the firms that realize a CAP based on ROA of 20 or more years are active in the Drugs industry (SIC 283) and additional five firms in the Grocery Stores industry (SIC 541). Both industry categories seem to offer conditions that allow a relatively high portion of their member firms to realize a very long sustainability of CA.

Figure 26: Industries with an industry advantage period (IAP) based on ROA of 10 or more years
(IAP ROA: industry advantage period with ROA as performance variable; SIC: Standard Industry Classification)

IAP ROA	SIC	Description
24.00	6798	Real Estate Investment Trusts
24.00	5651	Retail-Family Clothing Stores
19.00	2086	Bottled & Canned Soft Drinks & Carbonated Waters
16.00	2721	Periodicals: Publishing or Publishing & Printing
16.00	4924	Natural Gas Distribution
16.00	4941	Water Supply
16.00	7374	Services-Computer Processing & Data Preparation
15.00	5411	Retail-Grocery Stores
14.00	4931	Electric & Other Services Combined
13.00	1521	General Contractors-Single-Family Houses
13.00	1531	Operative Builders
12.00	1522	General Contractors-Residential Buildings
12.00	4833	Television Broadcasting Stations
12.00	5311	Retail-Department Stores
11.50	3842	Orthopedic, Prosthetic & Surgical Appliances & Supplies
11.00	7372	Services-Prepackaged Software
10.00	7363	Services-Help Supply Services
10.00	5621	Retail-Women's Clothing Stores

Figure 27: Industries with an industry advantage period (IAP) based on Tobin's q of 10 or more years
(IAP q: industry advantage period with Tobin's q as performance variable; SIC: Standard Industry Classification)

IAP q	SIC	Description
26.00	2834	Pharmaceutical Preparations
18.00	7374	Services-Computer Processing & Data Preparation
17.00	3572	Computer Storage Devices
16.00	3842	Orthopedic, Prosthetic & Surgical Appliances & Supplies
15.00	8731	Services-Commercial Physical & Biological Research
15.00	8742	Services-Management Consulting Services
12.50	2835	In Vitro & In Vivo Diagnostic Substances
11.50	7372	Services-Prepackaged Software
11.50	2836	Biological Products (No Disgnostic Substances)
11.00	3841	Surgical & Medical Instruments & Apparatus
10.00	7363	Services-Help Supply Services

Figure 28: Firms with a competitive advantage period (CAP) based on ROA of 20 or more years
(CAP ROA: competitive advantage period with ROA as performance variable; SIC: Standard Industry Classification)

CAP ROA	Firm name	Industry name (four-digit SIC)
26.00	BRISTOL-MYERS SQUIBB	Pharmaceutical Preparations
26.00	FIFTH THIRD BANCORP	State Commercial Banks
26.00	MERCK & CO. , INC.	Pharmaceutical Preparations
26.00	PERKINELMER INCORPORATED	Surgical & Medical Instruments & Apparatus
26.00	PERMIAN BASIN ROYALTY TRUST	Real Estate Investment Trusts
26.00	WEIS MARKETS INC	Retail-Grocery Stores
25.00	ALBERTSON'S, INC.	Retail-Grocery Stores
25.00	FEDERAL SIGNAL CORPORATION	Motor Vehicles & Passenger Car Bodies
25.00	TELEFLEX INCORPORATED	Motor Vehicle Parts & Accessories
24.00	MYLAN LABORATORIES INC.	Pharmaceutical Preparations
24.00	OTTER TAIL CORPORATION	Electric Services
24.00	PFIZER INC.	Pharmaceutical Preparations
23.00	SYNOVUS FINANCIAL CORP.	State Commercial Banks
22.00	CANADIAN UTILITIES LIMITED	Natural Gas Distribution
22.00	MICROSOFT CORPORATION	Services-Prepackaged Software
22.00	SUPERIOR INDUSTRIES INTERNATIONAL, INC.	Motor Vehicle Parts & Accessories
22.00	WM MORRISON SUPERMARKETS	Retail-Grocery Stores
21.00	BANK OF GRANITE CORPORATION	State Commercial Banks
21.00	MCDONALD'S CORPORATION	Retail-Eating Places
21.00	SCHERING-PLOUGH	Pharmaceutical Preparations
21.00	SUBARU ENTERPRISE CO., LTD.	Highway and Street Construction, Except Elevated Highways
20.00	BIOMET, INC.	Orthopedic, Prosthetic & Surgical Appliances & Supplies
20.00	BIOTEST AG	Biological Products (No Disgnostic Substances)
20.00	COCA-COLA COMPANY (THE)	Bottled & Canned Soft Drinks & Carbonated Waters
20.00	DIONEX CORPORATION	Laboratory Analytical Instruments
20.00	DPL INC.	Electric Services
20.00	GAZ METRO LIMITED	Natural Gas Distribution
20.00	HARDYS & HANSONS P.L.C.	Malt Beverages
20.00	MARKS AND SPENCER GROUP PLC	Retail-Department Stores
20.00	METALRAX GROUP PLC	Services-Engineering Services
20.00	ONO PHARMACEUTICAL CO LTD	Pharmaceutical Preparations
20.00	TESCO PLC	Retail-Grocery Stores
20.00	UNI LAND SPA	Biological Products (No Disgnostic Substances)
20.00	UTAH MEDICAL PRODUCTS, INC.	Surgical & Medical Instruments & Apparatus
20.00	VALSPAR CORPORATION	Paints, Varnishes, Lacquers, Enamels & Allied Prods
20.00	VIRBAC	Biological Products (No Disgnostic Substances)
20.00	WINN-DIXIE STORES, INC.	Retail-Grocery Stores
20.00	WW GRAINGER INC	Wholesale-Electrical Apparatus & Equipment, Wiring Supplies

Figure 29: Arrangement of firms with a competitive advantage period (CAP) based on ROA of 20 or more years into three-digit Standard Industry Classification (SIC) industries
(CAP ROA: competitive advantage period with ROA as performance variable; SIC: Standard Industry Classification)

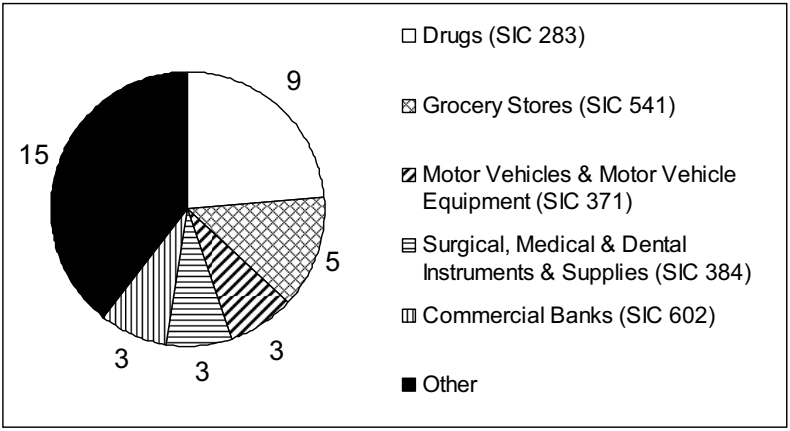


Figure 30: Firms with a competitive advantage period (CAP) based on Tobin's q of 20 or more years
(CAP q: competitive advantage period with Tobin's q as performance variable; SIC: Standard Industry Classification)

CAP q	Firm Name	Industry name (four-digit SIC)
26.00	ALLEANZA ASSICURAZIONI S.P.A.	Life Insurance
26.00	ELECTROCOMPONENTS PLC	Wholesale-Electrical Apparatus & Equipment, Wiring Supplies
26.00	PERMIAN BASIN ROYALTY TRUST	Real Estate Investment Trusts
26.00	TEXAS PACIFIC LAND TRUST	Land Subdividers & Developers (No Cemeteries)
24.00	INTEL CORPORATION	Semiconductors & Related Devices
24.00	PAYCHEX, INC.	Services-Management Consulting Services
22.00	BANK OF GRANITE CORPORATION	State Commercial Banks
21.00	GALLIFORD TRY PLC	Operative Builders
21.00	SCHLOSSGARTENBAU AG	Operators of Nonresidential Buildings
20.00	HUBBELL INCORPORATED	Wholesale-Electrical Apparatus & Equipment, Wiring Supplies
20.00	LONDON SCOTTISH BANK PLC	National Commercial Banks
20.00	TOTAL SYSTEM SERVICES, INC.	Services-Computer Processing & Data Preparation

Figure 31: Average competitive advantage period (CAP) in the analyzed countries
(CAP ROA: competitive advantage period with ROA as performance variable; CAP q: competitive advantage period with Tobin's q as performance variable)

	CAP ROA	CAP q
Canada	7.44	7.08
France	7.49	6.90
Germany	7.56	7.78
Italy	7.03	8.62
Japan	7.58	6.93
United Kingdom	7.82	7.62
United States	8.06	7.29

For the CAP based on Tobin's q only twelve firms realize a value of 20 or more years (see Figure 30) which is in line with the above findings for the percentage of firms realizing a CAP. In this case, only two three-digit SIC industry categories are represented with more than one firm: Electrical Goods (SIC 506) – two firms – and Commercial Banks (SIC 602) – also two firms.

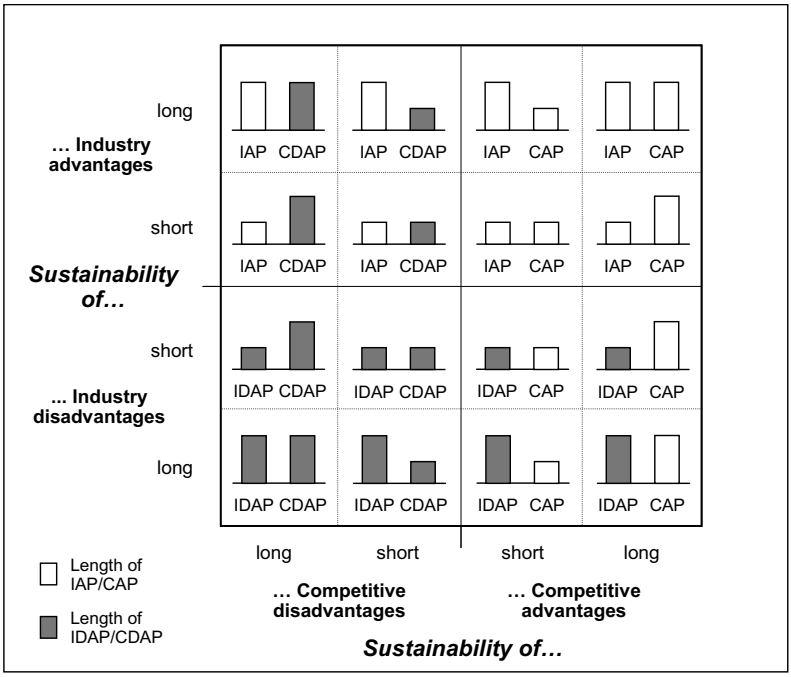
Calculating the average for the CAP based on ROA (Tobin's q) in the analyzed seven countries reveals no markedly differences (see Figure 31). In contrast to the industry a firm is active in, the country a firm is located in seems to have no influence on the sustainability of CA.

Inasmuch as the results show the existence of an IAP, Hypothesis 2 can be confirmed. Structural characteristics seem to lead to a sustainability of significant performance differences across industries (Bain, 1951, 1956; Mason, 1939). At the same time, however, the observable CAP confirms Hypothesis 3. Structure does not fully constrain firm conduct and firm performance. Thus, the results also support strategic management research, arguing for firm conduct and the resulting CA as an important variable in explaining profit differences (Hoskisson et al., 2004).

The existence of both a CAP and an IAP confirms Hypothesis 4. Although industry structure does not fully constrain performance, performance-enhancing industry characteristics do seem to allow the generation of IA and market-entry barriers assure a certain sustainability (Bain, 1951, 1956; Mason, 1939) – and/or inter-industry performance differences are an outcome of efficiency increases stemming from an optimized market structure (Demsetz, 1973; Posner, 1979; Stigler, 1968). At the same time, firm-specific conduct (Porter, 1980, 1985) and/or resources and capabilities in the possession of firms (Barney, 1986b, 1991; Rumelt, 1984; Wernerfelt, 1984) seem to be a source of sustainable CA. These results underline the necessity of

integrating the basic ideas of IO economics into strategic management research in order to get a more complete picture of the drivers of performance differences (Porter, 1981). For managers, the sustainability of intra- and inter-firm profit differences highlights the promising effects of both being active in a highly attractive industry and gaining a superior competitive position within an industry (see Figure 32). Figure 33 provides examples of industries/firms that reach based on my calculations for the accounting-related performance dimension a short/long sustainability of industry/competitive advantages.

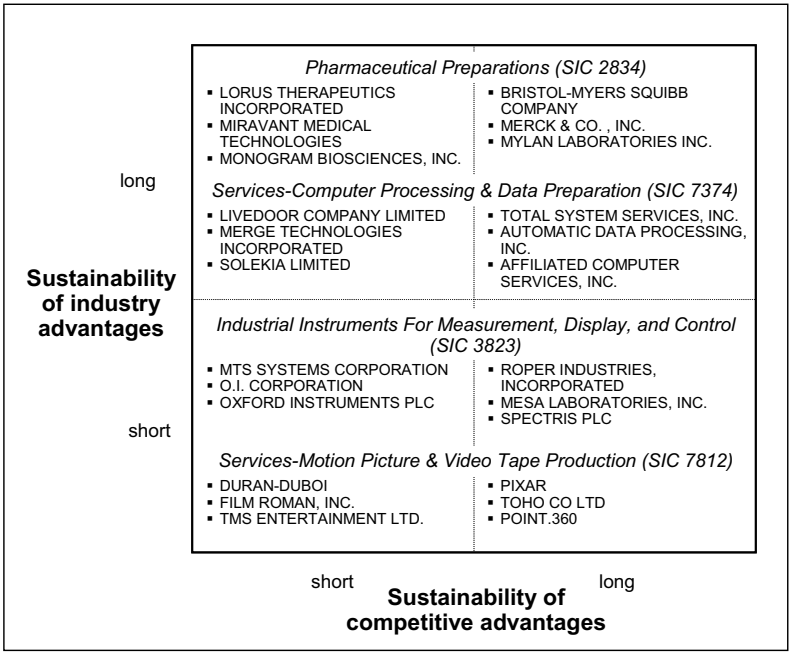
Figure 32: Sustainability of performance differences
(C(D)AP: competitive (dis-)advantage period; I(D)AP: industry (dis-)advantage period)



In addition to the sustainability of IA and CA as proven by the observable IAP and CAP, the results show that firms may also face sustainable industry disadvantages and/or sustainable competitive disadvantages: the IDAP is 8.25 years based on ROA (13.41 for Tobin's q) and the CDAP is 7.07 years based on ROA (8.93 for Tobin's q). Structural characteristics of industries sustain both significant positive and negative performance differences between industries. Additionally, firm conduct leading to competitive disadvantages and/or the absence of

threshold resources and capabilities can lock firms into a performance cluster below the average for several years.

Figure 33: Examples of industries/firms with a short/long sustainability of industry/competitive advantages
(Basis for allocation to the matrix fields: competitive/industry advantage period based on ROA; SIC: Standard Industry Classification)



Striking are the relatively high values for the IDAP and CDAP when Tobin's q is the performance variable as compared to the IDAP and CDAP based on ROA, as well as the IAP and CAP. In the capital market, industry disadvantages and competitive disadvantages seem to be more persistent than when based on accounting data. Thus, managers might be able to increase their firms' stock market performance through an increased ability to convince market participants that industry disadvantages and/or competitive disadvantages a firm has faced in the past have vanished. This is also emphasized by the relatively high average percentage of industries realizing an IDAP based on Tobin's q (71%) and of firms realizing a CDAP based on Tobin's q (63%) compared to the respective values based on ROA (35% and 21%). Interesting in this context is that the results also show that when based on ROA a large percentage of industries realize an IAP and IDAP, whereas when based on Tobin's q the percentage of industries realizing an IDAP is much higher than for the IAP. This means that according to

the accounting data during the 26 years under analysis, a high percentage of industries has faced both time periods with sustained IA and time periods with sustained industry disadvantages. From the capital market's point of view, a high percentage of industries had to cope with sustained industry disadvantages, but only a few achieved sustained IA. Again, this might be an outcome of information asymmetries leading to a relatively conservative valuation of IA. In his seminal work Akerlof (1970) highlights the importance of information asymmetries and the resulting difficulties in assessing good quality. In their work, Myers and Majluf (1984) demonstrate the problems resulting from the inability of firms to communicate future prospects credibly to investors. Furthermore, the above mentioned irrationalities of capital markets going along with overreaction to bad news and underreaction to good have to be taken into consideration. Such problems, arising in the context of information asymmetries and irrational investor behavior, offer a reasonable explanation for a capital market failing to take account of the sustainability of CA/IA as indicated by the results.

The limited IAP and CAP across the analyzed industries confirm Hypothesis 5 especially when looking at the expectations of strategy researchers concerning the sustainability of performance differences – for example Porter (1985) and Wiggins & Ruefli (2002) apply a threshold of 10 years to identify sustainable competitive advantages. Competitive processes with cycles of innovations and entrepreneurial activity (Hayeck, 1937; Menger, 1871, 1950; Schumpeter, 1934) and the resulting changes in industry characteristics (Nelson & Winter, 1982) seem to lead to a constant creation and destruction of IA and CA and thus of inter- and intra-industry profit differences.

At the same time, however, the high variance of the IAP reveals that the sustainability of IA is quite heterogeneous across industries. Some industries seem to be able to better protect their IA from the competitive processes that typically erode them. One example is the industry category Bottled & Canned Soft Drinks & Carbonated Waters (SIC 2086), with an IAP of 19 years based on ROA (average CAP 7.81 years based on ROA and 9.20 years based on Tobin's q). Although competition has been historically quite strong in this industry, the industry as a whole was able to sustain IA over a long time horizon. This may especially be an outcome of severe entry barriers, such as a high importance attached to branding and the existence of exclusive sales channels. However, since the mid-90s the industry has no longer been able to achieve a superior performance level, possibly a result of changes in the industry structure eroding IA – in particular, a shift in customer demand towards alternative, healthier products (Yoffie, 2004).

With respect to the CAP, the results also need to be looked at in greater detail. Although the CAP is, on average, relatively short, in some industries a much higher average CAP is observable. For example, in the industry category Surgical & Medical Instruments & Apparatus (SIC 3841) the average CAP is 11.07 years based on ROA. In this industry, with very complex technical products and the importance of patent protection (see Paddock & Hein, 2005, also in the following), the erosion of CA is much slower than in other industries. At the same time, average accounting performance is very low due to the capital intensity of the industry and the need for substantial R&D investments. As a matter of course, the IAP for this industry is only 6 years based on ROA. The Tobin's q–based CAP for this industry shows a totally different picture: the industry average, at 6.9 years, is below the average across the analyzed industries. Additionally, the average Tobin's q is very high (3.14) – reflecting an industry that is mainly driven by expectations about prospective successful products and speculative behavior.

All in all, the results discussed in the context of Hypothesis 5 make clear that sustaining IA and CA over a long time horizon is a great challenge to managers. Only a constant adaptation of strategies and skill sets to the changes in the environment and to competitive processes can lead to long-term sustainability of IA and CA. Additionally, achieving a long-term sustained CA resulting in long-term superior economic performance may not be a reasonable goal in certain industries (see also Wiggins & Ruefli, 2002, 100) as it may not be attainable at all or only very rarely – particularly as goals today have to be perceived as achievable in order to be a source of motivation (Sedry, 1960).

Based on the ideas of the dynamic capability approach and the strategic group research, I predicted in Hypothesis 6 that only a few firms would be able to achieve a long CAP. Comparing the maximum achieved CAP in the analyzed industries with the industry-average CAP generally confirms Hypothesis 6. For example, in the industry category Pharmaceutical Preparations (SIC 2834), the maximum CAP is 26 years and the average CAP is 9.51 years, based on ROA. Some firms are able to resist processes that normally erode CA. That is, they are able to protect their CA from imitation by competitors while also adapting to changes in the environment. This conclusion is supported by the relatively high average variance of the CAP in the sample. In general, these results do not allow a differentiation between the concept of dynamic capabilities and the strategic group approach. However, combining the findings of Lee et al. (2002) showing that strategic groups are unlikely to persist in absence of dynamic capabilities with my results clearly highlights the importance of the dynamic capability concept in

explaining sustainability of CA. In addition to the general confirmation of Hypothesis 6, a closer comparison of the differences between the observed industry average CAP and the maximum CAP across the industries reveals that substantial differences are observable. In some industries the competitive processes do not allow firms to achieve a sustainability of CA that is markedly higher than the average sustainability of CA in the industry (see, e.g., SIC 1041 or 1623). Thus, the importance and/or achievability of dynamic capabilities seems to be heavily influenced by the industry in which a firm is operating.

6 Conclusion

The intent of this chapter was threefold: (1) to determine whether performance differences within and across industries are sustainable, and if so, (2) to quantify via the CAP the average number of subsequent years during which a firm can sustain a superior economic position compared to other firms in the same industry, and (3) to quantify via the IAP the average number of subsequent years during which an industry can sustain a superior economic position compared to other industries.

By applying the non-parametric two-sample K-S test I find an IAP of 8.85 years based on ROA (9.19 for Tobin's q) and a CAP of 7.56 years based on ROA (7.38 for Tobin's q). The confirmation of sustainable inter- and intra-industry performance differences emphasizes that only integrated models combining the ideas of both IO economics and strategic management research can fully explain the sustainability of performance differences. On the one hand, industries' structural characteristics lead to sustainable differences in industry-specific performance levels. On the other hand, firm conduct and differences in the resource and capability positions of firms create sustainable performance differences within industries. Altogether, IA seem to be more sustainable than CA.

At the same time, competitive processes erode realized IA and CA, as is shown by the relatively short average IAP and CAP. Nonetheless, some industries are able to protect IA over a long time horizon, and in some industries CA erode much more slowly. Additionally, a few firms are able to sustain CA for more than 20 years. Apparently they are able to adjust their critical skills to changes in the environment. This finding underlines the importance of the dynamic capability approach for the concept of CA.

A comparison of the two chosen performance measures reveals two major facts. First, both the percentage of firms achieving an IAP and the percentage of firms achieving a CAP is markedly lower when based on Tobin's q than when based on ROA. It is more difficult for

firms to achieve sustainable superior economic performance in the capital market than when based on accounting data. Second, the sustainability of industry and competitive disadvantages is noticeably higher in the capital markets as compared to accounting data. Both results indicate a potential for managers to increase the capital market performance of their firms by diminishing information asymmetries with respect to (1) the industry advantages/ disadvantages of the firm's industry and (2) competitive advantages/disadvantages of the firm. Such communication strategies may also reduce the effects of irrational behavior of capital markets like short-term overreaction, over-/underreaction to bad/good news, increased post-event volatility.

As the applied selection process was very broad and included all industries having the minimum number of firms, the results should form a reasonable basis for the conclusions drawn above. Although the chosen database, Compustat Worldscope, offers several advantages, e.g., coverage of more than 20 years and reporting on a large portion of activity from all economic sectors, there are also some disadvantages. In particular, the industry definitions at the four-digit SIC level may distort segment-specific effects. When diversification significantly influences firm performance, the inclusion of diversified firms based on their primary SIC code may lead to biased results. Though, the diversification-performance literature indicates that there seems to be no clear positive or negative influence of diversification on firm performance (see Bausch & Pils, 2006, for a meta-analysis showing different impacts depending on the type of diversification; see Hoskisson & Hitt, 1990, 469 for a review). Nevertheless, a sub-sample of non-diversified firms of one industry (Bottled & Canned Soft Drinks & Carbonated Waters; SIC 2086) was tested for agreement with the general results to identify potential influences from the inclusion of diversified firms. My result for the non-diversified sub-sample grouped the majority of firms (92%) in the same performance stratum (see Wiggins & Ruefli, 1995, 1650, for a comparable result). Thus, the effect of including diversified firms should be negligible.

Furthermore, performance measurement is always questionable. Yet, the decision to include two different performance dimensions in the analysis enables us to elaborate the impact stemming from the type of performance measure. A further limitation of this study is that several concepts, e.g., the RBV, are assessed indirectly only. However, the findings offer strong support for the conclusions drawn.

In order to further assess the explanatory power of the different theoretical approaches explaining the sustainability of CA, future research should analyze determinants of the length of

the CAP/IAP. A replication of the applied method over a longer time frame would also be of interest. In fact, such an enlarged time frame would also encompass periods studied by early empirical work in strategic management research. In addition, future studies could also encompass other countries besides the ones included in my sample. Moreover, an analysis of whether differences in the length of the CAP exist that are dependent on the performance level (average or significantly below average) the firm was at before reaching a position of significantly above-average performance could shed additional light on factors influencing the sustainability of performance differences. Furthermore, the findings underline a need for further empirical research that integrates the explanatory effects of IO economics and the MBV with those of the SBV and the RBV as well as with those of dynamic approaches (Austrian economics, Schumpeter's concept, and evolutionary economics). Only studies incorporating the effect of IA and CA will be able to depict performance differences and sustainability of performance differences observable in reality. Finally, the results at hand highlight the need to focus future research on the actual sustainability of performance differences instead of predefining time periods in order to speak of sustained performance differences.

Part Four: Determinants of the Competitive Advantage Period and the Industry Advantage Period – Analyzing Intra- and Inter-Industry Performance Influences

1 Introduction

The analysis of determinants and sources of profitability differences has received a considerable amount of attention (see part two). However, to be of key interest for managers a performance determinant should lead not only to a positive performance impact but also to a sustainable superior economic performance position. None of the prior empirical studies has directly and systematically analyzed determinants that increase the sustainability of superior economic performance.

The CAP and the IAP quantify the concrete sustainability of superior economic performance within and across industries (see part three). The results obtained for these measures already allow us to assess the general explanatory power of research paradigms that aim to explain the sustainability of superior economic performance. A natural next step is to find out which performance determinants discussed in theory have a significant impact on the sustainability of superior economic performance. Thus, the goal of this analysis then is to identify determinants that significantly increase the sustainability of a superior economic position within an industry and across industries. The basis for the assessment will be a longitudinal dataset of 6,385 firms covering 99 four-digit SIC industries over 26 years. Unlike the majority of prior research, the sample will be international in make-up, comprising firms from the G7 countries. The present study furthermore applies not only an accounting-based performance view – utilized in the majority of past research (see, e.g., Droucopoulos & Lianos, 1993; Goddard & Wilson, 1996; Jacobsen, 1988; Mueller, 1986; Waring, 1996) – but also a market-based performance view.

There are currently three dominant theoretical approaches in the strategy literature addressing determinants of the sustainability of performance differences: (1) the MBV, (2) the SBV, and (3) the RBV. The first, the MBV – based on IO economics – focuses on industry characteristics such as market concentration, growth, and entry barriers as primary factors influencing performance differences between firms. According to the MBV, firms operating in a favorable industry structure – hereafter referred to as IA – are thus able to achieve economic performance superior to that of firms operating in other industries. SBV highlights the effect pursued strategies have on the creation of CA and hence firm performance. Finally, the RBV

takes a more inward approach and looks at the resources and capabilities in possession of the firm in an effort to explain the generation and sustainability of CA that allows a firm to achieve a superior economic position.

The analysis at hand investigates determinants of these three theoretical frameworks. In contrast to the majority of past research, I will not approach them as competing explanations of firm performance but rather as complementary explanations (see, e.g., Henderson & Mitchell, 1997, 5ff.; Powell, 1996, 323ff.; Weerawardena, O'Cass, & Julian, 2006, 37). Empirical studies in related areas underline the prospects of combining the frameworks (see, e.g., Bansal, 2005; Weerawardena et al., 2006). Due to the differences in the unit of analysis, the MBV is evaluated on the basis of industry-level data, whereas the SBV and the RBV are analyzed on the basis of firm-level data. The firm-level analysis is performed in an initial step across the included industries (cross-industry analysis) in order to identify the general impact of pursued strategies and firm resources. In a second step, three industry categories with markedly different characteristics – Pharmaceutical Preparation (SIC 2834), Motor Vehicle Parts & Accessories (SIC 3714), and Services-Prepackaged Software (SIC 7372) – are examined. These industry-specific analyses allow us to assess whether patterns associated with sustainable superior economic performance vary across different types of industry environments.

In the following section, hypotheses about both industry- and firm-level determinants on the sustainability of superior economic performance are formulated. The statistical techniques that were applied are then introduced, as well as the operationalization of variables and the sample. A presentation and discussion of the results then follows. The final section gives a conclusion, shows limitations, and illustrates areas for future research.

2 Theoretical Background and Hypotheses

Industry-level determinants

Mason (1939) and Bain (1956; 1959) propose in their basic SCP model of IO economics that (industry) structure predetermines (firm) conduct, which in turn predetermines (industry) performance. Early works in strategic management research (see, e.g., Caves & Porter, 1977; Porter, 1979) also included industry characteristics in their frameworks in an effort to explain the performance differences of firms. This MBV of strategy suggests that firms are facing an industry-inherent profit level due to the structural characteristics of the industry forming the competitive situation in the respective industry (Porter, 1985, 4). As a result, the dominant unit of analysis of empirical research within IO economics and the MBV of strategy are inter-

industry profit differences and their sustainability rather than performance differences between individual firms (Robinson & McDougal, 1998, 1081).

The basic line of reasoning behind this proposed influence of industry structure is that firms operating in an industry with favorable industry characteristics are enjoying IA – the term IA itself, however, is newly introduced and thus not used in other papers. IA allow members of a specific industry to generate higher profits than firms in other industries and protect them from erosion – due to market entry, e.g. several studies investigated the determinants affecting the creation of IA, which in turn lead to performance differences. But which factors allow members of an industry to reach and/or sustain a superior performance position vis-à-vis firms in other industries? Past theoretical and empirical research tends to advocate concentration, growth, and entry barriers as structural characteristics influencing the sustainability of performance differences (see, e.g., Bain, 1959, 248, 251 and 408; Chappell & Cottle, 1985, 1033f.; Leach, 1997, 15; Mason, 1939, 66; Robinson & McDougal, 1998, 1080; Spanos et al., 2004, 146).

Concentration

Phillips (1962) and Stigler (1964) provide theoretical foundations in their work for the link between concentration and performance. The basic idea of their models is that in highly concentrated industries collusion tends to be easier (Quals, 1974, 612). This is especially due to the fact that monitoring is less complicated in the case of a lower number of competitors and price wars are less likely (Ramaswamy, Gatignon, & Reibstein, 1994, 48). Additionally, the perceptibility of signaling is higher in industries with a low number of competitors (Heil & Robertson, 1991, 415). Based on game theory, Burke and Moore (1990) show that the lower the number of participants involved in interactions, the higher the rates of cooperation. This seems to be caused by a greater awareness of advantages and a lower degree of anonymity. Independent of collusive behavior, the increased market power of large firms in cases of higher concentration can explain a positive concentration-performance relationship (Leach, 1997, 14). Additionally, decreased competition in an industry along with increased concentration per se can explain higher profit rates (Hill & Hansen, 1991, 191). Demsetz (see, e.g., 1973) points out that concentration reflects the superior performance of large firms. Turning the SCP paradigm upside down, Demsetz (1973) argues that superior low-cost firms achieve a higher performance and in turn become dominant in their industry, resulting in an increased concentration. At the same time, however, decreased competition in more concentrated industries can lead to inefficiencies, e.g., due to organizational slack, and in turn to low profits (Hill

& Hansen, 1991, 191; Kotha & Nair, 1995, 500). Capon, Farley, & Hoenig (1990), however, find a positive effect of concentration on performance in their meta-analysis. Hence, my first hypothesis is:

H_1: Concentration positively affects the sustainability of IA.

Growth

Bain (1959) already highlighted the trend in demand as an important structural characteristic. Scherer & Ross (1990) argue that due to errors in supply expectations and a time lag in supply response, higher growth will increase performance when investments in additional capacity are lower than the demand growth. Porter (1980) notes that a high growth rate allows incumbents to maintain their performance level in a situation of new market entries. The high growth rate can compensate for market shares acquired by new entrants. Thus, new entrants in growing markets will also face less retaliation. Peltzman (1977) discusses the positive performance effects of market growth for small firms. In a growing market, they can typically more easily achieve a better cost position and more quickly develop the necessary skills to operate successfully in the industry. On the contrary, Bain (1959) emphasizes that high growth could decrease performance as collusive agreements will be more difficult to maintain. However, according to Hay & Morris (1991), more than 75% of the studies in IO economics find positive effects of market growth on performance. Strategy researchers associate high growth with the environmental munificence of an industry (Dess & Beard, 1984, 55), which is argued to lead to ample resources. This increased availability of resources allows firms to generate slack resources (Lumpkin & Dess, 1996, 158). Cyert & March (1963) expect slack resources to influence a firm's ability to innovate. Additionally, slack resources can offer a buffer for firms in periods of relative scarcity (Dess & Beard, 1984, 55). Thus, environmental munificence should lead to increased performance (Kotha & Nair, 1995, 500; Spanos et al., 2004, 147). These arguments lead to Hypothesis 2:

H_2: Growth positively affects the sustainability of IA.

Entry Barriers

Bain (1956) defines entry barriers as an (3):

> …industry advantage of established seller in an industry over potential entrant sellers, which is reflected in the extent to which established sellers can persistently raise their prices above competitive levels without attracting new firms to enter the industry.

According to this definition, entry barriers preventing new firms from entering highly attractive industries lead to fewer firms in the market and a lower level of competition (Grant, 1991, 117). As a result, incumbents can set a price above the competitive level (Mann, 1966, 296). This line of argumentation leads to the assumption that the existence of entry barriers can sustain superior economic performance.

High capital requirements can form a substantial entry barrier (Harrigan, 1981, 397). In the case of efficient capital markets, profitable large-scale and small-scale projects can be financed (Fama, 1970, 383). Although wealthier and more experienced firms enjoy advantages in financing over smaller firms in inefficient capital markets, they must not necessarily be the incumbents. Nevertheless, capital costs can form an indirect entry barrier when substantial resources are required of the entrant in order to enter an industry (McAfee, Mialon, & Williams, 2004, 464f.). These sunk costs that are associated with market entry can lead to considerable losses (Baumol, Panzar, & Willig, 1983, 493ff.). Thus, higher capital requirements increase the threat of aggressive competition by incumbents and consequently form a barrier to entry. Furthermore, high capital requirements indicate the existence of economies of scale. In the case of substantial scale economies, unless large-scale entry is feasible (see Thompson, 2007, 357, for an example of large scale entry in the case of the camera industry when firms with video technology experience entered the camera market with the rise of digital cameras) new entrants will produce at higher costs than incumbents (Scherer, 1973, 141ff.).

Those resources, such as brand reputation, experience advantages, and technology, that are in the possession of incumbents and which entrants can acquire only gradually or at extraordinary expense can also form entry barriers (Grant, 1991, 117). Such resources typically go along with an increased differentiation of the products in the market. According to Bain (1951; 1956), product differentiation represents the most important source of entry barriers. Investments in technology not only allow firms to stay ahead of potential entrants with respect to the products offered in the market, but also with respect to established processes (Orr, 1974, 61). Entrants would have to make substantial investments to acquire the resources in the possession of incumbents. At the same time, however, technology investments form a barrier to entry as they relate to economies of scale in the R&D process. The high fixed costs associated with R&D departments necessary to achieve a minimum amount of specialization for adequate team work, or to benefit from risk pooling through simultaneous R&D projects typically favor large firms (Mueller & Tilton, 1969, 571). I therefore hypothesize that:

H_3: Entry barriers positively affect the sustainability of IA.

Firm-level determinants

Whereas the MBV mainly looks at industry as the main unit of analysis, the SBV and the RBV focus especially on the firm in explaining profit differentials. The first approach can only explain inter-industry profit differences based on IA. The latter two offer frameworks explaining observable intra-industry profit differences resulting from firm-specific CA. Porter (1991) argues that the performance of a firm can be broken down into effects stemming from the structural characteristics of an industry in which a firm is active and the firm's strategic positioning. Pursued strategies allow a firm to generate and sustain CA vis-à-vis competitors in the firm's industry that result in above average performance (Porter, 1985, 11). Proponents of the RBV, such as Barney (1991), Rumelt (1984), and Wernerfelt (1984), propose that idiosyncrasies in the resource and capability position of firms create sustained CA. A clear implication of both the SBV and the RBV is that they require choosing individual firms as the unit of analysis.

Pursued Strategy

Working from the idea that firms must form a consistent configuration of activities to create sustainable CA, Porter (1985) developed three generic strategies for capturing the basic archetypes of competitive strategy: (1) cost leadership, (2) differentiation, and (3) focus. A generic strategy of cost leadership aims at giving competitors a product with a quality comparable to the quality of competitors' products at lower cost. Firms pursuing a differentiation strategy aspire to offer a product perceived to be unique, thus allowing them to demand premium prices. A focus strategy involves competing only in a narrow segment of the industry (a market niche), based on either low-cost or differentiation. Firms that do not clearly position themselves along these two dimensions – strategic advantage and strategic target – can be expected to realize a lower performance – they are "stuck in the middle" (Porter, 1980, 41f.).

Although Porter's framework of generic strategies has found broad acceptance in strategic management research, particularly when compared to other proposed classifications (see Part Two for an overview; see, e.g., Miles & Snow, 1978; Miller, 1990; Parnell, 2006; Treacy & Wiersema, 1995, for alternative frameworks), several authors use it merely as a starting point for further refinements to the original model (see, e.g., Beal, 2000; Hambrick, 1983; Kim & Lim, 1988; Miller, 1992). In the present study, an adopted version of the modified Porter approach proposed by Hambrick (1983) is utilized as I perceive it to be more precise than Porter's original classification with regard to the definition of the underlying characteristics lead-

ing to CA (see, e.g., David et al., 2002; Hambrick & Lei, 1985; Kotha & Nair, 1995, for other applications of Hambrick's typology).

The following three dimensions will be applied in assessing the effect of pursued strategies on the sustainability of CA (see Hambrick, 1983, 689):

- Efficiency: extent to which inputs per unit of output are low
- Differentiation: extent to which products are perceived to be unique
- Scale: relative size of activities

In contrast to Porter (1980; 1985), in this typology efficiency and differentiation are not interpreted as opposite ends of one strategy dimension but as independent dimensions – although they may be correlated (Hill, 1988, 401ff.; Murray, 1988, 395f.; see Thornhill & White, 2007, 554f., for an overview).

Firms pursuing an efficiency strategy attempt to lower their cost, which enables them to set a lower price than rivals while at the same time offering a comparable quality. Successfully competing at a higher level of efficiency leads to CA (Wright et al., 1991, 58). Firms can in particular pursue an efficiency strategy by realizing economies of scale (Wright, 1987, 95). Moreover, experience curve effects acquired via a high cumulative output can steer efficiency (Abernathy & Wayne, 1974, 110). As a result, past research has emphasized the role of asset parsimony in achieving efficiency (Kotha & Nair, 1995, 503). In fact, asset parsimony represents a special case of an efficiency strategy: the degree to which assets per unit of output are few (Hambrick, 1983, 689f.). A lack of asset parsimony often goes hand in hand with aggressive and destructive competition, leading to lower performance (Buzzell & Gale, 1987, 148; Hambrick & Lei, 1985, 778). Capital intensity, indicating a lack of asset parsimony, has been shown to be a crucial strategic variable (Gale, 1980, 80), varying inversely with direct costs (Porter, 1980, 335). Firms pursuing an efficiency strategy often restrict their investments to fewer specific assets in order to achieve greater economies of scale (Gupta & Govindarajan, 1986, 708). In contrast to those firms focusing on differentiation, they to not need to invest in a wide range of capital assets, allowing resource redeployment and coordination flexibility in product development, manufacturing, and distribution (Sanchez, 1995, 139).

Traditional PIMS-based analyses, including, e.g., the work of Schoeffler, Buzzell, & Heany (1974), have already identified product quality as a performance-increasing factor. Firms pursuing a differentiation strategy typically do not focus on capacity utilization, manufacturing

expenses or relative direct costs, but instead rely on the quality of the products offered in order to support higher prices (Wright et al., 1991, 59). Thus, differentiators address their products to customers that are relatively price-insensitive (Wright, 1987, 93). Differentiation can be achieved by various means, e.g., brand image (Kotha & Vadlamani, 1995, 78), reputation (Phillips et al., 1983, 27), or product technology (Porter, 1985, 121). Successfully pursuing a differentiation strategy insulates a firm from threats arising from the competitive forces in an industry of sinking price-cost margins. Thus, a differentiation strategy is argued to lead to sustained CA (Porter, 1980, 37). Differentiation aims at creating customer loyalty (Phillips et al., 1983, 26). By offering a product that is perceived to be unique, differentiators intend to create price inelasticity on the part of the buyers. As a result, differentiators are able to realize a price premium for such products. Empirical results in fact show that a strategy of differentiation allows realization of a higher margin (see, e.g., David et al., 2002, 873f.). Gale & Swire (1977), for example, note that higher-quality products allow firms to avoid performance-deterring price competition, resulting in the margin advantages described above. Additionally, Fine (1983) posits positive performance impacts resulting from a quality learning curve mechanism. Following a differentiation strategy often requires broader investments, more expensive production technologies, and less standardized production processes (Phillips et al., 1983, 26). Thus, differentiators often cannot simultaneously pursue a strategy of asset parsimony. Achieving a strategy of differentiation also typically requires a perception of exclusivity, which is mostly incompatible with a strategy of scale (Porter, 1980, 38).

Theory particularly emphasizes market power resulting from the scale dimension of competitive strategy. Increased scale of activities allows firms to reduce risks (Porter, 1980, 18), and typically gives firms greater control of the market due to fewer constraints (Barney, 2002, 247ff.). Firms may exploit this power by setting higher prices, for example, or exploiting control over distribution channels (Kotha & Nair, 1995, 505). At the same time, larger firms are likely to have a more favorable bargaining position with their suppliers (Caves & Porter, 1977, 1). Thus, increased size can be hypothesized to decrease performance variance leading to sustained CA (Makhija, 2003, 438). Additionally, increased firm size goes typically along with economies of scale (Stigler, 1958, 54ff.) and learning curve effects (Abernathy & Wayne, 1974, 110). Economies of scale can exist not only in production but also in other functional areas, such as advertising, distribution, and R&D (Scherer & Ross, 1990, 122ff.). In the presence of significant transaction costs, large firms may also achieve scale economies in raising capital (Wiggins, 1981, 60). Nonetheless, meta-analytic evidence shows conflicting

results on the size-performance relationship (Bausch et al., 2007, 8; Szymanski, Bharadwaj, & Varadarajan, 1993, 10).

These arguments lead us to Hypotheses 4, 5 and 6:

H_4: *Asset parsimony positively affects the sustainability of CA.*

H_5: *Differentiation positively affects the sustainability of CA.*

H_6: *Scale positively affects the sustainability of CA.*

Resources and capabilities

The RBV depicts firms as being dynamic collections of resources and capabilities (see, e.g., Barney, 1986b, 1991; Rumelt, 1984; Wernerfelt, 1984). Due to differences in pursued strategies and organizational structures, firms evolve in different ways. Thus, firms also differ in the resources and capabilities they possess (Nelson, 1991, 66ff.). Proponents of the RBV argue that firms able to accumulate resources and capabilities that are valuable, rare, costly-to-imitate, and non-substitutable will realize sustained CA (Barney, 1991, 105f.; Dierickx & Cool, 1989, 1507f.). In fact, resources that are valuable and rare form the basis for creating CA. To sustain a resource-based CA, the resources also need to be costly-to-imitate and non-substitutable (Priem & Butler, 2001, 25). A crucial assumption for this framework and the proposed impact on CA is – besides the described heterogeneity in the resource and capability position – the existence of costs associated with the transfer of resources and capabilities between firms (Barney, 1986b, 1233ff.).

Resources and capabilities can be viewed as bundles of tangible and intangible assets in the firm's possession, for example, management skills, technological know-how, or organizational processes (see, e.g., Barney, Wright, & Ketchen Jr, 2001, 625; Priem & Butler, 2001, 25). Although both tangible and intangible resources can be a source of sustained CA, intangible resources in particular are today highlighted as a major source of sustained CA (Makhija, 2003, 439). Itami (1987) already stated that intangible resources are more likely to be a source of CA as they tend to be path dependent, socially complex, and casually complex. These intangible resources can consist of tacit knowledge in the procession of the firm (Polanyi, 1958, 49; see Styhre, 2004, 183ff., for a discussion and critique of the term tacit knowledge). The knowledge-based view (KBV) of the firm (see, e.g., Liebeskind, 1996; Nonaka & Takeushi, 1995; Spender, 1996), as an extension of the RBV (see Acedo, Barroso,

& Galan, 2006, for this and other main trends within the RBV), considers knowledge to be an intangible resource that generates sustainable CA.

A firm's R&D activities, in particular, it is argued, lead to new intangible knowledge (MacDonald, 1985, 584). Caves (1982) underlines the impact intangible assets in the form of technological and innovative capabilities can have on the creation and sustainability of CA. The positive performance impact stemming from technological and innovative capabilities is empirically emphasized by meta-analytic evidence on the performance effects of strategic options – in the context of internationalization, as well as mergers and acquisitions, technological and innovative capabilities spur the observed performance relationships (Bausch & Fritz, 2005, 23f.; Bausch & Krist, 2007, 20).

In light of the above arguments my seventh hypothesis is:

> H_7: *Intangible assets in the form of technological and innovative capabilities positively affect the sustainability of CA.*

3 Method

Sample

The data for the analyses described in the following comprise accounting and capital market data for the years 1980 to 2005 collected from Datastream Worldscope for firms located in the G7 countries. The firms were grouped into industries according to their four-digit SIC codes. The sample comprises the 6,385 and the 99 industries for which I have been able to calculate a CAP and an IAP in part three.

Statistical tests

The influence of the above theoretically derived determinants on the sustainability of IA and CA is modeled as follows:

$$IAP_k = \beta_o + \sum_{i=1}^{n} \beta_i X_{ik} + \varepsilon \quad (1)$$

$$CAP_l = \beta_o + \sum_{j=1}^{m} \beta_j Y_{jl} + \varepsilon \quad (2)$$

where IAP_k is the industry advantage period for industry k, X_{ik} represents the independent variables *1* to *n* for industry k, β_i are the regression coefficients for the independent variables *1* to *n*, CAP_l is the competitive advantage period for firm l, Y_{jl} represents the independent vari-

ables *1* to *m* for firm *l*, β_j are the regression coefficients for the independent variables *1* to *m*, β_0 is the constant term of the regression model, and ε is the error term. Both equations were tested via ordinary least square (OLS) regression analysis (Cohen, Cohen, West, & Aiken, 2003, 64ff.). I include the average values of the independent and dependent variables during the analyzed time period in the model to account for a potential time lag before the independent variables affect the sustainability of IA and CA. The overall fit of the models was assessed by looking at the portion of variance explained by the model (adjusted R^2). To assess the significance of the overall model the F-test was applied. The significance of the regression coefficients was tested with the t-test. For both the F- and the t-test I applied significance levels of 10%, 5%, 1%, and 0.1%.

To test the construct validity of the independent variables for each equation, I conducted two factor analyses (Cronbach & Meehl, 1955, 281ff.). Factor analysis lets us determine whether multiple variables for one determinant load on one factor and whether variables used to operationalize different determinants load on different factors. Thus, factor analysis permits us to reach a parsimonious representation of the tested determinants (Kim & Mueller, 1978, 8). For both industry- and firm-level variables, I performed a principal component analysis, treating factor loadings smaller than ±0.5 as the cut-off level for significance (Dess & Davis, 1984, 472; Kim & Mueller, 1978, 71; Landau & Everitt, 2004, 299). The factor scores from the factor analyses (regression method) were used as independent variables for the regression analyses (see, e.g., David et al., 2002, 873f., for a comparable procedure).

Industry-level variables

The sustainability of IA was assessed by looking at the IAP – the average number of subsequent years during which an industry can sustain a superior economic position compared to other industries (see part three). The variables used to operationalize the hypothesized industry-level determinants are described in the following.

Concentration

Concentration was measured by the Herfindahl-Hirschman Index (HHI) (see, e.g., Leach, 1997, 15f.; Spanos et al., 2004, 150f.). The HHI – the sum of the squared market shares of the firms – ranges from 1/*n* for *n* firms of equal size to a maximum of 1 where there is only one firm.

Growth

Growth of the industry was operationalized in terms of the sales growth in the industry (see, e.g., Chappell & Cottle, 1985, 1034; Phillips, 1962, 181).

Entry barriers

Entry barriers were represented using three measures. Fixed capital turnover – total fixed assets divided by net sales – and capital investment intensity – investment into fixed assets divided by net sales – were used to capture the capital intensity of the industries (see, e.g., Chappell & Cottle, 1985, 1033; Leach, 1997, 15; Spanos et al., 2004, 150f.). The R&D ratio – R&D expenses divided by net sales – was used to measure the technological resource intensity of the industries (see, e.g., Mueller & Tilton, 1969, 571; Orr, 1974, 59).

A factor analysis of these five variables produced four factors with eigenvalues equal to or larger than 1. In accordance with the Kaiser criterion, I included these four factors in the flowing analysis (Bryman & Cramer, 2005, 330). Based on the underlying content, I labeled these factors (1) capital intensity, (2) concentration, (3) growth, and (4) technological resource intensity.

The factor loadings, eigenvalues, and portions of variance explained are shown in Figure 34. The Kaiser-Meyer-Olkin measure of sampling adequacy of this factor analysis is larger than 0.5, indicating that a factor analysis of the included variables is meaningful (Cureton & D'Agostino, 1983, 389f.). Additionally, the measure of sampling adequacy of all included variables is larger than 0.5, thus confirming that besides the overall model each variable is also meaningful.

The results show that both measures applied for capital intensity actually load on the same factor. Furthermore, the R&D ratio loads on a different factor, indicating that technological resource intensity and capital intensity are different dimensions of entry barriers. The low factor loadings of all variables on the other factors underline the parsimonious representation of the tested determinants.

Figure 34: Factor analysis of industry-level determinants
(N = 99; rotated factor matrix: Varimax with Kaiser Normalization; HHI: Herfindahl-Hirschman Index)

	Component			
	1 **Capital intensity**	2 **Concen-tration**	3 **Growth**	4 **Techno-logical resource intensity**
HHI	-0.008	0.996	-0.042	-0.066
Sales growth	0.015	-0.042	0.999	-0.014
Fixed capital turnover	0.888	0.035	-0.017	-0.016
Capital investment intensity	0.886	-0.046	0.037	-0.001
R&D ratio	-0.013	-0.066	-0.014	0.998
Eigenvalue	1.574	1.002	1.001	1.000
Portion of variance explained	0.315	0.200	0.200	0.200
Cummulative variance explained	0.315	0.515	0.715	0.915

Firm-level variables

The sustainability of CA was assessed via the CAP – the average number of subsequent years during which a firm can sustain a superior economic position compared to other firms in the same industry (see part three). The variables used to operationalize the hypothesized firm-level determinants are described in the following.

Asset Parsimony

Asset parsimony was operationalized using measures for capital intensity. Ratios showing high capital intensity indicate a lack of asset parsimony along with decreased efficiency (see, e.g., David et al., 2002, 873; Hambrick, 1983, 693; Kotha & Nair, 1995, 507, for empirical verification not only of the before described relationship but also of the variables measuring capital intensity presented in the following; Wright et al., 1991, 145). Capital intensity is assessed by the fixed capital turnover and the investment intensity. Fixed asset turnover was calculated as the ratio of fixed assets to net sales. Capital investment intensity was calculated as investment into fixed assets divided by net sales.

Differentiation

The differentiation dimension was gauged using the gross margin of firms. The gross margin was calculated as net sales minus cost of goods sold divided by net sales. A larger gross margin implies the firm's ability to command higher margins compared to competitors and can be expected to be associated with a differentiation strategy (see, e.g., David et al., 2002, 873; Hambrick, 1983, 693, for empirical applications). The basic reasoning supporting the effect of

higher margins realized by differentiators is that they specifically aim to offer customers a high quality product, which in turn allows them to command a price premium. Such a quality-based price premium, resulting from a successful differentiation strategy, can be expected to be higher than the additional cost of goods sold associated with the increased quality, thus leaving the differentiator with a higher gross margin (Besanko, Dranove, & Shanley, 1996, 467f.). The margin increases realized through a strategy of decreased costs can be expected to be smaller than those resulting from quality premium of differentiators, as the cost-advantage typically goes hand in hand with an average or even below-average product quality. Indeed, David et al. (2002) and Hambrick (1983), for example, empirically show that gross margin is a statistically significant predictor of a differentiation strategy. Thus, firms pursuing an efficiency strategy seem to realize their performance advantage first and foremost by combining the cost-advantage with the asset parsimony advantage. A low capital turnover (see definition above) in particular will allow firms pursuing an efficiency strategy to multiply the realized gross margin and hence to achieve a position of superior economic performance.

Scale

To address the scale dimension of the pursued strategy, I applied three measures: (1) market share, (2) logarithm of net sales in US dollars, and (3) logarithm of number of employees (see, e.g., Hambrick, 1983, 693; Makhija, 2003, 445; Shalit & Sankar, 1977, 290ff.; Spanos et al., 2004, 151f.; Wiggins & Ruefli, 2002, 87). I used the logarithm of net sales and number of employees "to reflect the differential problem of adding equal absolute amounts of resources in different size classes" (Cool, 1985, 310).

Technological and innovative capabilities

To capture a firm's technological and innovative capabilities, I applied the R&D ratio – R&D expenses divided by net sales (see, e.g., Grabowski & Mueller, 1978, 330; Mauri & Michaels, 1998, 214). Caves (1982) argues that R&D expenditures reflect a firm's endowment of unique knowledge in the possession of individuals and teams within the firm. In other words, they are investments in intangible resources of the firm (Baily, 1972, 73).

A factor analysis of these seven variables produced four factors with eigenvalues exceeding 1. Based on the underlying content, I labeled these factors (1) scale, (2) capital intensity, (3) differentiation, and (4) technological and innovative capabilities. Figure 35 shows the factor loadings, eigenvalues, and portions of variance explained for the firm-level variables.

The Kaiser-Meyer-Olkin measure of sampling adequacy of this factor analysis is also larger than 0.5, indicating that a factor analysis of the included variables is meaningful (Cureton & D'Agostino, 1983, 389f.). Additionally, the measure of sampling adequacy of all included variables is again also larger than 0.5. All three measures introduced to assess scale load on the same factor, confirming the classification. In addition, fixed capital turnover and capital investment intensity, established as measures of capital intensity, both load on the same factor. Also for the firm-level data, the low factor loadings of all variables on the other factors underline the parsimonious representation of the tested determinants.

Figure 35: Factor analysis firm-level determinants
(N = 6.385; rotated factor matrix: Varimax with Kaiser Normalization)

	Component			
	1 **Scale**	2 **Capital intensity**	3 **Differen-tiation**	4 **Techno-logical and innovative capa-bilities**
Fixed capital turnover	-0.080	0.751	0.056	0.005
Capital investment intensity	0.026	0.723	-0.092	-0.005
Gross margin	0.038	-0.033	0.989	-0.002
Market share	0.640	0.071	-0.074	-0.020
Log net sales (in US $)	0.920	-0.123	0.116	0.016
Log number of employees	0.926	-0.067	0.052	0.025
R&D ratio	0.008	0.001	-0.002	1.000
Eigenvalue	2.124	1.112	1.011	1.001
Portion of variance explained	0.303	0.159	0.144	0.143
Cummulative variance explained	0.303	0.462	0.607	0.750

4 Results and Discussion

Industry-level determinants

Figure 36 reports the findings for the regression of the industry-level determinants. Bivariate correlations for these and other regression analyses are reported in Figure 37 through Figure 46. For both the IAP based on ROA (IAP ROA) and the IAP based on Tobin's q (IAP q), the insignificant F statistic and the very low adjusted R^2 show that the theoretically derived determinants are not able to explain the sustainability of industry advantages observable in the sample. Additionally, for the regression with IAP q as dependent variable, the t statistics for all tested determinants except concentration are insignificant. For the regression with IAP ROA as dependent variable, the t statistics for all tested determinants are insignificant.

Thus, Hypotheses 1, 2, and 3 have to be rejected. This finding is quite surprising in light of the significant number of past research results that were able to show significant effects of industry-level determinants on inter-industry performance differences (see part two). However, none of these past empirical approaches tested the effect on the sustainability of IA. In other words, these determinants might be able to explain variability of performance, but not the sustainability of superior economic performance resulting from sustainable industry advantages. Amit & Schoemaker (1993) emphasize that it is not industry characteristics per se that matter, but the fit of the firms' actions to the industry-specific characteristics. When industry incumbents achieve as a group at least on average to react to the specific industry conditions in a superior way, they might be able to compensate for initial structural disadvantages and thus nonetheless establish sustainable IA. Empirical findings, e.g., by Richardson (1972), Thompson (2007), and Tripsas (1997), emphasize the impact of industry-specific capabilities as a way to isolate a firm from structural disadvantages. My results indicate that such industry-specific capabilities may emerge on an industry-wide basis and thus allow industry members to isolate themselves at least partly from industry characteristics. This interpretation is supported by the findings of Thompson (2007), showing a positive impact for collaborative arrangements and availability of key technological components for incumbents.

Figure 36: Regression analysis of industry-level determinants
(t statistics in parentheses; †, *, **, and *** denote significance level of 10%, 5%, 1%, and 0.1% for t and F statistics; IAP ROA: industry advantage period with ROA as performance variable; IAP q: industry advantage with Tobin's q as performance variable)

	Dependent variables	
	IAP ROA	IAP q
Constant	9.061	15.266
	(19.160) ***	(4.615) ***
Capital intensity	1.682	-0.424
	(1.782)	(-0.541)
Concentration	-0.206	-3.478
	(-0.422)	(-2.191) *
Growth	-0.300	6.526
	(-0.757)	(0.838)
Technological resource intensity	-0.296	39.624
	(-0.750)	(1.560)
R	0.241	0.438
F	1.128	1.779
Adjusted R^2	0.007	0.084
N	78	35

Figure 37: Industry-level correlations and significance for the industry advantage period (IAP) based on ROA as dependent variable (IAP ROA: industry advantage period with ROA as performance variable)

		IAP ROA	Capital intensity	Concentration	Growth	Technological resource intensity
Pearson correlation	IAP ROA	1.000				
	Capital intensity	0.203	1.000			
	Concentration	-0.047	0.002	1.000		
	Growth	-0.092	-0.035	-0.013	1.000	
	Technological resource intensity	-0.080	0.026	0.006	-0.001	1.000
Significance	IAP ROA					
	Capital intensity	0.037				
	Concentration	0.341	0.494			
	Growth	0.211	0.382	0.456		
	Technological resource intensity	0.243	0.410	0.478	0.496	

Figure 38: Industry-level correlations and significance for the industry advantage period (IAP) based on Tobin's q as dependent variable
(IAP q: industry advantage period with Tobin's q as performance variable)

		IAP q	Capital intensity	Concentration	Growth	Technological resource intensity
Pearson correlation	IAP q	1.000				
	Capital intensity	-0.002	1.000			
	Concentration	-0.048	0.042	1.000		
	Growth	-0.006	-0.053	-0.021	1.000	
	Technological resource intensity	-0.105	0.013	-0.001	0.000	1.000
Significance	IAP q					
	Capital intensity	0.495				
	Concentration	0.359	0.374			
	Growth	0.483	0.344	0.438		
	Technological resource intensity	0.211	0.460	0.498	0.499	

Figure 39: Firm-level correlations and significance for the competitive advantage period (CAP) based on ROA as dependent variable
(CAP ROA: competitive advantage period with ROA as performance variable)

		CAP ROA	Scale	Capital intensity	Differentiation	Technological and innovative capabilities
Pearson correlation	CAP ROA	1.000				
	Scale	0.146	1.000			
	Capital intensity	-0.029	0.002	1.000		
	Differentiation	0.035	-0.048	-0.185	1.000	
	Technological and innovative capabilities	-0.014	-0.394	-0.183	0.243	1.000
Significance	CAP ROA					
	Scale	0.000				
	Capital intensity	0.048	0.444			
	Differentiation	0.024	0.003	0.000		
	Technological and innovative capabilities	0.220	0.000	0.000	0.000	

Figure 40: Firm-level correlations and significance for the competitive advantage period (CAP) based on Tobin's q as dependent variable
(CAP q: competitive advantage period with Tobin's q as performance variable)

		CAP q	Scale	Capital intensity	Differentiation	Technological and innovative capabilities
Pearson correlation	CAP q	1.000				
	Scale	0.135	1.000			
	Capital intensity	-0.001	-0.020	1.000		
	Differentiation	-0.005	-0.001	0.139	1.000	
	Technological and innovative capabilities	-0.057	-0.202	0.111	0.094	1.000
Significance	CAP q					
	Scale	0.000				
	Capital intensity	0.482	0.242			
	Differentiation	0.435	0.485	0.000		
	Technological and innovative capabilities	0.023	0.000	0.000	0.000	

Figure 41: Firm-level correlations and significance in the industry category Pharmaceutical Preparations industry (SIC 2834) for the competitive advantage period (CAP) based on ROA as dependent variable
(CAP ROA: competitive advantage period with ROA as performance variable)

		CAP ROA	Scale	Capital intensity	Differentiation	Technological and innovative capabilities	Scale x technological and innovative capabilities
Pearson correlation	CAP ROA	1.000					
	Scale	0.722	1.000				
	Capital intensity	-0.198	-0.159	1.000			
	Differentiation	0.184	0.097	-0.496	1.000		
	Technological and innovative capabilities	0.206	0.224	0.045	-0.066	1.000	
	Scale x technological and innovative capabilities	-0.431	-0.702	0.026	-0.002	-0.062	1.000
Significance	CAP ROA						
	Scale	0.000					
	Capital intensity	0.002	0.011				
	Differentiation	0.004	0.082	0.000			
	Technological and innovative capabilities	0.001	0.001	0.258	0.169		
	Scale x technological and innovative capabilities	0.000	0.000	0.353	0.489	0.186	

Figure 42: Firm-level correlations and significance in the industry category Pharmaceutical Preparations (SIC 2834) for the competitive advantage period (CAP) based on Tobin's q as dependent variable
(CAP q: competitive advantage period with Tobin's q as performance variable)

		CAP q	Scale	Capital intensity	Differentiation	Technological and innovative capabilities	Scale x technological and innovative capabilities
Pearson correlation	CAP q	1.000					
	Scale	0.335	1.000				
	Capital intensity	-0.207	-0.049	1.000			
	Differentiation	0.199	0.078	-0.989	1.000		
	Technological and innovative capabilities	0.218	-0.229	0.040	-0.054	1.000	
	Scale x technological and innovative capabilities	-0.026	-0.833	0.003	-0.034	0.551	1.000
Significance	CAP q						
	Scale	0.087					
	Capital intensity	0.205	0.424				
	Differentiation	0.214	0.379	0.000			
	Technological and innovative capabilities	0.192	0.180	0.437	0.415		
	Scale x technological and innovative capabilities	0.459	0.000	0.496	0.447	0.009	

Figure 43: Firm-level correlations and significance in the industry category Motor Vehicle Parts & Accessories (SIC 3741) for the competitive advantage period (CAP) based on ROA as dependent variable
(CAP ROA: competitive advantage period with ROA as performance variable)

		CAP ROA	Scale	Capital intensity	Differentiation	Technological and innovative capabilities	Scale x technological and innovative capabilities
Pearson correlation	CAP ROA	1.000					
	Scale	-0.008	1.000				
	Capital intensity	-0.045	0.432	1.000			
	Differentiation	0.122	-0.218	-0.808	1.000		
	Technological and innovative capabilities	0.214	-0.053	-0.814	0.841	1.000	
	Scale x technological and innovative capabilities	0.133	-0.675	-0.830	0.665	0.669	1.000
Significance	CAP ROA						
	Scale	0.470					
	Capital intensity	0.347	0.000				
	Differentiation	0.138	0.025	0.000			
	Technological and innovative capabilities	0.028	0.318	0.000	0.000		
	Scale x technological and innovative capabilities	0.119	0.000	0.000	0.000	0.000	

Figure 44: Firm-level correlations and significance in the industry category Motor Vehicle Parts & Accessories (SIC 3741) for the competitive advantage period (CAP) based on Tobin's q as dependent variable
(CAP q: competitive advantage period with Tobin's q as performance variable)

		CAP q	Scale	Capital intensity	Differentiation	Technological and innovative capabilities	Scale x technological and innovative capabilities
Pearson correlation	CAP q	1.000					
	Scale	-0.135	1.000				
	Capital intensity	0.011	-0.290	1.000			
	Differentiation	0.122	0.430	-0.610	1.000		
	Technological and innovative capabilities	-0.055	0.475	-0.449	0.729	1.000	
	Scale x technological and innovative capabilities	0.072	-0.806	0.164	-0.234	-0.069	1.000
Significance	CAP q						
	Scale	0.247					
	Capital intensity	0.478	0.067				
	Differentiation	0.268	0.011	0.000			
	Technological and innovative capabilities	0.390	0.005	0.008	0.000		
	Scale x technological and innovative capabilities	0.359	0.000	0.202	0.116	0.363	

Figure 45: Firm-level correlations and significance in the industry category Services-Prepackaged Software (SIC 7372) for the competitive advantage period (CAP) based on ROA as dependent variable
(CAP ROA: competitive advantage period with ROA as performance variable)

		CAP ROA	Scale	Capital intensity	Differentiation	Technological and innovative capabilities	Scale x technological and innovative capabilities
Pearson correlation	CAP ROA	1.000					
	Scale	0.466	1.000				
	Capital intensity	-0.026	0.175	1.000			
	Differentiation	0.165	0.053	-0.772	1.000		
	Technological and innovative capabilities	0.085	-0.048	-0.894	0.837	1.000	
	Scale x technological and innovative capabilities	-0.177	-0.647	-0.756	0.532	0.708	1.000
Significance	CAP ROA						
	Scale	0.000					
	Capital intensity	0.364	0.008				
	Differentiation	0.012	0.235	0.000			
	Technological and innovative capabilities	0.125	0.258	0.000	0.000		
	Scale x technological and innovative capabilities	0.008	0.000	0.000	0.000	0.000	

Figure 46: Firm-level correlations and significance in the industry category Services-Prepackaged Software (SIC 7372) for the competitive advantage period (CAP) based on Tobin's q as dependent variable
(CAP q: competitive advantage period with Tobin's q as performance variable)

		CAP q	Scale	Capital intensity	Differentiation	Technological and innovative capabilities	Scale x technological and innovative capabilities
Pearson correlation	CAP q	1.000					
	Scale	0.354	1.000				
	Capital intensity	0.258	-0.307	1.000			
	Differentiation	-0.003	0.418	-0.412	1.000		
	Technological and innovative capabilities	-0.249	0.439	-0.736	0.570	1.000	
	Scale x technological and innovative capabilities	-0.487	-0.896	0.066	-0.232	-0.120	1.000
Significance	CAP q						
	Scale	0.006					
	Capital intensity	0.035	0.015				
	Differentiation	0.493	0.001	0.001			
	Technological and innovative capabilities	0.041	0.001	0.000	0.000		
	Scale x technological and innovative capabilities	0.000	0.000	0.324	0.053	0.204	

Furthermore, intra-industry spillovers (Griliches & Lichtenberg, 1984, 324f.; Scherer, 1982, 627ff.) can explain the emergence of industry-specific capabilities on an industry-wide bass. Finally, the differences in industry-specific results presented in the firm-level analysis reported below support the existence of industry-specific capabilities.

Firm-level determinants

The results for the regression of the firm-level determinants are presented in Figure 47. For both dependent variables – the CAP based on ROA (CAP ROA) and the CAP based on Tobin's q (CAP q) – the F statistics show that the tested determinants significantly contribute ($p \leq 0.001$) to the explanation of the sustainability of CA. However, the adjusted R^2 is in both cases comparatively low (adjusted $R^2 = 0.024$ and adjusted $R^2 = 0.016$), which may be a result of the cross-industry analysis leading to a considerable heterogeneity in the sample. The influence of the tested determinants can be expected to vary across the industries tested due to considerable differences in industry characteristics (see part two). Furthermore, several other industry-specific factors besides the included general determinants probably influence the sustainability of CA across the broad range of analyzed industries. As a consequence, the usage of generic strategies as well as the importance of technological and innovative capabilities can be expected to be affected by the type of industry and other environmental factors (Beal, 2000, 40ff.; Dreyer & Gronhaug, 2004, 409ff.). This line of reasoning would be supported by higher values for the adjusted R^2 in the industry-specific regression models of firm-level determinants presented later on. At the same time, however, the high significance levels of both regressions models underline the explanatory power of the tested determinants in the cross-industry firm-level models.

Hypothesis 4 predicted that asset parsimony positively affects the sustainability of CA. The results show that the coefficient of capital intensity fails to reach statistical significance for both dependent variables. Thus, in the context of the cross-industry regression models, I find no support for Hypothesis 4. Although efficiency increases resulting from a strategy of asset parsimony can increase firm performance – at least in the short-term (see, e.g., Dess & Davis, 1984, 482; White, 1986, 227) – in general firms cannot translate these advantages into an increased sustainability of CA vis-à-vis their competitors. Reasons for this effect may be that efficiency increases are limited and that they are more easily duplicated by other competitors than other strategies.

Hypothesis 5 argued that differentiation positively affects the sustainability of CA. The positive and significant ($p \leq 0.1$) coefficient for the differentiation variable with the CAP ROA as the dependent variable confirms this hypothesis for the accounting-based performance dimension. In contrast to an asset-parsimony strategy, a differentiation strategy allows firms to generally insulate themselves from competition leading to an increased sustainability of CA with respect to accounting-based performance (Porter, 1980, 37). For example, brand- (Kotha & Vadlamani, 1995, 78), reputation- (Phillips et al., 1983, 27) and product technology–related (Porter, 1985, 121) differentiation, in conjunction with a higher product quality, seem to allow firms to avoid performance-deterring price competition. By offering a product perceived to be unique, differentiators attempt to create customer loyalty and price inelasticity on the part of the buyers, permitting them to increase the sustainability of CA. Furthermore, quality learning curve effects proposed by Fine (1983) can explain the observed effect.

Figure 47: Regression analysis of firm-level determinants
(t statistics in parentheses; †, *, **, and *** denote significance level of 10%, 5%, 1%, and 0.1% for t and F statistics; CAP ROA: competitive advantage period with ROA as performance variable; CAP q: competitive advantage period with Tobin's q as performance variable)

	Dependent variables	
	CAP ROA	CAP q
Constant	7.841	7.186
	(125.595) ***	(81.450) ***
Scale	0.503	0.352
	(8.610) ***	(4.469) ***
Capital intensity	-0.090	0.013
	(-0.938)	(0.177)
Differentiation	0.195	-0.010
	(1.647) †	(-0.080)
Technological and innovative capabilities	3.843	-1.290
	(2.048) *	(-1.067)
R	0.157	0.139
F	20.566 ***	6.010 ***
Adjusted R^2	0.024	0.016
N	3,253	1,233

For the capital market–based performance dimension, however, the hypothesis is not supported. On a cross-industry basis, the capital market does not seem to value differentiation as a strategy for increasing the sustainability of CA.

The scale coefficient is significant ($p \leq 0.001$) and positive for both dependent variables. This result confirms Hypothesis 6, which predicted a positive influence of scale on the sustainability of CA. Factors such as market power (Caves & Porter, 1977, 1; Kotha & Nair, 1995, 505),

reduced risk (Porter, 1980, 18), economies of scale (Stigler, 1958, 54ff.), and learning curve effects (Abernathy & Wayne, 1974, 110) – typically going along with increased scale of firm activities – seem to translate into a higher sustainability of CA. Hence, in general a strategy of scale allows firms to protect themselves longer from performance-deterring competitive processes. The results for the tested generic strategies are generally in line with the SBV, suggesting that certain generic strategies will lead to sustained CA.

Finally, Hypothesis 7 forecast a positive influence of technological and innovative capabilities on the sustainability of CA. For the accounting-based regression, the coefficient for this determinant is significant ($p \leq 0.05$) and positive. Consequently, in this performance dimension the results confirm Hypothesis 7 for the cross-industry analysis. On the whole, unique knowledge in the possession of the firm is an auspicious source of internal strengths, resulting in a longer sustainability of a superior competitive position. Thus, the analysis supports the positive effect of resources and capabilities on the sustainability of CA predicted by the RBV.

For the capital market–based performance dimension, I find no support for Hypothesis 7. In fact, in the capital market–related cross-industry analysis scale is the only determinant that has a significant impact on the sustainability of CA. This result indicates that in the capital markets, on a cross-industry basis, no strategic set-up except the scale of the firm is positively perceived as increasing the sustainability of superior economic performance resulting from related sustainable CA. Bhushan (1989) shows that analyst coverage is very strongly correlated with firm size. As a result, information about small firms gets out more slowly and investors face much higher costs for acquiring information about small firms (Hong, Lim, & Stein, 2000, 266). Investors consequently have to devote much more effort to learning about the stocks of these firms. These information asymmetries in the capital markets offer a reasonable explanation for the observed results. Furthermore, Merton (1987) and Grossman & Miller (1988), for example, argue that the market-making capacity of larger firms may be higher. At the same time, supply shocks can lead to a greater tendency towards reversal for small firms – resulting in negatively correlated returns (Hong et al., 2000, 267). Whereas the former effect should lead to a longer CAP of large firms, the latter should result in a shorter CAP for small firms. Thus, both lines of argumentation support my findings.

Overall, the differences in the findings for the two dependent variables emphasize again the multidimensionality of firm performance. Consequently, it is crucial that empirical analysis utilizing firm performance as a variable include more than one performance dimension and address the specific dimensions and related implications for the research questions being ana-

lyzed (Combs et al., 2004, 276 and 279ff.). Such a dimension specific approaches can lead to much richer and balanced conclusions.

In Figure 48, the results for the regression of firm-level determinants in the industry category Pharmaceutical Preparations (hereafter, "pharmaceutical industry") are presented. In addition to the basic regression models for both dependent variables (Model 1), the table also shows the results for a second model (Model 2). In this extended model, I included a product term of scale and technological and innovative capabilities to show a potential moderating effect of scale on the relationship between technological and innovative capabilities and the sustainability of CA (see, e.g., Aguinis, 1995, 1143f.; Aguinis, Beaty, Boik, & Pierce, 2005, 94; Zedeck, 1971, 300f.). Please note that the introduction of this product term into the regression of firm-level determinants in the cross-industry sample resulted in no significant effects and thus was not included in the presentation of results. Additionally, no other product terms (e.g., of capital intensity and scale) nor squared terms (e.g., of scale) – the latter indicating a non-linear relationship – delivered any significant effect in the industry and firm-level models and thus, for reasons of simplification, none are reported in the results presented.

The F statistic of Model 1 and Model 2 is insignificant ($F = 1.094$ and $F = 1.305$) for the regression with CAP q as the dependent variable. This failure of the models to reach a significant level should be particularly attributable to the small sample size of only 18 firms realizing a CAP q in the pharmaceutical industry and the resulting very low statistical power (Cohen, 1990, 1304ff.). This subsample thus does not permit us to draw any conclusions on determinants affecting the sustainability of capital market–based CA in this industry.

For the regression models with CAP ROA as a dependent variable, having a much larger sample size ($N = 210$), the tested models reach statistical significance. The F statistic of 59.871 in Model 1 demonstrates that the tested determinants significantly ($p \leq 0.001$) contribute to the explanation of differences in the sustainability of accounting-based CA in the pharmaceutical industry. As hypothesized above, in this industry-specific regression analysis the model is able to explain a much higher portion of the variance observable for the CAP ROA (adjusted $R^2 = 0.530$). When focusing the analysis on just one industry, the decreasing heterogeneity due to the absence of inter-industry differences allows us to reach higher explanation levels for the variance of the dependent variables.

Figure 48: Regression analysis of firm-level determinants for the industry category Pharmaceutical Preparations (SIC 2834)
(t statistics in parentheses; †, *, **, and *** denote significance level of 10%, 5%, 1%, and 0.1% for t and F statistics; CAP ROA: competitive advantage period with ROA as performance variable; CAP q: competitive advantage period with Tobin's q as performance variable)

	Dependent variables			
	CAP ROA		CAP q	
	Model 1	Model 2	Model 1	Model 2
Constant	11.040	10.989	9.164	8.333
	(37.770) ***	(37.635) ***	(7.960) ***	(6.558) ***
Scale	3.027	3.428	1.122	2.681
	(14.006) ***	(11.157) ***	(1.654)	(2.681) †
Capital intensity	-0.191	-0.146	-1.969	-1.631
	(-0.738)	(-0.565)	(-0.487)	(-0.416)
Differentiation	0.281	0.268	-0.732	-0.611
	(1.850) †	(1.771) †	(-0.371)	(-0.320)
Technological and innovative capabilities	20.264	15.586	49.706	2.740
	(1.208)	(0.924)	(1.267)	(0.053)
Scale x technological and innovative capabilities		18.037		38.256
		(1.826) †		(1.364)
R	0.734	0.739	0.502	0.593
F	59.871 ***	49.109 ***	1.094	1.305
Adjusted R^2	0.530	0.535	0.022	0.082
N	210	210	18	18

Entering the product term described above in addition to the hypothesized determinants increases the adjusted R^2 to 0.535. This change of the adjusted R^2 is statistically significant ($p \leq 0.1$), supporting the presence of a moderating effect (Aguinis, 2004, 33). Thus, the following further discussion of the results for the pharmaceutical industry will focus on Model 2.

The coefficient of the capital intensity variable also fails in the case of the pharmaceutical industry to reach statistical significance. Consequently, Hypothesis 4 is again not supported. Analogous to the cross-industry analysis, the coefficients for differentiation and scale are significant ($p \leq 0.1$ and $p \leq 0.001$) and positive, confirming Hypotheses 5 and 6 for the pharmaceutical industry. The coefficient for technological and innovative capabilities is positive as predicted in Hypothesis 7. In contrast to the cross-industry regression analysis, the coefficient is statistically not significant. Hence, Hypothesis 7 is not directly supported for this industry. However, the product term of scale and technological and innovative capabilities is significant ($p \leq 0.1$) and positive; i.e., in the pharmaceutical industry an increase of scale significantly increases the slope of technological and innovative capabilities on the sustainability of CA (Cohen et al., 2003, 257).

Pursuing an efficiency strategy via asset parsimony does not translate into an increase of the sustainability of CA for pharmaceutical firms. At the same time, strategies of differentiation and scale are sources that increase the sustainability of CA. A look at the demand side as well as the competitive structure in the industry explains the failure of an asset parsimony strategy to have a positive effect on the CAP. On the demand side, it is usually not the consumer who decides on the usage of particular drug but the physician, who typically lacks information about relative prices (Ellison, Cockburn, Griliches, & Hausman, 1997, 437). As a result, lower prices going along with a strategy of asset parsimony (Besanko et al., 1996, 466) are in many cases not relevant decision criteria in the markets when pharmaceutical products are bought. On the supply side, strong patent regulations for pharmaceutical products – especially in the developed countries – and continuous innovations complicate restricting investments to few specific assets and thus successfully pursuing a strategy of asset parsimony (Ramrattan & Szenberg, 2006, 67f.). At the same time, these factors favor differentiation strategies in the pharmaceutical industry.

The benefits of a scale strategy in the pharmaceutical industry are obvious. Pharmaceutical firms spend on average 700 million US dollars on each new developed drug and another 400 million US dollars on marketing the drug (Bastianelli, Eckhardt, & Teirlynck, 2001, 118; Leask & Parker, 2007, 724). In addition, it takes, on average, 15 years to develop the drugs from initial discover to approval by the national drug agencies (Higgins & Rodriguez, 2006, 353). As a result, even big firms heavily rely on international blockbuster products to which they allocate almost their entire marketing and sales budgets (Bastianelli et al., 2001, 118f.). In this research-intensive industry these factors result in substantial economies of scale and scope favoring larger firms in the competition (Henderson & Cockburn, 1996, 55f.). Empirical findings show that these economies of scale even increase in the pharmaceutical industry along with increasing firm size (Nesta & Saviotti, 2005, 139). Additionally, large firms can profit from experience effects in trial studies due to the increasing complexity of – especially phase two and three – trials (Danzon, 2006, 14f.). Furthermore, Shuman & Seeger (1986) document that larger firms fundamentally differ from smaller firms, especially with regard to the financial and management resources available. This financial strength of larger firms puts them clearly ahead of smaller firms in an industry with high ratios of R&D and marketing expenditures as well as a relative long time span needed for market introduction.

At the same time, these factors can also explain the surprising finding that technological and innovative capabilities do not increase the sustainability of CA in the pharmaceutical industry

per se, although its firms rely heavily on intangible assets, especially in the form of knowledge in the areas of R&D (Nerkar & Roberts, 2004, 780). Only in combination with the global presence and financial strength of larger pharmaceutical firms can technological and innovative capabilities be leveraged. The necessity of market power in order that intangible assets in the possession of the firm become a valuable resource that increases the sustainability of CA offers a reasonable explanation for my result that only the product term of scale and technological and innovative capabilities has a significant positive effect on the length of CAP ROA. This is emphasized by the results of Nesta and Saviotti (2005), who found that pharmaceutical firms can only produce high quality R&D within their own distinctive competencies. Pooling resources, e.g., in horizontal R&D alliances in an attempt to reach a critical mass, seems not to be a strategic option for small firms trying to overcome disadvantages in the resource position.

Looking at the results for the industry category Motor Vehicle Parts & Accessories (hereafter, "vehicle parts industry") reveals a very different picture for the relationship between the hypothesized determinants and the CAP ROA (Figure 49). In both models, the adjusted R^2 is lower (adjusted $R^2 = 0.090$ and adjusted $R^2 = 0.080$) than in the pharmaceutical industry, but still significant ($p \leq 0.05$), and larger than in the cross-industry analysis. The inclusion of the product term in Model 2 does not increase the adjusted R^2 compared to Model 1. For the regression analyses with CAP q as the dependent variable, the F statistic is insignificant in both models ($F = 0.596$ and $F = 0.456$). Again, this may be a consequence of low statistical power resulting from a small sample size ($N = 28$). The further presentation and discussion of results for the vehicle parts industry will thus focus on Model 1 of the regression analysis with CAP ROA as the dependent variable.

In contrast to the preceding regression models for industry-level determinants, the coefficient for capital intensity is significant ($p \leq 0.05$). As asset parsimony is measured by capital intensity, higher values for this determinant are associated with a decreased asset parsimony. Thus, the significant positive coefficient of the capital intensity variable does not support Hypothesis 4. The results even indicate a converse effect. The coefficient for differentiation is not significant, leading to a rejection of Hypothesis 5. The effect of scale is significant ($p \leq 0.1$) but negative. Hence, Hypothesis 6 is also not supported. Only Hypothesis 7 is confirmed by a significant ($p \leq 0.01$) and positive effect of technological and innovative capabilities on the CAP ROA.

Figure 49: Regression analysis of firm-level determinants for the industry category Motor Vehicle Parts & Accessories (SIC 3741)
(t statistics in parentheses; †, *, **, and *** denote significance level of 10%, 5%, 1%, and 0.1% for t and F statistics; CAP ROA: competitive advantage period with ROA as performance variable; CAP q: competitive advantage period with Tobin's q as performance variable)

	Dependent variables			
	CAP ROA		CAP q	
	Model 1	Model 2	Model 1	Model 2
Constant	18.033 (4.843) ***	18.014 (4.811) ***	5.728 (3.913) ***	5.759 (2.999) **
Scale	-1.271 (-1.871) †	-0.960 (-0.925)	-0.482 (-0.774)	-0.513 (-0.377)
Capital intensity	69.507 (2.611) *	72.190 (2.616) *	2.337 (0.502)	2.335 (0.490)
Differentiation	-6.621 (-0.345)	-5.805 (0.766)	16.730 (1.378)	16.635 (1.284)
Technological and innovative capabilities	298.735 (3.130) **	276.110 (2.476) *	-57.560 (-0.815)	-56.050 (-0.602)
Scale x techno-logical and inno-vative capabilities		19.662 (0.399)		-1.419 (-0.026)
R	0.368	0.371	0.306	0.306
F	2.977 *	2.387 *	0.596	0.456
Adjusted R^2	0.090	0.080	-0.064	-0.112
N	81	81	28	28

The vehicle parts industry is characterized by a substantial need for specialized investments to meet the specific requirements of their customers (Carr, 1993, 562f.). This effect has even been increased by two trends: (1) the development of whole systems of components for car manufacturers and (2) the association of firms with particular systems or technologies (Sadler, 1999, 111). These specific investments result in negative impacts on the asset parsimony of firms and are associated with a high capital intensity on the part of vehicle parts suppliers (Head, Ries, & Spencer, 2004, 40ff.; Kotha & Nair, 1995, 504). At the same time, however, a strategy of specialization in lieu of focusing on asset parsimony allows vehicle parts suppliers to increase the sustainability of CA. The benefits of offering a product focused on the need of the customer seem to outweigh potential risks resulting from hold-up. Hold-up describes the situation that occurs when a party A (in this case, the vehicle parts supplier) does not take a Pareto optimal agreement because after A has made an agreement-specific investment, a party B (in this case, the car manufacturer) might want to demand a larger share of the profits due to the increased negotiation power of B after A's specific investment (Klein, Crawford, & Alchian, 1978, 298f.; Williamson, 1979, 251). Studies by Lamming (1993) and Head et al. (2004), e.g., indicate that the benefits of offering a customer specific products are reinforced

by vertical R&D networks connecting vehicle parts suppliers and car manufacturers, which decrease the risk of opportunistic behavior. This is in line with the findings of Battigalli, Fumagalli, & Polo (2007), showing that lower buyer power – which can be established via joint R&D efforts, e.g. – alleviates the problem of hold-up and leaves both sellers and buyers better off.

The high degree of specialization of vehicle parts suppliers has resulted in a highly fragmented industry (Ramcharran, 2001, 12f.). Potentials for realizing economies of scale or exercising market power are thus limited (Carr, 1993, 564). Together with the need to offer a high degree of manufacturing flexibility (Ramcharran, 2001, 12f.), e.g., just-in-time delivery, these industry characteristics explain why smaller firms – in contrast to Hypothesis 6 – realize a higher sustainability of CA than larger firms.

Although vehicle parts suppliers typically have to invest heavily in order to offer a very specialized product for their (often exclusive) customers, they cannot leverage these specialized investments to realize differentiation-based price premiums as a source for increasing the sustainability of CA. This result is in line with the results of Talluri, Vikery, & Droge (2003), showing that vehicle parts suppliers typically are not able to successfully pursue a differentiation strategy. Even when the firms succeed in differentiating their product, price pressure and control exercised by the for the most part large and powerful car manufacturers (Sadler, 1999, 110f.) should leave vehicle parts suppliers almost no freedom to harvest the fruits of a successful differentiation strategy: higher prices for the products offered. Insulating a firm from the competitive forces in the industry is hardly attainable for motor vehicle parts suppliers in the presence of customers with a considerable amount of negotiation power.

Intangible assets in the form of technological and innovative capabilities can also increase the sustainability of CA in the vehicle parts industry (see also Carr, 1993, 564f.; Sánchez & Pérez, 2003, 57, for the importance of intangible assets in the vehicle parts industry). The industry, characterized by substantial investments in highly specialized products and the need to continually offer new products with improved technological characteristics, is heavily driven by know-how. Firms in the possession of superior (technological) know-how and thus being able to offer state-of-the-art products can translate this advantage into a higher sustainability of CA. In contrast to the pharmaceutical industry, size is no prerequisite in successfully using these firm-specific intangible assets – again, a result probably attributable to the high degree of specialization and fragmentation in the vehicle parts industry.

The regression analyses of firm-level determinants for the industry category Services-Prepackaged Software (hereafter, "software industry") are presented in Figure 50. Applying CAP ROA as the dependent variable, both Model 1 and Model 2 are significant ($p \leq 0.001$). The introduction of the product term of scale and technological and innovative capabilities results in a significant increase of the adjusted R^2 ($p \leq 0.05$). Likewise, for the regression analyses with CAP q as the dependent variable, both regression models are significant ($p \leq 0.001$). However, the introduction of the product term does not lead to a significant increase of the adjusted R^2. Consequently, the following discussion of the software industry's results focuses on Model 2 for the accounting-based performance dimension and on Model 1 for the capital market–related dimension. Once again, the adjusted R^2 is markedly higher than in the cross-industry sample for both dependent variables.

Figure 50: Regression analysis of firm-level determinants for the industry category Services-Prepackaged Software (SIC 7372)
(t statistics in parentheses; †, *, **, and *** denote significance level of 10%, 5%, 1%, and 0.1% for t and F statistics; CAP ROA: competitive advantage period with ROA as performance variable; CAP q: competitive advantage period with Tobin's q as performance variable)

	Dependent variables			
	CAP ROA		CAP q	
	Model 1	Model 2	Model 1	Model 2
Constant	7.441	7.349	5.736	6.020
	(6.038) ***	(6.037) ***	(5.232) ***	(5.232) ***
Scale	1.953	3.073	1.238	0.502
	(6.633) ***	(5.560) ***	(4.026) ***	(0.541)
Efficency	-1.624	3.532	5.068	4.943
	(-0.219)	(0.462)	(0.792)	(0.541)
Capital intensity	6.897	7.677	1.391	1.511
	(1.394)	(1.568)	(0.438)	(0.473)
Technological and innovative capabilities	-12.563	-57.169	-75.896	-57.816
	(-0.383)	(-1.529)	(-2.101) *	(-1.372)
Scale x technological and innovative capabilities		37.574		-23.537
		(2.382) *		(-0.840)
R	0.488	0.511	0.583	0.592
F	14.198 ***	12.785 ***	5.796 ***	4.748 ***
Adjusted R^2	0.221	0.241	0.281	0.277
N	187	187	50	50

For both dependent variables the coefficients for capital intensity and differentiation are insignificant. The coefficient for scale in both cases is significant ($p \leq 0.001$) and positive. The results thus confirm Hypothesis 6 but do not support Hypothesis 4 and 5 in either performance dimension for the software industry. With regard to the impact of technological and in-

novative capabilities, the results diverge. The accounting-based analysis finds no significant coefficient for technological and innovative capabilities (not supporting Hypothesis 7) but a significant ($p \leq 0.05$) and positive impact for the product term, in line with a significant increase of the adjusted R^2. Although Hypothesis 7 predicted a positive impact, the capital market–related analysis shows a significant ($p \leq 0.05$) and negative impact of technological and innovative capabilities.

The software industry is characterized by high growth rates (above 10%), a high risk of business failure, and a heterogeneous size structure, with some very large firms, e.g., Microsoft and Oracle, and a large number of much smaller firms (Mann & Sager, 2007, 193; O'Malley & O'Gorman, 2001, 309 & 311). The market environment in which software firms operate is very dynamic and turbulent, resulting in very short technology life cycles (Li & Calantone, 1998, 18). Consequently, firms are more or less constantly playing catch-up with changes in the technology (Honjo, 2000, 578). In this dynamic environment, process flexibility is an important factor steering the CA of firms (Nidumolu & Knotts, 1998, 23). At the same time, however, development of products and human resources is crucial and requires a substantial amount of investment in order to deliver products that meet the latest technological standards (O'Malley & O'Gorman, 2001, 316). Under these circumstances, larger firms enjoy considerable advantages compared to their smaller rivals, as they have highly specialized employees available for use in multiple R&D projects. This reusability shortens the development cycle of new software products and at the same time enhances their reliability (Nidumolu & Knotts, 1998, 111 & 123). Furthermore, technology selection is less crucial for larger firms, as their financial power allows them to pursue several R&D projects simultaneously (Li & Calantone, 1998, 26). These factors explain the dominance of a strategy of scale in this industry.

Furthermore, the rapid rate of change in the software industry also offers an explanation for why an asset parsimony strategy does not increase the sustainability of CA (Nidumolu & Knotts, 1998, 124). Firm efforts have to emphasize development processes and investments in order to respond to the constant environmental changes, thus preventing them from focusing on efficiency gains via asset parsimony.

The existence of only a few large players with a global presence may explain why a differentiation strategy is not increasing the sustainability of CA in the overall industry. Small firms may have not the necessary market power to act successfully as differentiators in the presence of continual environmental change and the need for substantial investments. Moreover, the

short technology cycles especially tend to squeeze out small firms, preventing them from developing a strategic position of differentiation (Honjo, 2000, 577).

Although in the software industry, too, intangible assets in the form of technological and innovative capabilities are hypothesized to have a positive impact on the competitive position (Cusumano & Kemerer, 1990, 1385; Romijn & Albaladejo, 2002, 1065), my results fail to find a positive impact in the accounting-based performance dimension and even show a negative impact in the capital market–oriented dimension. For larger firms, however, technological and innovative capabilities are a source of increased sustainability of CA in the accounting-based performance dimension. This effect may be closely connected to the advantages resulting from reusability of experienced human resources in R&D processes described above. Larger software firms with multiple development projects will typically have a greater opportunity for resource reusability than smaller firms (Nidumolu & Knotts, 1998, 123). This effect may additionally be reinforced by the high failure rate of small software firms (Honjo, 2000, 577), leaving them no chance to develop and/or reuse technological and innovative capabilities.

The short-term orientation of the capital markets and massive problems of investors in predicting the outcome of R&D activities in the presence of a high bankruptcy rate and highly volatile industry environment may explain the observed negative effect of technological and innovative capabilities for the CAP q.

5 Conclusion

The goal of this paper was to identify determinants that significantly increase the sustainability of inter- and intra-industry superior economic performance differences – the former mirroring IA, and the latter, CA. The theoretical foundation for my assessment established three theoretical approaches within strategic management that attempt to explain the sustainability of performance differences within and across industries: the MBV, the SBV, and the RBV.

Altogether, I tested three industry-level determinants: (1) concentration, (2) growth, and (3) entry barriers. Based on an international sample of 6,385 firms covering 99 industries, I find no support for the three theoretically derived industry-level determinants on the sustainability of IA – a quite surprising result given the broad range of past empirical research confirming the impact of these determinants on inter-industry performance differences. In contrast to these past studies, however, I did not test the influence on performance differences, but their influence on the sustainability of a superior economic position stemming from IA (the IAP).

Although these factors may be able to explain performance differences at a single point in time or for a single period, they cannot explain differences in the sustainability of IA observable across industries. Adaptation of the industry members to structural disadvantages in their industry by firm actions may allow them to compensate for these disadvantages or even to gain a sustainable superior position compared to other industries.

On the firm-level, I tested the effect of four potential determinants: (1) asset parsimony, (2) differentiation, (3) scale, and (4) technological and innovative capabilities. In an initial step, I applied these determinants to the overall sample to get a cross-industry assessment of their influence on the sustainability of CA. To analyze industry-specific differences I additionally tested the determinants in three industry specific samples.

The results at the firm-level strongly diverge between the two performance dimensions – accounting-related and capital market–related – applied in the analysis. At the cross-industry-level, my results show a positive impact of differentiation, scale, and technological and innovative capabilities on the sustainability of CA as measured based on the CAP ROA. For asset parsimony, I find no significant effect on the length of the CAP ROA. This does not mean that firms pursuing an efficiency strategy cannot realize CA. However, my results show that a strategy of efficiency cannot increase the sustainability of CA. Performance increases realized by a higher efficiency established via asset parsimony are easily duplicated and thus erode relatively quickly. A strategy of differentiation, however, allows firms to insulate themselves longer from competitive processes that erode CA. Effects such as increased market power and the economies of scale associated with a strategy of scale allow firms to increase the sustainability of CA. Finally, my results confirm the positive impact of resources and capabilities in the form of intangible assets on the sustainability of CA proposed by the RBV – technological and innovative capabilities have a significant positive effect on the CAP ROA.

The results for the CAP q – the capital market–related performance dimension – yield a very different picture, and hence emphasize not only the multidimensionality of the performance phenomena but also the need to interpret results dimension-specifically. On the cross-industry-level, only scale has a significant effect on the length of the CAP q. Scale significantly increases the sustainability of CA from the capital market perspective. Analyst coverage, information asymmetries, market making capacity, and supply shocks offer explanations for the dominance of a scale strategy in the capital market.

The industry-specific analyses reveal that although significant effects exist in the overall sample, the influence of determinants on the sustainability is strongly moderated by the industry context. For example, in the pharmaceutical and the software industry, the positive effect of technological and innovative capabilities on the sustainability of CA is only realizable for larger firms. The moderating effect of the industry is also underscored by the substantially higher adjusted R^2 in the industry-specific regression analyses when compared to the cross-industry analyses. Overall, the industry-specific differences emphasize that although certain general recommendations concerning determinants on the sustainability of CA can be given, the industry-specific situation and the necessary adaptation of firm strategies to these characteristics are crucial. Managers trying to copy successful strategies from firms in other industries – best practice transfers, for example – have to carefully consider whether differences in the industry characteristics will allow such a transfer. If the differences in the industry-specific situation are substantial, a blind application may even lead to competitive disadvantages.

The sample selection and variable measurements applied in this study are open to question. However, the application of a broad international sample for a period of 26 years should offer a reasonable basis for drawing conclusions on determinants of the sustainability of IA and CA. The operationalization of determinants is not only closely aligned with the theoretical line of argumentation leading to the tested hypothesis but also builds on measures accepted and previously confirmed in strategic management research. A further limitation arises from the fact that I was not able to operationalize the concept of dynamic capabilities – one of today's dominating extensions of the RBV, which offers substantial explanatory power for the dynamics of CA. However, the results of part three already indirectly support the existence of dynamic capabilities.

In a next step, further studies may apply a finer-grained assessment of pursued strategies in an attempt to draw more differentiated conclusions on the effect different strategic set-ups have on the sustainability of CA. If my conclusion, that there are no across-the-board general industry characteristics leading to IA *per se* in all industry environments, is to be questioned, future research will have to develop and test for new determinants driving the sustainability of IA. Determinants proposed in the past are not able to explain differences in the sustainability of IA that are observable in reality.

Part Five: Conclusion

The review of past research on superior economic performance conducted in part two revealed that superior economic performance is driven by four main factors: (1) industry structure (MBV/IO economics), (2) firm conduct (SBV), (3) firm resources and capabilities (RBV) and (4) intertemporal dynamics (Austrian school, Schumpeter's approach, hypercompetition, and evolutionary economics).

The influence of intertemporal dynamics raises the question of the concrete sustainability of a position of superior economic performance. The meta-analytic evidence that both industry- and firm-level performance differences are significant (see part two) led me to include in my analysis on the sustainability of superior economic performance not only a firm-level (intra-industry performance differences) but also an industry-level perspective (inter-industry performance differences). In addition to the main results mentioned above, reviewing past empirical research on superior economic performance also revealed a strong focus on two countries (USA and UK), a missing verification outside a few specific industries, and a reliance especially on accounting-related performance measures. To overcome potential biases in past empirical research stemming from sample selection and the dimension of performance measurement, I based my further analyses on an international sample (G7 countries) covering a broad range of industries (99 four-digit SIC industries) and included both an accounting- and a capital market–related performance measure (ROA and Tobin's q).

To assess the sustainability of superior economic performance on these two levels, I applied and adapted the concept of the CAP and supplemented it with the newly developed concept of the IAP. The former, measured by the average number of subsequent years during which a firm achieves statistically significant above-average performance vis-à-vis other firms in the same industry, reflects the sustainability of CA. The latter, measured by the average number of subsequent years during which an industry achieves statistically significant above-average performance vis-à-vis other industries, reflects the sustainability of IA. The term IA was newly introduced to reflect the fact that not only firms can achieve CA over rivals but that an industry as a whole can also realize a superior position in comparison to other industries. In fact, IA offer a theoretical construct for the significant inter-industry performance differences found in the meta-analysis conducted in part two.

The results concerning existence, length, and variability of the CAP and IAP indirectly confirm not only the MBV/IO economics, the SBV, and the RBV, but also dynamic concepts

(Austrian economics, Schumpeter's approach, hypercompetition, evolutionary economics, and dynamic capabilities). Additionally, the quantification of the sustainability of CA and IA allows us a better understanding of how fast competitive dynamics deter intra- and inter-industry performance differences. Whereas the meta-analysis conducted in part two is only able to demonstrate that a significant performance effect exists on both levels, the CAP and IAP demonstrate that these performance differences are sustainable over time and that, on average, IA are more sustainable than CA.

In order to directly confirm the effects proposed by the MBV/IO economics, the SBV and the RBV, in a final step (part four) I analyzed the impact of determinants derived from these theoretical concepts. Testing the effects of determinants furthermore allowed me to:

- Analyze finer-grained models (e.g., impact of different generic strategies),
- Determine exactly which theoretical frameworks show an impact (SBV and/or RBV),
- Identify industry specific differences, and
- Examine moderating effects.

The results for the determinants of the CAP and IAP confirmed the impact of generic strategies (SBV) and resources and capabilities (RBV) – based on an accounting–related measurement. In addition to the effect found in the review of past research (part two – influence on the creation of superior economic performance as a result of connected CA) these results show a link to the sustainability of CA; i.e., both generic strategies and resources and capabilities in the form of technological and innovative capabilities allow firms to generate and to increase the sustainability of CA.

Somewhat surprisingly, I was not able to find a general impact of structural characteristics on the IAP which is hypothesized by the MBV/IO economics, although the majority of past empirical analyses found an influence on the creation of superior economic performance. However, again my perspective is different: I examine the effect on the sustainability of superior economic performance and not on the possible attainment of superior economic performance in a certain year or on average over a period of several years.

Although the cross-industry analyses showed that generally resources and capabilities as well as strategies of size and differentiation positively influence the CAP, I additionally found in-

dustry-specific differences in the effect certain generic strategies and resources and capabilities have on the CAP.

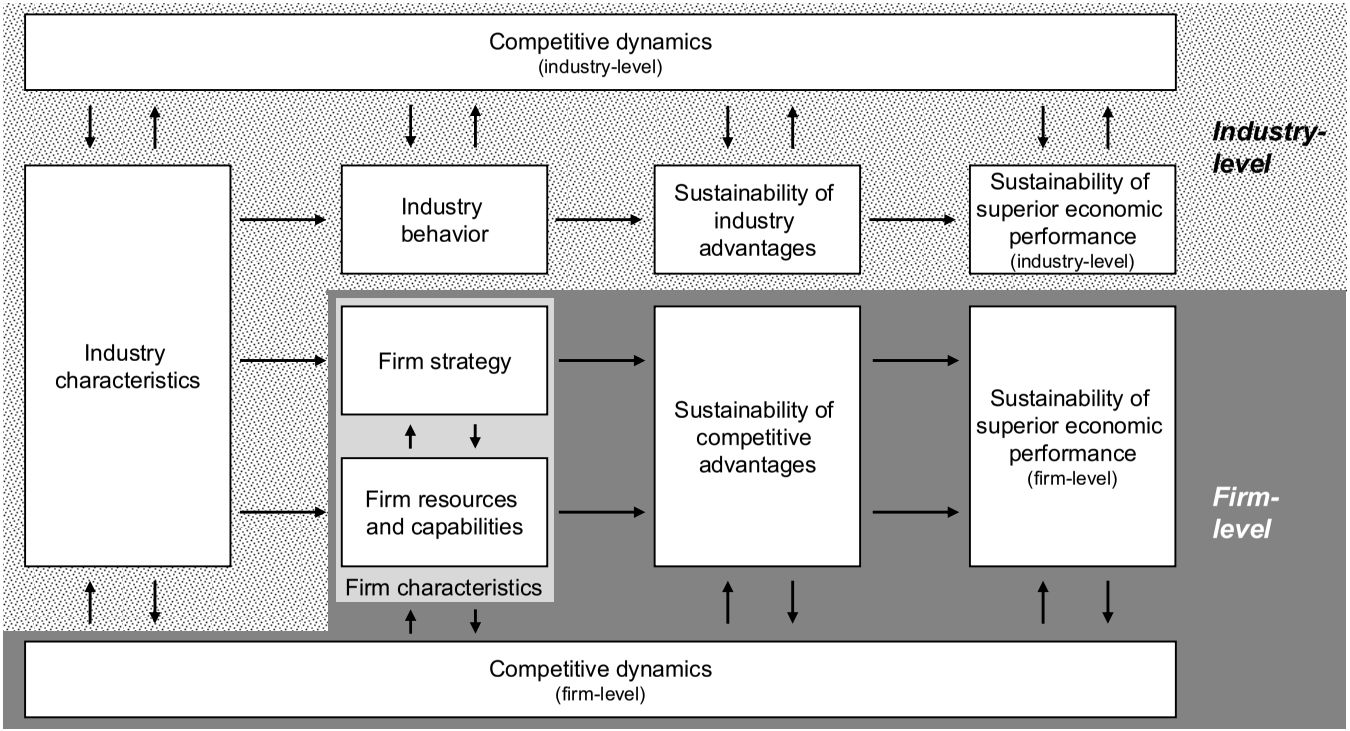
On the one hand, the missing effect of structural industry characteristics makes clear that these characteristics have no general impact *per se* on the IAP across a broad range of industries. On the other hand, the existence of the IAP based on my results confirms that industries can generate and sustain IA. Combining these two results suggests the existence of a mediating effect that industry behavior has on the relationship between industry characteristics and the sustainability of industry advantages. That is to say, an industry can overcome initial disadvantages resulting from structural characteristics by superior adjustment of the industry members (industry behavior) to these initial disadvantages. As a result, industry characteristics have no general influence on the sustainability of IA.

The industry-specific differences in the impact that both pursued strategies and resources and capabilities have on the sustainability of CA underscores again an effect that already became apparent in the results of the review of past research: firm-level effects are markedly influenced by industry characteristics. Consequently, managers have to be careful when adopting (general) success criteria not tested in their own industry-specific environment. Differences in the industry characteristics may otherwise result in a zero or even negative outcome when applying these recommendations.

Figure 51 integrates the findings from parts two, three, and four into an overall framework addressing the factors driving the sustainability of superior economic performance. The framework distinguishes the two relevant levels for analysis of superior economic performance identified in the review of past empirical research (see part two): (1) the industry-level and (2) the firm-level. On both levels, sustainability of superior economic performance can be achieved, as shown by the existence of both an IAP and a CAP (see part three).

At the industry-level, sustainability of superior economic performance results from sustainable IA. The sustainability of IA seems not to be a direct consequence of certain industry characteristics but rather an outcome of industry behavior in the light of certain industry characteristics (see part four). At the firm-level, sustainability of superior economic performance results from sustainable CA. Both firm strategy and firm resources and capabilities –which should be aligned to each other – influence the sustainability of CA (see part two and four).

Figure 51: Factors driving the sustainability of superior economic performance



The impact of both factors is heavily influenced by the characteristics of the industry (see part two and four). Together the two factors, firm strategy and firm resources and capabilities, shape the characteristics of the firm as a result of firm behavior.

At the same time, the sustainability of IA and CA is heavily influenced by competitive dynamics. This is shown by the relatively small IAP and CAP (see part three). However, the review of past research has already emphasized the need for a framework to take into account the profit-deterring effect of competitive processes (see part two). These competitive dynamics exist not only at the firm-level (intra-industry competitive processes) but also at the industry-level (inter-industry competitive processes). The influence of competitive dynamics – based on the Schumpeterian process of "creative destruction" – can in particular be further illustrated. Sustainable IA and the resulting superior economic performance at the industry-level attract firms from other industries. Imitation and innovations initiated from outside the industries may erode the existing IA and, in turn, the position of superior economic performance. At the firm-level, CA and the resulting superior economic performance at the firm-level attract competitors from inside and outside the industry. At this level imitation and innovation may then also erode the position of superior economic performance – in this case, by eroding the CA of the firm.

Additionally, competitive dynamics also influence the other previously mentioned elements and vice versa – another element of the inter-temporal interconnectedness of factors driving the sustainability of superior economic performance. This means that isolating a firm or an industry – at least for a certain time – from the superior economic performance–deterring competitive processes can be achieved by influences of or on each of the other factors in the model. As a result, despite the much lower average values, some firms and industries are able to isolate themselves from these superior performance–deterring processes for 20 years or more (as measured by CAP/IAP). This long-term sustainability of CA that some firms achieve suggests the existence of dynamic capabilities that allow firms to adapt their resources to changes in the environment.

For example, a superior strategic set-up of a firm (under the present industry characteristics) may not only result in sustained CA and thus in superior economic performance but also change the industry characteristics over time via firm-level competitive dynamics. Looking again at the software industry analyzed in part four, Microsoft provides a perfect example of the described interrelationships.

Beginning as a firm focused on operating systems, Microsoft's first break-through was in 1980, when IBM asked them to develop a new operating system for their new personal computer. By 1984, this operating system (MS-DOS) – tailored to work exclusively with Intel microprocessors – had achieved a market share of 85% (see also in the following Vecciato & Roveda, 2007; Yoffie, Metha, & Seseri, 2006). From this position of large scale in the operating system market, they moved to the graphical user interfaces market, where they introduced a software called Windows.

In the early 1990s, they established a leading position in both markets by offering with Windows 3.0 a graphical user interface that not only offered the look and easy-to-use feel of Apple's Macintosh operating system but also allowed users to run their old MS-DOS programs. By establishing these complementary products, Microsoft doubled its revenue per PC: key to this success was their reaching a position of large scale with Windows as well. Instead of selling their graphical user interface through retailers, as other software producers did, they established direct relationships with original equipment manufacturers, which pre-installed the program on each computer's hard drive. Looking at the cost for developing new operating systems with an integrated graphical user interface shows how crucial these exclusive relationships with the original equipment manufacturers and the resulting position of large scale were. By 2005, Microsoft required five years and over 2 billion US dollars to develop a new operating system.

From this superior strategic set-up – which itself had totally changed the industry characteristics – they managed to isolate themselves further from competitive processes and, in fact, changed the industry characteristics again. They used the power achieved in the market for operating systems and transferred it to the application software market – a market that was characterized by a great diversity of sales channels. In the late 1980s, Microsoft was the first firm to offer a bundle of applications at a discount price and even offered a "competitive upgrades" sales program that provided customers switching from Lotus 1-2-3 or Word Perfect with a significant discount. Once they had established a dominant position in the market for application software, other firms had nearly no opportunity to successfully position themselves in this market. The high training costs that would arise if a firm switched to a less common software application created a significant source of market power in this market segment.

With the emergence of the internet, Microsoft once again used its dominant position in the market for operating systems to change the competitive situation in another sub-market. By

integrating the Internet Explorer browser directly into the pre-installed operating system, they were able to defeat previously dominant products from competitors such as Netscape.

These examples in the case of Microsoft show how each of the firm-level components interact with each other over time via competitive dynamics in ways other than the linear relationship, from industry characteristics to firm characteristics, sustainability of CA, and sustainability of superior economic performance. At the same time, they show the interaction of the firm-level factors of the model with the industry characteristics. Microsoft managed to use sustainable CA and sustainable superior economic performance achieved in the market for application software to also realize CA in the other market segments. Once having established sustainable CA in the other market segments, this not only increased the sustainability of CA and superior economic performance in their original market segment (operating systems) but also isolated them from performance-deterring competitive processes in the overall market. As a result, Microsoft managed to increase markedly the sustainability of CA and superior economic performance in the entire software industry. In fact, Microsoft achieved a CAP ROA of 22 years (industry average, 8.15 years) and a CAP q of 16 years (industry average, 6.38 years). In both performance dimensions Microsoft realized the maximum CAP of the software industry.

On the industry-level, the camera industry offers a good example of how distinctive industry competencies resulting from past experiences can be used to isolate industry members at least partly from the Schumpeterian process “creative destruction” and thus from the competitive dynamics. With the emergence of digital cameras, traditional mechanical film cameras have gradually been replaced over the last few years. In 1996 only a few thousand digital cameras were sold, but by 2002 the market had increased to 27.97 million units (IDC, 2003). The rise of digital camera technology was especially spurred by firms with video technology experience and resulted in the market entry of these firms. In other words, the observable changes in the industry characteristics were especially driven by competitive dynamics coming from outside the industry. Nonetheless, empirical results show that the incumbents’ experiences in the traditional camera industry were a major determinant of success in the newly evolving market for digital cameras (Thompson, 2007, 357).

Their competencies, particularly with respect to lens technology and sales organization but also in other areas, such as reputation, could be transferred to this new, uncertain product. Applying existing industry-specific competencies to a situation with new industry characteristics and developing new industry-specific competencies allowed the industry incumbents to sustain superior economic performance despite the competitive dynamics the industry was

facing. At the same time, the industry behavior and resulting new industry-specific competencies changed the industry characteristics once again – this time driven by the incumbents.

Along with these factors and their interrelationships (described in Figure 51), one has to bear in mind that the influence a specific factor has on the sustainability of superior economic performance depends heavily on the chosen performance dimension. Achieving superior economic performance based on accounting-related measures may require very different actions than achieving superior economic performance based on capital market–related measures. Managers, especially, have to be aware of these differences and consider them in the light of their specific goal functions when deciding on strategic actions.

In addition to those areas for future research already discussed, the application of my results for the CAP to company valuation models offers further potential for future research. Such a transfer of the results to the question of company valuation would also reconnect my approach to the roots of the former definitions and applications of the CAP (see Mauboussin & Johnson, 1997). The current dominate company valuation approach, using discounted cash flows (DCF), faces the problem that only a minor part of the calculated value stems from the detailed planning period. Often the terminal value accounts for a significantly higher part of the calculated firm value (Damodaran, 1994, 65f.). Bausch & Pape (2005) recommend applying a three-phase model instead of the commonly applied two-phase model to overcome this problem. In the first phase (5 to 10 years) – the detailed planning period – specific free cash flows are planed for each year (see, e.g., Copeland, Koller, & Murrin, 2007, 273f.). In the second phase – the less detailed planning period – for which it is assumed that the firm can realize superior economic performance, a profile for the free cash flows is modeled. In the third phase – the terminal value period – firms have reached a stable equilibrium in which superior economic performance can no longer be earned.

To model the second phase, both the length of the period and the free cash flow profile have to be determined. As it is assumed that in the third phase firms do not generate superior economic performance any longer, a ramping-down approach seems to be plausible (Damodaran, 1994, 115). However, of course, the specific strategic situation of a firm and the general development of the industry have to be taken into account. The model presented in Figure 51, building on my findings, might offer a framework for assessing the expected profile of free cash flows. Additionally, identifying the performance stratum of firms via a Kolmogorov-Smirnov approach may offer an empirical-based solution for the free cash flow level. The length of the second phase can be determined via the firm-specific CAP.

Based on the assumption for the third phase that superior economic performance will no longer be achieved in this phase and further assuming that in this situation the firm's Economic Value Added (*EVA*) is zero, one can rearrange the formula for calculating the *EVA*:

$$EVA = (ROCE - WACC) \bullet CE$$

$$0 = (ROCE - WACC) \bullet CE$$

$$ROCE = WACC$$

with *ROCE* as the return of capital employed, *WACC* as the weighted average cost of capital, and *CE* as the capital employed. Building on the result that the *ROCE* equals the *WACC* at the beginning of the terminal value period and assuming that the firm will realize the industry average capital turnover (revenues divided by *CE*) at the beginning of the terminal value period, the formula for the calculating the *ROCE* can be rearranged in the following way:

$$ROCE = \frac{NOPAT}{CE}$$

$$ROCE = \frac{NOPAT}{CE} \bullet \frac{Revenues}{Revenues}$$

$$ROCE = \frac{NOPAT}{Revenues} \bullet \frac{CE}{Revenues}$$

$$ROCE = \frac{NOPAT}{Revenues} \bullet Capital\ Turnover_{industry}$$

$$WACC = \frac{NOPAT}{Revenues} \bullet Capital\ Turnover_{industry}$$

$$NOPAT = \frac{WACC}{Capital\ Turnover_{industry}} \bullet Revenues$$

with *NOPAT* as the net operating profit after taxes. Including this result in the perpetuity formula for the terminal value (*TV*) and assuming a growth rate of zero due to the equilibrium state of the firm's performance in the terminal value period, this formula can also be rearranged:

$$TV = \frac{NOPAT}{WACC}$$

$$TV = \frac{WACC}{Capital\ Turnover_{industry}} \bullet \frac{Revenues}{WACC}$$

$$TV = \frac{Revenues}{Capital\ Turnover_{industry}}$$

As a result, the terminal value for the firm can be calculated by dividing the predicted firm revenues at the beginning of the terminal value period by the industry-specific capital turnover.

Including my empirically derived results for the CAP as described above into the three-phase DCF approach should further enrich the model, as the crucial assumption of the model that after the second phase no superior economic performance is achieved by the firm precisely corresponds to my definition of the CAP. The exact quantification of the CAP based on the calculation approach introduced in part three allows us to apply an empirically validated industry or even firm-specific value for the length of the second phase of the three-phase DCF model. Thus, applicators of this DCF approach no longer have to rely on estimations or rules of thumb for setting the length of second phase.

Finally, in addition to those limitations already noted in connection with the individual chapters, further limitations for the presented results and conclusions can result from the chosen scientific approach of empirical research. Empirical studies in particular can be influenced by artifacts (Schmidt, 1992, 1178). Many empirical studies are also confronted with the critique that their results are sample-specific and have only partial value for drawing general conclusions (Woywode, 2004, 30). The meta-analytic results presented in part two are, due to their integrative nature, *per se* less affected by these problems and even overcome some of them – due to the correction of sample error, for example. The very broad sample on which the results presented in parts three and four are based should limit negative influences for the analyses at hand. Additionally, the longitudinal nature of the data set prevents potential problems resulting from time lags between independent and dependent variables and time-based effect differences.

Furthermore, the samples of many empirical studies have a strong survivor bias (Brüderl, Preisendörfer, & Ziegler, 1992, 227), reducing the representativeness of the results. In the calculation of the CAP/IAP and their determinants, I explicitly included firms that left the market during the analyzed period, thus the results are not affected by a survivor bias. In fact, for determining superior economic performance it is crucial to include those firms that leave

the market during the analyzed period in order to fully reflect the performance position of firms within their respective industry and of industries in comparison to other industries.

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